Social Problems in ADHD: Is it a Skills Acquisition or Performance Problem?

Paula A. Aduen, M.A.[1], **Taylor N. Day, B.S.**[2], **Michael J. Kofler, Ph.D.**[2], **Sherelle L. Harmon, M.S.**[2], **Erica L. Wells, M.Ed.**[2], and **Dustin E. Sarver, Ph.D.**[3]

[1]University of Virginia, Curry School of Education

[2]Florida State University, Department of Psychology

[3]University of Mississippi Medical Center, Department of Pediatrics, Center for Advancement of Youth

Abstract

Recent models suggest that social skills training's inefficacy for children with ADHD may be due to target misspecification, such that their social problems reflect inconsistent performance rather than knowledge/skill gaps. No study to date, however, has disentangled social skills acquisition from performance deficits in children with ADHD. Children ages 8–12 with ADHD (*n*=47) and without ADHD (*n*=23) were assessed using the well-validated social behavioral analysis framework to quantify cross-informant social skills acquisition deficits, performance deficits, and strengths. Results provided support for the construct and predictive validities of this Social Skills Improvement System (SSIS) alternate scoring method, including expected magnitude and valence relations with BASC-2 social skills and ADHD symptoms based on both parent and teacher report. Acquisition deficits were relatively rare and idiosyncratic for both the ADHD and Non-ADHD groups, whereas children with ADHD demonstrated cross-informant social performance deficits (*d*=0.82–0.99) on several specific behaviors involving attention to peer directives, emotion regulation, and social reciprocity. Relative to themselves, children with ADHD were perceived by parents and teachers as exhibiting more social strengths than social acquisition deficits; however, they demonstrated significantly fewer social strengths than the Non-ADHD group (*d* = −0.71 to −0.89). These findings are consistent with recent conceptualizations suggesting that social problems in ADHD primarily reflect inconsistent performance rather than a lack of social knowledge/skills. Implications for refining social skills interventions for ADHD are discussed.

ADHD is frequently associated with impaired social functioning (de Boo & Prins, 2007; Huang-Pollock et al., 2009). These social behavioral difficulties begin in childhood for children with ADHD, and continue through adolescence (Bagwell et al., 2001; Kofler et al., 2015) and into adulthood (Friedman et al., 2003). Whereas self-report is generally not suggestive of social problems (Owens et al., 2007), parent and teacher reports are highly consistent with peer-reported perceptions, and reveal higher rates of peer rejection and neglect, fewer friends, and less varied social activities in children with ADHD relative to their neurotypical peers (Bagwell et al., 2001; Flicek, 1992; Heiman, 2005; Hoza et al., 2005). Observational studies are consistent with these reports, and document social performance-based impairments that involve task-unrelated comments and less frequent attention to peers during conversation (Stroes et al., 2003), as well as increased commands and negative responses during peer (Cunningham & Siegel, 1987) and caregiver interactions (Winsler, 1998). Social problems in ADHD occur above and beyond the risk conveyed by co-occurring oppositional-defiant symptoms (Bagwell et al., 2001; Clark et al., 2002), deviant peer associations, parental monitoring, and school climate (Kofler et al., 2015). This pattern of impaired social functioning reflects a critical intervention target (van der Oord et al., 2005), particularly given its association with a host of adverse long-term outcomes including academic failure, delinquent behavior, and substance abuse (Mikami & Hinshaw, 2006).

Interventions for impaired social functioning primarily involve office-based instruction and role playing of key social skills (Pelham & Fabiano, 2008), based on the assumption that these children have not acquired the requisite skills for adept social interactions (Tseng et al., 2014). However, this assumption warrants scrutiny for children with ADHD given conceptualizations of ADHD-related social problems as arising from performance rather than skills acquisition deficits (de Boo & Prins, 2007; Mikami, 2014). Indeed, social skills training is not considered an evidence-based treatment for ADHD given that it fails to improve ADHD-related social functioning (Evans et al., 2014). Thus, the inefficacy of social skills training for ADHD may be due to target misspecification (Antshel & Remer, 2003), such that current social skills treatment focuses on remediating presumed knowledge gaps rather than helping children apply their knowledge in the moment (Mikami et al., 2010).

Evidence supporting the conceptualization of social problems in ADHD as performance-based rather than skills-based includes findings from social skills training studies in which children with ADHD demonstrate appropriate social conduct when prompted (Merrell & Boelter, 2001; Saunders & Chambers, 1996), as well as evidence of improved social interactions with other children and adults while receiving psychostimulant treatment without specific social skills training (de Boo & Prins, 2007). Additional support for this framework is suggested by emerging evidence of improved social performance in children with ADHD when parents (Mikami et al., 2010) and teachers (Mikami et al., 2013) use *in*

vivo strategies to scaffold peer interactions, as well as longitudinal evidence of intact social knowledge across the middle school years for children with ADHD (Kofler et al., 2015).

To date, however, no study has explicitly disentangled social skills acquisition from performance deficits in children with ADHD (Gresham et al., 2010). Two approaches hold promise for informing the skills acquisition vs. performance debate: randomized intervention studies, and social behavioral analysis (Gresham et al., 2010). The first approach would require competing interventions that differentially target acquisition vs. performance deficits; however, this approach has not yet been applied to ADHD-related social problems (Abikoff et al., 2013). This paucity of research is surprising given the implications for treatment development (Frey et al., 2011) and current lack of empirically-supported social skills interventions for ADHD (Evans et al., 2014).

A complementary approach involves applying the social behavioral analysis framework to classify specific, empirically-identified and developmentally expected social behaviors in terms of how frequently children are observed demonstrating them (Gresham et al., 2010). This framework is grounded in social learning principles, and conceptualizes social skills as a group of environmentally learned and controlled behaviors that are the primary determinants of peer status (Frey et al., 2011). In this framework, inappropriate social behaviors are classified as *acquisition deficits* if the child failed to learn the social skills, or has consistent difficulty knowing when to apply the skill (Gresham et al., 2010). Children with acquisition deficits do not display socially appropriate behavior because they do not have the necessary skill repertoire to do so. Conversely, inappropriate social behaviors are classified as *performance deficits* when children possess the learned skills, but do not consistently apply these skills at developmentally appropriate levels. Children with performance deficits are able to perform the social skills under certain conditions (e.g., with scaffolding), or perform them successfully sometimes but not consistently (Gresham et al., 2010).

The critical distinction between acquisition and performance deficits involves emphasis on social skills in terms of *observable* behavior (Gresham et al., 2010), which differentiates it from approaches that focus on declarative social knowledge (Kofler et al., 2015; Leonard et al., 2011) or comprehension (Sibley et al., 2010). This emphasis on procedural skill demonstration is central to the current study's method for classifying behaviors according to the social behavioral analysis framework (Gresham, 2010), which defines social acquisition deficits, performance deficits, and strengths based on the frequency with which specific, empirically-identified behaviors are demonstrated. The framework places additional emphasis on the perceived importance of the behavior, that is, how critical the social skill is to the environment in which it is observed (Gresham et al., 2010). Previous research supports the reliability and validity of this framework for analyzing parent- and teacher-reported social behaviors in preschool (Frey et al., 2011) and school-aged children (Gresham et al., 2010), both in terms of classifying social behaviors and differentially linking acquisition and performance deficits with specific intervention strategies (Frey et al., 2011).

The current study is the first to systematically differentiate skills acquisition from performance problems in children with ADHD, using the same item-level algorithms and

norm-referenced social behavioral inventories used by Gresham and colleagues (2010; Frey et al., 2011). This alternative scoring method is implemented in the Social Skills Improvement System (SSIS), a widely-used, well-established, and norm-referenced measure of social skills developed based on the social behavioral analysis framework (Gresham et al., 2010). However, despite demonstrated utility in community samples (Frey et al., 2011; Gresham et al., 2010), to our knowledge this method of differentiating acquisition and performance deficits has not been previously applied in a clinical sample. Therefore, the first aim of the current study was to assess the construct and predictive validities of this SSIS alternate scoring method in a clinical sample. We hypothesized that the Gresham et al. (2010) social behavioral analysis framework would show acceptable validity in a sample of children with and without ADHD. Specifically, we expected SSIS acquisition and performance deficits would correlate negatively, and strengths correlate positively, with norm-referenced Behavior Assessment System for Children – Second Edition (BASC-2; Reynolds & Kamphaus, 2004) social skills according to both parent and teacher reports (construct validity). We expected the opposite pattern for BASC-2 ADHD symptoms. That is, we expected positive associations with SSIS acquisition and performance deficits, and negative associations with SSIS strengths (predictive validity).

We then applied the multi-informant, item-level social behavioral analysis framework (Gresham et al., 2010) to determine whether ADHD is associated with social skills acquisition vs. performance deficits relative to a Non-ADHD group matched for comorbidities. We expected ADHD to be associated primarily with social performance (Humphreys et al., 2015) rather than acquisition deficits (de Boo & Prins, 2007). Specifically, we expected the ADHD group to exhibit higher levels of social performance deficits than Non-ADHD children based on both parent and teacher report. To the extent that social problems in ADHD are performance-based as hypothesized (de Boo & Prins, 2007), we expected that the ADHD and Non-ADHD groups would not differ significantly with regard to acquisition deficits.

Exploratory analyses of social strengths were included also given our group's broader goal of applying the positive youth development framework (Lerner et al., 2009) to promoting resiliency in children with ADHD. Briefly, positive youth development refers to a strengths-based approach to identifying and promoting youths' personal and social assets as a method for facilitating prosocial growth (Lerner et al., 2009). It differs from traditional, deficit-reduction approaches, and may be a particularly promising framework for facilitating interpersonal functioning among children with ADHD given evidence that these children engage in prosocial behavior at rates indistinguishable from their neurotypical peers (Erhardt & Hinshaw, 1994; Mikami et al., 2007; Ronk et al., 2011). From this perspective, optimal social development for children with ADHD may be facilitated by strengthening their strengths (i.e., engagement in prosocial behavior), in addition to reducing their weaknesses (i.e., engagement in negative behavior; Mikami, 2014). We speculated that a significant proportion of children with ADHD would show cross-informant social strengths. No hypotheses were made regarding which specific behaviors would be identified as strengths due to the paucity of prior strengths-based research with this population.

Method

Participants

The sample comprised 70 children aged 8 to 12 years (*M*=10.19, *SD*=1.31; 25 girls) from the Southeastern U.S., referred through community resources. Psychoeducational evaluations were provided to caregivers. All parents and children gave informed consent and assent, respectively, and we obtained IRB approval prior to data collection. Sample ethnicity was mixed with 53 Caucasian/Non-Hispanic (76%), 7 Hispanic/English-speaking (10%), 3 African American (4%), 4 Asian (6%), and 3 multiracial children (4%).

Group Assignment

All children and their parents participated in a detailed, semi-structured clinical interview using the Kiddie Schedule for Affective Disorders and Schizophrenia for School-Aged Children (K-SADS; Kaufman et al., 1997). The K-SADS (2013 Update) assesses onset, course, duration, severity, and impairment of current and past episodes of psychopathology in children and adolescents based on DSM-5 criteria (APA, 2013). Additional information was collected through parent and teacher ratings from the Behavior Assessment System for Children (BASC-2; Reynolds & Kamphaus, 2004) and Child Symptom Inventory (CSI-IV; Gadow & Sprafkin, 2002).

Children were included in the ADHD group (*N*=47; 34% girls) based on meeting all of the following: (1) DSM-5 ADHD diagnosis by the directing clinical psychologist based on K-SADS; (2) parent ratings ≥1.5 *SD*s on the BASC-2 Attention Problems and/or Hyperactivity scales, or exceeding criterion scores on the parent CSI-IV ADHD-Inattentive and/or ADHD-Hyperactive/Impulsive subscales; and (3) teacher ratings ≥1.5 *SD*s on the BASC-2 Attention Problems and/or Hyperactivity scales, or exceeding criterion scores on the teacher CSI-IV ADHD-Inattentive and/or ADHD-Hyperactive/Impulsive subscales. All children had current impairment based on the K-SADS interview. Twenty ADHD (43%) children were prescribed psychostimulants.

All ADHD subtypes/presentations were eligible given the instability of ADHD subtypes (Valo & Tannock, 2010). Of the 47 children with ADHD, 23 met criteria for Combined (49%), 22 for Inattentive (47%), and 2 for Hyperactive/Impulsive Presentation (4%). To improve generalizability, children with comorbidities were included. Comorbidities reflect clinical consensus best estimates, and included anxiety disorders (15%), depressive disorders (13%), oppositional defiant disorder (11%), and autism spectrum disorder (4%).[1]

The Non-ADHD group comprised 23 consecutive case-control referrals (39% girls) who did not meet ADHD criteria, and included both neurotypical children and children with psychiatric disorders other than ADHD. Diagnoses in this group include anxiety (13%), oppositional defiant (4%), autism spectrum (4%)[1], depressive (4%), and obsessive-compulsive disorders (4%). Neurotypical children (70%) had normal developmental histories and nonclinical parent/teacher ratings, and were recruited via community resources. Non-ADHD disorders were included to control for comorbidities in the ADHD group.

---

[1] The pattern and interpretation of results was unchanged when excluding children with autism spectrum disorder.

Importantly, the ADHD and Non-ADHD groups did not differ in the proportion of children diagnosed with a clinical disorder other than ADHD ($\chi^2[1]$=1.58, p=.21).

Children were excluded if they presented with gross neurological, sensory, or motor impairment; history of seizure disorder, psychosis, or intellectual disability; or non-stimulant medications that could not be withheld for testing.

Social Skills Deficits and Strengths

The Social Skills Improvement System (SSIS; Gresham et al., 2010) includes 46-item parent and teacher forms that assess social functioning relative to age- and gender-based norms (N=4,700; 6–8 week test-retest=.82–.86; α=.95–.97). Informants rate the frequency with which children exhibit each social skill on a 4-point scale (*never*, *seldom*, *often*, *almost always*), and the importance of each social skill on a 3-point scale (*not important*, *important*, *critical*). Importance ratings reflect parent and teacher perceptions and expectations of how critical a specific social skill is to development in a specific context (Frey, Elliott, & Gresham, 2011; Gresham, Elliott, & Kettler, 2010).

Using the SSIS alternative scoring method (Gresham et al., 2010), each SSIS item was coded individually for each child, separately for parent and teacher ratings, into one of three mutually exclusive categories. In the Gresham et al. (2010) framework, *Acquisition Deficits* are operationally defined as any social skill with a frequency rating of 'never' and an importance/belief rating of 'important' or 'critical'. *Performance Deficits* are operationally defined as any social skill with a frequency rating of 'seldom' and an importance rating of 'important' or 'critical.' *Strengths* are defined as any social skill with a frequency rating of 'almost always' and an importance rating of 'important' or 'critical.' Items not meeting the above criteria are considered neither strengths nor weaknesses. Additional precedent and conceptual support for this method can be found in Frey et al. (2011). Primary outcomes were the percentage of items falling into each of these categories, computed individually for each child, separately for parent and teacher ratings. Higher percentages for *Acquisition Deficits* and *Performance Deficits* indicate more perceived social problems; higher percentages for *Strengths* reflect better social functioning.

Notably, this method for differentiating acquisition and performance deficits relies on the assumption that we can infer a child's level of expertise based on how frequently the skill is performed. It is certainly possible that a child has knowledge of a skill despite never demonstrating it, or that they sometimes perform a skill despite insufficient procedural knowledge (e.g., with scaffolding). Further, it is possible that informants' expectations may change based on a child's difficulties (e.g., devaluing the importance of a skill that a child repeatedly struggles to learn). However, as described below, interpretation of results was unchanged with or without inclusion of the skill importance criterion.

The current framework has been previously validated in both pre-school (Frey et al., 2011) and school-aged children (Gresham et al., 2010) and is the first to incorporate multi-informant behavioral ratings to systematically differentiate skills acquisition from performance deficits in children. However, to our knowledge the validity of this framework has not been tested in a clinical sample. Therefore, the current study's first aim was to assess

its construct and predictive validities as a prerequisite for drawing conclusions regarding social functioning in ADHD.

Behavior Assessment System for Children-Second Edition (BASC-2)

The BASC-2 (Reynolds & Kamphaus, 2004) parent and teacher forms are 160- and 139-item scales, respectively, that assess internalizing and externalizing behavior problems in children ages 2–21. Raw scores are converted to age- and gender-specific T-scores based on the national standardization sample ($N = 1,800$ per form). The parent and teacher Social Skills subscales each contain 9 items that index children's peer/social functioning (6-week test-retest = .84–.86; α = .87–.92). Parent and teacher social skills composite scores were used to probe the construct validity of the SSIS acquisition, performance, and strength estimates described above. Higher scores on the BASC-2 reflect better social functioning.

Intellectual Functioning (FSIQ)

All children were administered the Wechsler Abbreviated Scales of Intelligence-Second Edition (WASI-II; Wechsler, 2011; $n = 35$), WISC-IV (Wechsler, 2003; $n = 2$), or WISC-V (Wechsler, 2014; $n = 33$) to obtain an overall estimate of intellectual functioning.

Socioeconomic Status (SES)

Hollingshead (1975) SES was estimated based on caregiver(s)' education and occupation.

Data Analysis Overview

Two sets of analyses were conducted to inform the debate regarding the nature of social problems in ADHD. In the first set (Tier I), we probed the construct and predictive validities of the Gresham et al. (2010) social behavioral analysis framework by comparing SSIS acquisition deficits, performance deficits, and strengths estimates to each other and to norm-referenced estimates of social skills (construct validity) and ADHD symptoms (predictive validity) from the BASC-2 parent and teacher scales. Tier II examined ADHD vs. Non-ADHD between-group differences in acquisition deficits, performance deficits, and strengths. To inform treatment development, these analyses were complemented by item-level examination of base rates for specific social behaviors identified as acquisition deficits, performance deficits, and strengths for the ADHD and Non-ADHD groups. Sensitivity analyses were added by omitting the Gresham et al. (2010) importance criteria and reclassifying each item for each child based on frequency only. The Tier II analyses were then repeated to inform the extent to which the findings were affected by parent and teacher perceptions regarding skill importance.

Results

Preliminary Analyses

All variables were screened for univariate/multivariate outliers and tested against $p<.001$. Acquisition and performance estimates for one ADHD child were winsorized relative to the ADHD group as recommended (Tabachnick & Fidell, 2007). Parent and teacher ADHD ratings were higher for the ADHD relative to Non-ADHD group as expected (Table 1).

Construct and Predictive Validity

Construct validity—As shown in Table 2, SSIS acquisition deficits, performance deficits, and strengths showed the expected correspondence with each other based on both parent and teacher report. Specifically, there were significant positive correlations between acquisition and performance deficits for both parent and teacher report, $r= .36–.46$, $p<.05$, and significant negative associations between social strengths and both deficit estimates for parent and teacher report, $r= −.25$ to $−.78$, $p<.05$.

The SSIS estimates also showed the expected correspondence with BASC-2 social skills T-scores, such that acquisition and performance deficits were negatively associated with social skills, and strengths were positively associated with social skills. Specifically, better-developed social skills on the BASC-2 were related to greater SSIS social strengths ($r= .48–.57$, $p<.0005$), fewer SSIS acquisition deficits ($r= −.25$ to $−.45$, $p<.05$), and fewer SSIS performance deficits ($r= −.30$ to $−.56$, $p<.01$) for both parent and teacher report.

Predictive validity—The SSIS estimates showed the expected magnitude and valence relations with BASC-2 attention problems and hyperactivity problems: SSIS acquisition ($r=.27–.29$, $p<.05$) and performance ($r=.26–.57$, $p<.05$) deficits were positively associated with BASC-2 ADHD symptoms, whereas SSIS strengths were negatively associated with BASC-2 ADHD symptoms ($r= −.26$ to $−.48$, $p<.05$). The association between teacher SSIS acquisition deficits and BASC-2 hyperactivity was the only non-significant finding ($r=.16$, $p=.19$) (Table 2).

Demographic associations—Negative associations between age and acquisition deficits failed to reach two-tailed significance in the parent ($r= −.23$, $p= .059$) and teacher ($r= −.21$, $p= .081$) models. Children from lower SES families were rated by caregivers ($r=−.25$, $p<.05$) but not teachers ($r=.04$, ns) as exhibiting more social acquisition deficits. Further, the associations between IQ and social skills as assessed by the SSIS also failed to reach significance ($r=.25$, ns). For comparison purposes, BASC-2 social skills were not associated significantly with age, SES, or FSIQ (Table 2).

Social Skills Acquisition vs. Performance Deficits in ADHD

Taken together, the Tier I findings provided support for the construct and predictive validities of the Gresham et al. (2010) framework for differentiating among social acquisition deficits, performance deficits, and strengths. In Tier II, we applied this framework to characterize the nature of social problems in ADHD. The ADHD and Non-ADHD groups did not differ in age ($p=.57$), FSIQ ($p=.82$), SES ($p=.41$), or gender ($p=.55$); we therefore report simple model results with no covariates.

Acquisition deficits—Acquisition deficits were relatively rare and idiosyncratic for both groups. In the context of low base rates for both groups, teachers ($d=0.84$, $p<.01$) but not parents ($d=0.19$, $p=.46$) rated children with ADHD as having more acquisition deficits than children without ADHD (Table 1). This pattern corresponded to, on average, 5.3% of teacher items (range=0.0–17.0% per child) and 4.3% of parent items (range=0.0–29.0%) being rated as having acquisition deficits for children in the ADHD group, relative to 1.0%

(teacher; range=0.0–10.9%) and 2.9% (parent; range=0.0–19.6%) for the Non-ADHD group. Fewer than 15% of children with ADHD exhibited cross-informant acquisition deficits on any specific social behavior assessed by the SSIS (Table 3a).

Performance deficits—Teachers (*d*=0.99, *p*<.001) and parents (*d*=0.82, *p*<.01) rated children with ADHD as exhibiting large magnitude performance deficits (Table 1). Specifically, 32.1% of teacher items (range=0.0–67.4%) and 33.7% of parent items (range=6.5–67.4%) were rated as performance deficits for children in the ADHD group, on average, relative to 16.2% (teacher; range=0.0–52.2%) and 20.7% (parent; range=0.0–56.5%) for the Non-ADHD group. Parents and teachers rated more than half of children with ADHD as inconsistently performing two social behaviors, both of which are core ADHD symptoms applied to peer interactions (attending to instructions, following directions; Table 3b). Over 33% of children with ADHD were rated by both informants as inconsistently performing eight additional social skills related to emotion regulation (calmly accepting criticism, staying calm when disagreeing), social norms (following household/ classroom rules, behaving well when unsupervised), and social reciprocity (compromising, taking turns when speaking, taking responsibility for actions).

Social strengths—Children with ADHD were rated by teachers (*d*=−0.71, *p*<.01) and parents (*d*=−0.89, *p*<.001) as exhibiting significantly fewer social strengths than children without ADHD (Table 1). On average, 15.0% of teacher items (range=0.0–67.4%) and 15.1% of parent items (range=0.0–50.0%) were rated as strengths for children in the ADHD group, relative to 29.9% (teacher; range=0.0–82.6%) and 32.9% (parent; range=2.2–89.1%) for the Non-ADHD group. Notably, a substantial minority of children with ADHD exhibited cross-informant strengths on three social behaviors (expressing feelings when wronged, thanking others, initiating peer conversations; Table 3c).

Sensitivity Analyses

To probe the extent to which results were affected by variation in informant perceptions of skill importance, we departed from the Gresham et al. (2010) approach and recomputed each child's acquisition, performance, and strength estimates based on frequency ratings only (i.e., omitting SSIS importance ratings). The magnitude and interpretation of between-group differences were highly consistent (all Cohen's *d* effect sizes unchanged within ±0.09), suggesting that skill importance was not viewed systematically differently for children with vs. without ADHD.

Discussion

The current study was the first to apply the social behavioral analysis framework (Gresham et al., 2010) to characterize the nature of social problems in ADHD. Because this approach had not been previously applied to clinical samples, we first sought to test its construct and predictive validities. The predicted relations were found among SSIS acquisition deficits, performance deficits, and strengths. Moreover, SSIS deficits and strengths showed the expected relations with another well-validated measure of social skills based on both parent and teacher report (BASC-2). Collectively, these findings support the construct validity of

the social behavioral analysis framework in a sample of children with and without ADHD. Further, the SSIS estimates showed relations of the expected magnitude and valence with BASC-2 inattention and hyperactivity symptoms, with one exception. These results are consistent with previous studies of community samples (Frey et al., 2011; Gresham et al., 2010), and extend these findings by providing evidence of predictive validity in a clinical child sample for whom social problems are a key area of functional impairment (de Boo & Prins, 2007).

Social Skills Acquisition vs. Performance Deficits in ADHD

Of primary interest, the current study examined the magnitude and frequency of social skills acquisition deficits, performance deficits, and strengths among children with and without ADHD. Our results were highly consistent with prior studies detailing global social problems in ADHD (de Boo & Prins, 2007), and revealed that parents and teachers perceive children with ADHD as exhibiting more social performance problems than children without ADHD (d=0.82 to 0.99). In contrast, acquisition deficits were relatively rare and idiosyncratic. Within the context of low base rates, acquisition deficits were detected for the ADHD group based on teacher report (d=0.84) but not parent report (d=0.19, *ns*). This discrepancy suggests that parents and teachers may have different behavioral expectations for prosocial peer relationships (Lane et al., 2004), and/or view children's social behaviors in different contexts (e.g., large groups vs. playdates). Recent evidence suggests that teachers may be better reporters of functional impairments than parents (Langberg et al., 2013). At the same time, inspection of the item-level data indicates that no SSIS-assessed social behavior was *reliably* identified as absent among children in the ADHD group (Table 3a). These findings indicate that ADHD does not systematically interfere with the acquisition of any specific social behavior (de Boo & Prins, 2007). Instead, these estimates of acquisition deficits reflect, on average, only two undeveloped social behaviors per child with ADHD based on teacher report and one undeveloped social behavior for every two children with ADHD according to parent report. Combined with their large magnitude performance deficits, these findings indicate that most children with ADHD have learned age-expected social skills, but fail to consistently perform them at home and school (de Boo & Prins, 2007).

Ten of the 38 social skills included on both the parent and teacher forms were reliably identified as social performance deficits for a substantial minority of the ADHD group. Inspection of these behaviors suggests that they primarily reflect difficulties with emotion regulation, compliance with social norms, and social reciprocity (Table 3b). This pattern of performance-based impairments is consistent with previous findings of ADHD-related deficits in emotion regulation (Bunford et al., 2015b; Graziano & Garcia, 2016) and may help explain the inefficacy of social skills training for ADHD (Evans et al., 2014). That is, CBT-based social skills training may be unnecessary to the extent that children with ADHD already possess these skills (de Boo & Prins, 2007; Mikami, 2014). Instead, the current findings lend conceptual support for emerging interventions that scaffold peer interactions via parent- and teacher-implemented *in vivo* strategies (e.g., identifying commonalities and facilitating peer interactions, modeling positive regard for the child with ADHD, shaping desired social skills; Mikami et al., 2010, 2013). This conceptualization is supported also by

findings from social skills training studies in which children with ADHD demonstrate appropriate social conduct when prompted (Merrell & Boelter, 2001; Saunders & Chambers, 1996), evidence of impaired social behavior despite intact social declarative knowledge (Kofler et al., 2015), and improved social interactions while receiving psychostimulant treatment without specific social skills training (de Boo & Prins, 2007).

Heterogeneity in ADHD-Related Social Behavior

Although the ADHD group demonstrated large magnitude performance deficits, identifying the specific behaviors driving these impairments was considerably more challenging. To wit, parent-teacher agreement was relatively modest (r=.21–.28), and social performance deficits showed only moderate continuity with ADHD symptoms (r=.26–.57). Item-level analysis indicated that none of the assessed social behaviors were impaired across settings for all children with ADHD, and only two of these behaviors were identified in at least half of the ADHD sample. Both of these behaviors reflect core ADHD symptoms applied to peer interactions (attending to instructions, following directions), a finding consistent with the moderate continuity between social performance deficits and ADHD symptoms (do Boo & Prins, 2007). In terms of treatment targeting, an additional eight social behaviors were present across settings for 33%–49% of the ADHD group (described above). These findings are consistent with previous evidence indicating substantial heterogeneity in social skills deficits among children with ADHD (Kofler et al., 2016), and extend these findings by indicating that this heterogeneity extends to the individual symptom level. Given this heterogeneity, and the idiosyncratic nature of acquisition deficits in ADHD, we hypothesize that treatment approaches will be maximally effective if they focus on *in vivo* performance (Mikami et al., 2010), while training specific knowledge gaps as they are identified. Such approaches would presumably be more responsive to the individual social weaknesses of children as they would be tailored to the changing context and demands of various social situations.

Interestingly, while children with ADHD displayed fewer overall social strengths (d=−0.71 to −0.89) than their non-ADHD peers, we detected a subgroup that consistently expressed their feelings, thanked others, and initiated peer conversations. At the same time, this subgroup included only approximately 25% of the ADHD sample, a finding that further emphasizes the heterogeneous presentation of social skills within ADHD (Huang-Pollock et al., 2009). Nonetheless, at the group level, children with ADHD demonstrated more social strengths than acquisition deficits. Thus, our findings provide evidence against globally attributing ADHD-related social problems to a lack of social knowledge (de Boo & Prins, 2007) and instead indicate that deficits are performance-based and considerably variable from child to child, with some children with ADHD displaying significant social strengths. Further research into processes and characteristics that contribute to the strengths seen in this subgroup might lend insight into novel ways to improve existing treatment approaches within a positive youth development framework (Lerner et al., 2009).

Future Directions

Our finding that ADHD is primarily associated with performance rather than acquisition deficits, combined with the substantial between-child heterogeneity in social behavioral

profiles and relatively modest social skills/ADHD symptom associations, suggests that we need to look beyond symptoms of inattention and hyperactivity/impulsivity to elucidate the mechanisms and processes underlying *in vivo* social performance deficits in ADHD (Bunford et al., 2014). Two related lines of inquiry have shown promise, and have implicated social-cognitive impairments (Wheeler et al., 2000; Melnick & Hinshaw, 1996; Sibley et al., 2010) and executive dysfunction (Bunford et al., 2014; Tseng & Gau, 2013) as candidate mechanisms linking ADHD with social impairments. However, some evidence suggests that social cognitive problem-solving skills may be intact in ADHD and fail to mediate the longitudinal association between ADHD and social problems (Kofler et al., 2015). More critically for the current discussion, neither line of inquiry has probed for differential prediction as a function of the social learning mechanisms identified herein. It seems likely that executive dysfunction may be important for both skills acquisition and performance due to its role as a gateway between the environment and long-term memory (Baddeley, 2007). However, the extent to which specific executive functions support skills acquisition vs. performance remains an unknown yet important area of future inquiry.

Limitations

The current study is the first to apply the social behavioral analysis framework to understand social problems in ADHD. Several caveats merit consideration. Parents and teachers provide reliable, ecologically valid data on children's social functioning, but generalizability is limited by biases (e.g., negative halo, expectancy). Our method for differentiating acquisition and performance deficits relies on the assumption that we can infer a child's knowledge of a skill based on how frequently the child performs that skill. This approach seemed reasonable given our conceptualization of social skills as procedural rather than declarative (Gresham et al., 2010). However, there may be degrees of skill development rather than the dichotomous present/absent operationalization used herein; it remains possible that children with ADHD demonstrate less refined/nuanced social knowledge despite generally intact declarative knowledge. Future work would also benefit from more direct assessment of social knowledge (Kofler et al., 2015) as an additional means of assessing social skills acquisition, as well as consideration of peer learning histories, expectancies, and other socio-contextual factors that reciprocally influence children's social behavior (Mikami, 2014). Ultimately, randomized clinical trials that compare skills-based with performance-based training are likely to provide the most definitive evidence (cf. Abikoff et al., 2013 for an exemplar of this approach applied to ADHD-related organizational skills deficits).

Further, the low base rates for acquisition deficits in our sample may be related to our age inclusion criteria (ages 8–12). Future work that includes younger children with ADHD is needed to determine whether different social learning mechanisms contribute to social problems across development. More generally, the low base rates of social skills acquisition deficits in this and previous studies (Gresham et al., 2010) may suggest that this conceptualization of deficits is too stringent and may not apply to most children. Our study emphasized generalizability by including an ADHD sample with common comorbidities and recruiting a non-ADHD comparison group matched for the number of such disorders. However, this improved external validity may have come at the expense of internal validity,

and as such future work is needed to determine how more 'pure' ADHD samples compare to non-disordered children. Finally, replication with larger samples is needed to determine whether social acquisition and performance deficits in ADHD vary as a function of specific socio-demographic factors (e.g., gender).

Clinical and Research Implications

Taken together, the current study adds to a growing evidence base indicating that social problems are a key area of impairment among children with ADHD (de Boo & Prins, 2007), and provides evidence that these impairments primarily reflect in-the-moment performance deficits rather than missing knowledge or skills. For treatment development, the current study identified specific social behaviors that may merit *in vivo*, behaviorally-based intervention (Mikami et al., 2010) as opposed to knowledge gaps that would require skills-based instruction. Finally, parents and teachers identified more social strengths than acquisition deficits in ADHD, suggesting that optimal outcomes may be obtained by remediating difficulties while simultaneously reinforcing and building upon strengths (Lerner et al., 2009).

Acknowledgments

References

Abikoff H, Gallagher R, Wells KC, Murray DW, … Petkova E. Remediating organizational functioning in children with ADHD: Immediate and long-term effects from a randomized controlled trial. Journal of Consulting and Clinical Psychology. 2013; 81:113–128.

Antshel KM, Remer R. Social skills training in children with ADHD: A randomized-controlled clinical trial. Journal of Clinical Child and Adolescent Psychology. 2003; 32:153–165. [PubMed: 12611031]

Baddeley, A. Working memory, thought, and action. Vol. 45. OUP Oxford; 2007.

Bagwell CL, Molina BSG, Pelham WE, Hoza B. Attention-deficit hyperactivity disorder and problems in peer relations: Predictions from childhood to adolescence. Journal of the American Academy of Child and Adolescent Psychiatry. 2001; 40:1285–1292. [PubMed: 11699802]

Bunford N, Brandt NE, Golden C, Dykstra JB, … Owens JS. ADHD symptoms mediate the association between deficits in executive functioning and social impairment in children. Journal of Abnormal Child Psychology. 2015a; 43:133–147.

Bunford N, Evans SW, Wymbs F. ADHD and emotion dysregulation among children and adolescents. Clinical child and family psychology review. 2015b; 18(3):185–217.

Clark C, Prior M, Kinsella G. The relationship between executive function abilities, adaptive behavior, and academic achievement in children with externalizing behavior problems. Journal of Child Psychology and Psychiatry. 2002; 43:107–112.

Cunningham CE, Siegel LS. Peer interactions of normal and attention-deficit-disordered boys during free-play, cooperative task, and simulated classroom situations. Journal of Abnormal Child Psychology. 1987; 15:247–268. [PubMed: 3611523]

deBoo GM, Prins PJ. Social incompetence in children with ADHD: Possible moderators and mediators in social-skills training. Clinical Psychology Review. 2007; 27:78–97.

Erhardt D, Hinshaw SP. Initial sociometric impressions of ADHD and comparison boys: Predictions form social behaviors and from nonbehavioral variables. Journal of Consulting and Clinical Psychology. 1994; 62(4):833–842. [PubMed: 7962888]

Evans SW, Owens JS, Bunford N. Evidence-based psychosocial treatments for children and adolescents with ADHD. Journal of Clinical Child & Adolescent Psychology. 2014; 43:527–551.

Flicek M. Social status of boys with academic problems and attention-deficit hyperactivity disorder. Journal of Abnormal Child Psychology. 1992; 20:353–366. [PubMed: 1527277]

Frey JR, Elliott SN, Gresham FM. Preschoolers' social skills: Advances in assessment for intervention using social behavior ratings. School mental health. 2011; 3(4):179–190.

Friedman SR, Rapport LJ, Lumley M, Tzelepis A, Stettner L, Kakaati L. Aspects of social and emotional competence in adult attention deficit/hyperactivity disorder. Neuropsychology. 2003; 17:50–58. [PubMed: 12597073]

Gadow, KD., Sprafkin, JN. Child Symptom Inventory 4 (CSI-4): Screening and norms manual. Stony Brook, NY: Checkmate Plus; 2002.

Graziano PA, Garcia A. ADHD and children's emotion dysregulation: A meta-analysis. Clinical psychology review. 2016; 46:106–123. [PubMed: 27180913]

Gresham FM, Elliott SN. Social skills deficits as a primary learning disability. Journal of Learning Disabilities. 1989; 22:120–124. [PubMed: 2915191]

Gresham FM, Elliott SN, Kettler RJ. Base rates of social skills acquisition/ performance deficits, strengths, and problem behaviors: An analysis of the Social Skills Improvement System-Rating Scales. Psychological Assessment. 2010; 22:809–815. [PubMed: 20804259]

Heiman T. An examination of peer relationships of children with and without attention deficit hyperactivity disorder. School Psychology International. 2005; 26:330–339.

Hollingshead, AB. Unpublished working paper. Department of Sociology, Yale University; 1975. Four factor index of social status.

Hoza B, Mrug S, Gerdes AC, Hinshaw SP, Bukowski WM, Gold JA, … Arnold LE. What aspects of peer relationships are impaired in children with attention-deficit/hyperactivity disorder? Journal of Consulting and Clinical Psychology. 2005; 73(3):411.

Huang-Pollock CL, Mikami AY, Pfiffner L, McBurnett K. Can executive functions explain relation between ADHD and social adjustment? Journal of Abnormal Child Psychology. 2009; 37:679–691. [PubMed: 19184400]

Humphreys KL, Galán CA, Tottenham N, Lee SS. Impaired social decision-making mediates the association between ADHD and social problems. Journal of Abnormal Child Psychology. 2016; 44:1023–1032. [PubMed: 26486935]

Kaufman J, Birmaher B, Brent D, Rao U, Flynn C, Moreci P, et al. Schedule for affective disorders and schizophrenia for school-age children-present and lifetime version (K-SADS-PL): Initial reliability and validity data. Journal of the American Academy of Child and Adolescent Psychiatry. 1997; 36:980–988. [PubMed: 9204677]

Kofler MJ, Larsen R, Sarver DE, Tolan PH. Developmental trajectories of aggression, prosocial behavior, and social–cognitive problem solving in emerging adolescents with clinically elevated attention-deficit/hyperactivity disorder symptoms. Journal of Abnormal Psychology. 2015; 124(4):1027. [PubMed: 26595479]

Kofler MJ, Rapport MD, Bolden J, Sarver DE, Raiker JS, Alderson RM. Working memory deficits and social problems in children with ADHD. Journal of Abnormal Child Psychology. 2011; 39:805–817. [PubMed: 21468668]

Kofler MJ, Sarver DE, Spiegel JA, Day TN, Harmon SL, Wells EL. Heterogeneity in ADHD: Neurocognitive predictors of peer, family, and academic functioning. Child Neuropsychology. 2016:1–27.

Lane KL, Givner CC, Pierson MR. Teacher expectations of student behavior social skills necessary for success in elementary school classrooms. The Journal of Special Education. 2004; 38(2):104–110.

Langberg JM, Dvorsky MR, Evans SW. What specific facets of executive function are associated with academic functioning in youth with ADHD? Journal of Abnormal Child Psychology. 2013; 41:1145–1159. [PubMed: 23640285]

Leonard MA, Milich R, Lorch EP. The role of pragmatic language use in mediating the relation between hyperactivity and inattention and social skills problems. Journal of Speech, Language, and Hearing Research. 2011; 54(2):567–579. [PubMed: 20719870]

Lerner, JV., Phelps, E., Forman, Y., Bowers, EP. Positive Youth Development. In: Lerner, RM., Steinberg, L., editors. Handbook of Adolescent Psychology, Volume 1: Individual Bases of Adolescent Development. Vol. 1. John Wiley & Sons; p. 524-558.

Melnick SM, Hinshaw SP. What they want and what they get: The social goals of boys with ADHD and comparison boys. Journal of Abnormal Child Psychology. 1996; 24(2):169–185. [PubMed: 8743243]

Merrell KW, Boelter E. An investigation of relationships between social behavior and ADHD in children and youth. Journal of Emotional and Behavioral Disorders. 2001; 9(4):260–269.

Mikami, AY. Social Skills Training for Youth with ADHD. In: Barkley, RA., editor. Attention-Deficit Hyperactivity Disorder: A handbook for diagnosis and treatment. 4. New York, NY: Guilford Press; 2014. p. 569-595.

Mikami AY, Griggs MS, Lerner MD, Emeh CC, Reuland MM, Jack A, Anthony MR. A randomized trial of a classroom intervention to increase peers' social inclusion of children with attention-deficit/hyperactivity disorder. Journal of consulting and clinical psychology. 2013; 81(1):100–112. [PubMed: 22866680]

Mikami AY, Hinshaw SP. Resilient adolescent adjustment among girls: Buffers of childhood peer rejection and attention-deficit/hyperactivity disorder. Journal of Abnormal Child Psychology. 2006; 34:825–839. [PubMed: 17051436]

Mikami AY, Huang-Pollock CL, Pfiffner LJ, McBurnett K, Hangai D. Social skills differences among attention-deficit/hyperactivity disorder types in a chat room assessment task. Journal of Abnormal Child Psychology. 2007; 35(4):509–521. [PubMed: 17354064]

Mikami AY, Lerner MD, Griggs MS, McGrath A, Calhoun CD. Parental influence on children with ADHD. Journal of Abnormal Child Psychology. 2010; 38:737–749. [PubMed: 20339911]

Owens JS, Goldfine ME, Evangelista NM, Hoza B, Kaiser NM. A critical review of self-perceptions and the positive illusory bias in children with ADHD. Clinical Child and Family Psychology Review. 2007; 10(4):335–351. [PubMed: 17902055]

Pelham WE Jr, Fabiano GA. Evidence-based psychosocial treatments for attention-deficit/hyperactivity disorder. Journal of Clinical Child & Adolescent Psychology. 2008; 37(1):184–214.

Reynolds, CR., Kamphaus, RW. BASC-2: Behavior Assessment System for Children: Second Edition, manual. Bloomington, MN: Pearson; 2004.

Ronk MJ, Hund AM, Landau S. Assessment of social competence of boys with attention-deficit/hyperactivity disorder: Problematic peer entry, host responses, and evaluations. Journal of abnormal child psychology. 2011; 39(6):829–840. [PubMed: 21468667]

Saunders B, Chambers SM. A review of the literature on ADHD children: Peer interactions and collaborative learning. Psychology in the Schools. 1996; 33:333–340.

Sibley MH, Pelham WE Jr, Molina BS, Gnagy EM, Waxmonsky JG, Waschbusch DA, … Kuriyan AB. When diagnosing ADHD in young adults emphasize informant reports, DSM items, and impairment. Journal of Consulting and Clinical Psychology. 2012; 80(6):1052.

Stroes A, Alberts E, van der Meere J. Boys with ADHD in social interaction with a nonfamiliar adult: An observational study. Journal of the American Academy of Child and Adolescent Psychiatry. 2003; 42:295–302. [PubMed: 12595782]

Tabachnick, BG., Fidell, LS. Using multivariate statistics. 5. Needham Heights, MA: Allyn & Bacon; 2007.

Tseng WL, Kawabata Y, Gau SSF, Crick NR. Symptoms of ADHD and peer functioning: A transactional model of development. Journal of Abnormal Child Psychology. 2014; 42:1353–1365. [PubMed: 24830516]

van der Oord S, van der Meulen EM, Prins PJM, Oosterlaan J, Buitelaar JK, Emmelkamp PMG. A psychometric evaluation of the social skills rating system in children with attention deficit hyperactivity disorder. Behaviour Research and Therapy. 2005; 43:733–746. [PubMed: 15890166]

Wheeler Maedgen J, Carlson CL. Social functioning and emotional regulation in the attention deficit hyperactivity disorder subtypes. Journal of clinical child psychology. 2000; 29(1):30–42.

Winsler A. Parent-child interaction and private speech in boys with ADHD. Applied Developmental Science. 1998; 2:17–39.

Valo S, Tannock R. Diagnostic instability of DSM–IV ADHD subtypes: Effects of informant source, instrumentation, and methods for combining symptom reports. Journal of Clinical Child & Adolescent Psychology. 2010; 39:749–760.

Table 1

Sample and Demographic Variables

Variable	ADHD		Non-ADHD		Cohen's *d*	*p*
	M	*SD*	*M*	*SD*		
N (Boys/Girls)	47 (31/16)		23 (14/9)		--	.55
Age	10.13	1.26	10.35	1.46	-0.17	.57
SES	50.69	9.76	52.85	10.58	-0.21	.41
FSIQ	106.77	15.50	107.73	8.11	-0.07	.82
BASC-2 Attention Problems (T-score)						
Parent	67.53	7.24	55.91	10.81	1.36	***
Teacher	62.89	8.24	50.04	10.31	1.43	***
BASC-2 Hyperactivity (T-score)						
Parent	71.19	13.33	54.39	12.35	1.29	***
Teacher	60.70	13.53	49.87	10.81	0.85	***
SSIS Social Behavioral Subtypes (% of items endorsed)						
Teacher						
Skill Acquisition Deficits	5.34	6.03	1.04	2.35	0.84	**
Social Performance Deficits	32.13	16.85	16.21	14.45	0.99	***
Social Strengths	14.96	17.22	29.87	27.53	-0.71	**
Parent						
Skill Acquisition Deficits	4.33	7.77	2.93	6.27	0.19	.46
Social Performance Deficits	33.66	15.65	20.72	16.10	0.82	**
Social Strengths	15.11	14.44	32.90	28.15	-0.89	***

Note. BASC-2 = Behavior Assessment System for Children (T-scores); FSIQ = Full Scale Intelligence Quotient (Standard Scores).

*
p < .05,

**
p ≤ .01,

***
p ≤ .001. Non-significant between-group effects shown in grey font.

Table 2

Construct and predictive validity of the Gresham et al. (2010) method for estimating SSIS Acquisition Deficits, Performance Deficits, and Strengths.

		SSIS-ACQ	SSIS-PER	SSIS-STR	BASC-SS	BASC-AP	BASC-HY	AGE	SES	FSIQ
1.	SSIS Acquisition Deficits	*.28 **	.38 ***	-.34 **	-.45 ***	.29 *	.29 *	-.23 †	-.25 *	-.11
2.	SSIS Performance Deficits	.46 ***	*.23* †	-.78 ***	-.56 ***	.57 ***	.27 *	-.002	-.12	-.002
3.	SSIS Strengths	-.25 *	-.68 ***	*.21* †	.57 ***	-.47 ***	-.48 ***	-.15	.04	.02
4.	BASC-2 Social Skills	-.25 *	-.30 **	.48 ***	*.32* **	-.49 ***	-.37 **	.07	.17	.01
5.	BASC-2 Attention Problems	.27 *	.40 **	-.46 ***	-.41 ***	*.47* ***	.73 ***	.03	-.20 †	-.05
6.	BASC-2 Hyperactivity	.16	.26 *	-.26 *	-.30 **	.60 ***	*.39* ***	-.13	-.27 *	.06
7.	Age	-.21 †	-.06	-.01	.19	-.01	-.03	--	.06	-.16
8.	SES	.04	-.21 †	.17	.19	-.15	-.16	.06	--	.04
9.	FSIQ	.02	-.24 †	.25 †	-.01	-.07	-.11	-.16	.04	--

Note: The left/bottom triangle reflects teacher-rated social skills and ADHD symptoms. The right/top triangle reflects parent-rated social skills and ADHD symptoms. The diagonal (***bold/italic font***) reflects the correlation between parent and teacher reports on each SSIS and BASC-2 subscale. SSIS scores reflect percentages of items endorsed. BASC-2 reflect age- and gender-normed T-scores.

ACQ = Acquisition, AP = Attention Problems, BASC-2 = Behavior Assessment System for Children-Second Edition, HY = Hyperactivity, PER = Performance, SS = Social Skills, SSIS = Social Skills Improvement System Rating Scales, STR = Strengths;

† $p \le .10$,

* $p < .05$,

** $p \le .01$,

*** $p \le .001$

Table 3a

Cross-informant social skill acquisition deficits

	Both Informants	Parent Only	Teacher Only
ADHD Group			
50% or more	None	None	None
33% to 49%	None	None	None
25% to 32%	None	None	None
15% to 24%	None	27 (doesn't bother others) 31 (calm when teased)	None
Non-ADHD Group			
50% or more	None	None	None
33% to 49%	None	None	None
25% to 32%	None	None	None
15% to 24%	None	None	5 (asks for adult help)

Note: Frequency subgroupings were selected to match Gresham et al. (2010). Items endorsed by both informants are listed in the lowest frequency category endorsed by either informant, among the 38 of 46 items included on both parent and teacher forms. Item numbers reflect the parent form. Items listed in the Parent Only column were endorsed by teachers for fewer than 15% of children, and vice versa. Item content paraphrased.

Table 3b

Cross-informant social performance deficits

	Both Informants	Parent Only	Teacher Only
ADHD Group			
50% or more	7 (attends to instructions) 17 (follows directions)	None	None
33% to 49%	2 (follows rules) 10 (takes turns speaking) 16 (good unsupervised behavior) 26 (takes responsibility) 27 (doesn't bother others) 34 (calmly accepts criticism) 36 (compromises) 46 (calm when disagreeing)	None	None
25% to 32%	5, 11, 14, 21, 31, 33, 35, 42	None	24, 29
15% to 24%	1, 6, 9, 15, 22, 23, 28, 30, 38, 39, 40, 44, 45	20	4, 13, 29, 25
Non-ADHD Group			
50% or more	None	None	None
33% to 49%	5 (asks for adult help) 25 (questions unfair rules)	None	None
25% to 32%	28, 31, 34, 35	None	None
15% to 24%	1, 7, 27, 33, 36, 44, 45, 46	None	None

Note: Frequency subgroupings were selected to match Gresham et al. (2010). Items endorsed by both informants are listed in the lowest frequency category endorsed by either informant, among the 38 of 46 items included on both parent and teacher forms. Item numbers reflect the parent form. Items listed in the Parent Only column were endorsed by teachers for fewer than 15% of children, and vice versa. Item content paraphrased.

Table 3c

Cross-informant social skill strengths

	Both Informants	Parent Only	Teacher Only
ADHD Group			
50% or more	None	None	None
33% to 49%	None	None	None
25% to 32%	1 (expresses feelings) 4 (thanks others) 19 (initiates peer conversations)	13, 25, 38	2, 14
15% to 24%	11, 20, 22, 23, 24, 29, 30, 40, 45	15, 28	6, 10, 16, 21, 26, 44
Non-ADHD Group			
50% or more	22 (respects others' property) 40 (eye contact when speaking)	None	None
33% to 49%	4 (thanks others) 16 (good unsupervised behavior) 19 (initiates peer conversations) 20 (appropriate gestures) 23 (easily makes friends) 24 (says please) 29 (gets along with peers) 30 (responds well to peer social bids) 44 (reacts appropriately to aggression)	1 (expresses feelings) 28 (comforts others) 33 (introduces self to others) 45 (assertive when treated unfairly)	None
25% to 32%	10, 11, 13, 14, 15, 26, 38, 42	None	7, 36
15% to 24%	2, 6, 9, 17, 21, 27, 35, 39, 46	5, 25, 31	None

Note: Frequency subgroupings were selected to match Gresham et al. (2010). Items endorsed by both informants are listed in the lowest frequency category endorsed by either informant, among the 38 of 46 items included on both parent and teacher forms. Item numbers reflect the parent form. Items listed in the Parent Only column were endorsed by teachers for fewer than 15% of children, and vice versa. Item content paraphrased.