



Published in final edited form as:

J Abnorm Child Psychol. 2017 July ; 45(5): 883–897. doi:10.1007/s10802-016-0217-x.

Factors Associated with Healthy and Impaired Social Functioning in Young Adolescents with ADHD

A. Raisa Ray¹, Steven W. Evans¹, and Joshua M. Langberg²

¹Ohio University

²Virginia Commonwealth University

Abstract

There is variability in the extent to which adolescents with attention-deficit/hyperactivity disorder (ADHD) exhibit social impairment, as the same diagnosis does not necessarily entail impairment in the same area(s) of functioning. The current study entailed a cross-sectional examination of enhancers to healthy social functioning and risk factors to parent- and self-rated social impairment in 324 middle school youth (ages 10–14 years) with ADHD. A series of binary logistic regression analyses were conducted to evaluate a risk-resilience model for social functioning, including testing compensatory (i.e., main; buffering) and protective (i.e., interaction) effects of enhancers in the presence of identified risk factors. Youth conduct problems, youth depression and negative parenting emerged as risk factors. Self-rated social acceptance, activity participation (breadth and intensity) and parent involvement were enhancers of healthy social functioning. Of these enhancers, activity participation (breadth and intensity) and parent involvement showed buffering effects against the negative impact of the risk factors on social functioning. None of the enhancers displayed protective effects. The findings of this study enhance our understanding of the social functioning of young adolescents with ADHD, who comprise an understudied population relative to younger children with similar problems.

Keywords

adolescents; ADHD; social functioning; risk factors; resilience

The combination of peer rejection and attention deficit/hyperactivity disorder (ADHD) is associated with significant risk for many poor outcomes in adolescence (Mikami & Hinshaw, 2006). Fortunately, only about half of the children with ADHD are socially impaired (e.g., MTA Cooperative Group, 1999), leaving many socially healthy (Nijmeijer et al., 2008). Perhaps in an attempt to identify problems that can be treated, most research on the social functioning of youth with ADHD has been focused on detecting risk factors to

Corresponding author: A. Raisa Ray, 200 Porter Hall, 1 Ohio University, Athens, OH, 45701, ap839211@ohio.edu, 1-877-724-4241.

Compliance with Ethical Standards

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent: Informed consent was obtained from all individual participants included in the study.

Conflict of Interest: The authors declare that they have no conflict of interest.

social impairment. Identifying contributors to healthy social functioning can enhance our understanding of social functioning of youth with ADHD (Modesto-Lowe, Yelunina, & Hanjan, 2011). A disconnect between the developmental literature including research on protective factors and the ADHD literature may reflect different conceptualizations of social functioning and may explain the lack of well-established treatments for social impairment associated with ADHD (Evans, Owens, & Bunford, 2014). Our study bridges the collective knowledge from developmental and ADHD research within a risk-resilience framework of social functioning in young adolescents with ADHD.

Socially competent youth exhibit desirable and developmentally appropriate social skills (Rose-Krasnor, 1997) and can apply such skills in a variety of social contexts (Dirks, Treat, & Weersing, 2007). Early adolescence is an important developmental period as youth strive for autonomy (Steinberg, 2001) and challenge differences in expectations and ideas about social conventions (e.g., Collins, 1990). Young adolescents are concerned about peer acceptance and popularity and view their friends as sources of advice and comfort outside their family (Gould & Mazzeo, 1990). Thus, a shift in the roles of peers and parents facilitates and shapes the social functioning of young adolescents. It is perhaps due to these changes in social interactions that many youth struggle with transitioning from childhood to adolescence (Holmbeck, Devine, Wasserman, Schellinger, & Tuminello, 2012).

In addition to the typical challenges of young adolescence, youth with ADHD have difficulties that further compromise their social functioning. Inattention symptoms hinder their ability to learn social skills through observation (e.g., Mrug, Hoza, & Gerdes, 2001) and to notice social cues (Landau & Milich, 1988). Hyperactivity and impulsivity symptoms contribute to an overbearing and uninhibited interaction style and aggression and to resultant negative perceptions by others (e.g., Mrug et al., 2001). The relationship between symptoms and social functioning persists through adolescence, but the symptoms contributing the most to this impairment vary with age (Zoromski, Owens, Evans, & Brady, 2015). For example, in early childhood, not listening and being on the go were the symptoms most strongly related to social impairment, whereas in adolescence, not following through with directions and often interrupting others had the strongest link to impairment. Symptoms of oppositional defiant disorder (ODD) and conduct disorder (CD) are also associated with social impairment (e.g., Graziano, Geffken, & McNamara, 2011). Examinations of the unique contribution of ODD and CD point to either no effect on or an exacerbation of social impairment in youth with ADHD (e.g., Booster, DuPaul, Eiraldi, & Power, 2012). Results concerning the additive impact of internalizing symptoms are mixed (for a review, see Becker, Luebke, & Langberg, 2012). Some findings indicate that symptoms of depression and anxiety are associated with social impairment, beyond ADHD symptoms (Becker, Langberg, Evans, Girio-Herrera, & Vaughn, 2016) or of ADHD and ODD (Mikami, Ransome, & Calhoun, 2011). Other research indicates that, among youth with ADHD, internalizing symptoms or disorders contribute to social impairment only in the presence of additional externalizing disorders such as ODD and CD (e.g., Booster et al., 2012). Given the high rates of comorbidity between ADHD and other disorders, comorbid externalizing and internalizing disorders may be associated with social impairment.

Parent characteristics are also associated with youth social impairment. For example, child social difficulties were associated with high levels of maternal and paternal negative parenting (Kaiser, McBurnett, & Pfiffner, 2011). In a sample of children (ages 6–10) with and without ADHD, findings about the contribution of maternal ADHD symptoms were mixed, indicating a need for further investigation. Although maternal inattentive and hyperactive/impulsive symptoms predicted parent-reported social problems in all children, maternal symptoms of ADHD predicted low prosocial behavior only in children without ADHD (Griggs & Mikami, 2011). Parents who exhibit negative parenting and parents with ADHD may both increase the risk of social impairment in youth.

In contrast to these various risk factors, some characteristics of youth and parents associated with healthy social functioning have been identified in both the ADHD and developmental literature. In a study with typically developing youth, McElhaney, Antonishak, and Allen (2008) found that self-perceived social acceptance at age 13 predicted social success at age 14, regardless of sociometric popularity. Other youth-related factors related to healthy social functioning entail activity participation. Specifically, these factors are: (a) activity intensity, which refers to the amount of time spent by youth in various activities, and (b) activity breadth, which pertains to the variety of activity participation (i.e., the number of activities in which the adolescent engages). Investigators found that participation in a leisure activity was positively related to the number of after-school friends among 14-year-olds (Mahoney & Stattin, 2000) and that participation in school-based extracurricular activities was associated with belonging to a prosocial peer network among high school students (Fredricks & Eccles, 2005). Moreover, both activity breadth and activity intensity were related to stronger interpersonal bonds in 13- to 18-year old youth (Rose-Krasnor, Busseri, Willoughby, & Chalmers, 2006). Thus, self-perceived social acceptance and participation in social activities may counteract some of the risk factors.

Parenting practices may also promote healthy social functioning. Kaiser et al. (2011) found a positive association between positive parenting practices (i.e., composite of parent involvement, positive parenting, and parental warmth) and social skills among youth with ADHD. Among typically developing children, parent involvement predicted improvement in child social skills and reduction in child problem behavior over time (El Nokali, Bachman, & Votruba-Drzal, 2010). Collectively, these results highlight the impact of positive parenting practices on adequate social development in youth with and without ADHD.

Although parenting factors and youth characteristics are associated with healthy social functioning, they have not been evaluated together in a risk resilience model. As a result, some interactive effects serving as buffers or protective factors may exist and highlight how to effectively improve social functioning. Methods for examining these effects have been described in the developmental literature by Masten (2001) and used in studies with girls with and without ADHD by Mikami and Hinshaw (2003, 2006). Mikami and Hinshaw (2003) found that, after controlling for peer rejection, popularity with adults predicted lower levels of aggressive behavior, an effect that was greater for peer-accepted girls than for peer-rejected girls. However, the 2006 study showed that neither popularity with adults, nor engagement in goal-directed play protected against the negative effect of peer rejection on adolescent adjustment, conceptualized as externalizing behavior and other behavioral

concerns. Together, these studies highlight a need for further investigation into factors that may be associated with aspects of healthy and impaired social functioning. Furthermore, to better understand how such factors may inform prevention efforts and intervention development, it will be important to focus research on characteristics and behaviors of the children and their parents. For example, the broad construct of popularity with adults does little to inform intervention development as popularity could be due to a variety of child characteristics and behaviors ranging from physical appearance to an absence of aggressive and disruptive behavior. Identifying the youth and parent characteristics and behaviors that are associated with average or better social functioning for youth with ADHD will generate hypotheses related to prevention or intervention targets for social impairment.

Current study

The goal of this study was to identify factors that distinguish between adolescents with ADHD who have healthy versus impaired social functioning based on parent and self-report. Our study is an investigation of a clinical sample of boys and girls, intended to explore risk and resilience factors as they pertain to adolescents with ADHD. Moreover, the chosen outcome variable is a broad measure of social functioning, as opposed to one that is focused on a subdomain of social functioning or on a related behavior (e.g., aggression). We hypothesized that ADHD, ODD, and CD symptoms, depressive and anxiety symptoms, as well as parent ADHD symptoms and negative parenting will increase the likelihood of social impairment in youth. Conversely, social acceptance, activity participation (breadth and intensity), positive parenting, and parent involvement will increase the likelihood of healthy social functioning. Our second aim was to explore the extent to which characteristics that emerge as enhancers have a compensatory (i.e., buffering, main effects) and/or a protective (i.e., interaction effects) effect on social functioning, in the presence of risk factors. The study was structured around two research questions (RQs), namely: RQ1 - What enhancing and risk factors are associated with membership in a healthy versus impaired social functioning category when: (a) only the parent account of social functioning is considered and (b) only the adolescent account of social functioning is considered? RQ2 - In the presence of risk factors, what enhancing factors show a significant: (a) compensatory effect and (b) protective effect pertaining to social functioning?

Method

Participants

Participants were 324 youth (71.3% male, 77.5% Caucasian) between the ages of 10 to 14 years ($M=12.22$ years), who had a diagnosis of ADHD, Predominantly Inattentive or Combined Type. Adolescents were recruited from nine middle schools in Midwestern United States, within the context of a randomized clinical trial. Evaluations providing data for this study took place between March and August preceding the school year in which participants entered grades six through eight.

Procedures

ADHD diagnoses were determined via parent-report on the Children's Interview for Psychiatric Syndromes (P-ChIPS; Weller, Weller, Rooney, & Fristad, 2009), combined with parent and teacher ratings on the Disruptive Behavior Disorders (DBD) Rating Scale (Pelham, Gnagy, Greenslade, & Milich, 1992) and on the Impairment Rating Scale (IRS; Fabiano et al., 2006). Youth had an IQ of at least 80 or above, estimated using the Wechsler Intelligence Scale for Children – Fourth Edition (Wechsler, 2003) and did not meet diagnostic criteria for pervasive developmental disorder, psychosis, bipolar disorder, or obsessive-compulsive disorder. Details about recruitment and evaluation procedures are described elsewhere (Evans et al., 2016).

Measures – Risk Factors

Disruptive Behavior Disorders (DBD) Rating Scale (Pelham et al., 1992)—The DBD rating scale is a 45-item measure of DSM-IV-TR symptoms of ADHD, ODD and CD. Items are rated on a 4-point scale from 0 (*not at all present*) to 3 (*very much present*). Investigators have replicated the two-factor structure of ADHD symptoms with adolescents (Van Eck, Finney & Evans, 2010). In our study, internal consistency coefficients for parent report were: .86 (inattention), .89 (hyperactivity/impulsivity), .90 (ODD), and .77 (CD). ADHD, ODD and CD severity was determined by summing the scores on the respective items.

The Reynolds Adolescent Depression Scale – second edition (RADS-2; Reynolds, 2002)—The RADS-2 is a 30-item self-report measure of depression severity. Each item is rated on a 4-point scale, from 1 (*almost never*) to 4 (*most of the time*), with higher scores indicating a greater level of depressive symptoms. The RADS-2 had an overall internal consistency of .93 (Reynolds, 2002). In this study, the total score internal consistency was .87.

The Multidimensional Anxiety Scale for Children – long version (MASC; March, 1997)—The MASC is a 39-item self-report measure of anxiety symptoms. The items are rated on a 4-point scale, ranging from 0 (*never true about me*) to 3 (*often true about me*). The MASC demonstrated very good internal consistency ($r = .90$) for the overall instrument (March, Parker, Sullivan, Stallings, & Conners, 1997). In this study, internal consistency for the total score was .91 with coefficients for subscales ranging from .74 to .88.

The Conners' Adult ADHD Rating Scale (CAARS; Conners, Erhardt, & Sparrow, 1999)—The CAARS is a 30-item self-report measure of the presence and severity of ADHD symptoms in adults. The four CAARS subscales (inattention/cognitive problems, hyperactivity/ restlessness, impulsivity/emotional lability, and problems with self-concept) demonstrate both high internal consistency ($\alpha = .86-.92$) and strong test-retest reliability ($r = .80-.91$) over a period of approximately one month (Erhardt, Epstein, Conners, Parker, & Sitarenios, 1999).

The Alabama Parenting Questionnaire (APQ; Shelton, Frick, & Wootton, 1996)

—The APQ is a 42-item parent measure of parenting constructs: (1) positive parenting (e.g., *You reward or give something extra to your child for obeying you or behaving well*), (2) parent involvement (e.g., *You ask your child about his/her day in school; You drive your child to a special activity*), (3) inconsistent discipline (e.g., *You threaten to punish your child and then do not actually punish him/her*), (4) poor monitoring/supervision (e.g., *You don't check that your child comes home at the time she/he was supposed to*), and (5) corporal punishment (e.g., *You slap your child when he/she has done something wrong*). The parent is asked to rate the frequency for which statements are true from 1 (*never*) to 5 (*always*). The APQ yielded reliability coefficients ranging from .40 to .80, in children aged 6 to 13 years (Shelton et al., 1996). In our study, the inconsistent discipline, poor monitoring/supervision, and corporal punishment subscales were used to compute a composite risk factor of negative parenting. The positive parenting (i.e., praising or rewarding good child behavior) and parent involvement (i.e., asking the youth about his/her activities and friends, attending parent events at the school and extra-curricular engagements, and facilitating the youth's access to various activities) subscales were used as enhancing factors. Internal consistency coefficients for these subscales were .73 (negative parenting), .77 (parent involvement), and .80 (positive parenting).

Measures - Enhancing factors

The Self-Perception Profile for Children (SPPC; Harter, 1985)—The SPPC is a 36-item self-report measure capturing youth self-perceptions of scholastic competence, social acceptance, athletic competence, physical appearance, behavioral conduct and global self-worth. Items are scored on a scale from 1 (*low perceived competence*) to 4 (*high perceived competence*). The social acceptance subscale, which was the only one used in this study, reflects the degree to which the adolescent perceives him/herself as popular or accepted by peers (Harter, 1985). The SPPC's internal consistency coefficients for the social acceptance subscale range from .75 to .80 (Harter, 1985). In this study, internal consistency for the social acceptance subscale was .77.

The Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001)—The CBCL is a 118-item parent-reported broadband measure about youth behavior. The CBCL has shown satisfactory internal consistency and 15-day test-retest reliability (Achenbach, 1991). The CBCL was used to compute two measures: (a) activity breadth and (b) activity intensity. *Activity breadth* was determined by calculating the total number of activities in which the youth participates (e.g., sports, hobbies, clubs). *Activity intensity* was computed by adding scores reflecting the amount of time that the youth spends in each reported activity relative to others of the same age, and then dividing that score to the number of activities reported. Answers were assigned scores according to the anchors on the measure: 1 (*less than average*), 2 (*average*), and 3 (*more than average*). *Don't know* responses were coded as missing values.

Measures – Outcome Variables

The Social Skills Improvement System – Rating Scales (SSIS-RS; Gresham & Elliott, 2008)—The SSIS-RS contains three scales: (1) social skills, (2) problem behavior

and (3) academic competence. We only used the social skills scale in this study. Example parent items include: *Takes turns in conversations* and *Uses gestures or body appropriately with others*. Example youth items are: *I am polite when I speak to others* and *I smile or wave at people when I see them*. This 46-item scale assesses communication, cooperation, assertion, responsibility, empathy, engagement, and self-control. In our study, teens with SSIS-social skills standard scores below 85 were considered impaired, and those with SSIS-social skills standard scores of 85 and above were considered socially healthy. This is consistent with the conceptualization of the normal range from the SSIS-RS manual. The SSIS-RS has high internal consistency, at both scale and subscale level, with coefficients of around .80 (Gresham & Elliott, 2008). In our study, reliability for the total social skills scales were .94 (parent report) and .95 (youth report). Furthermore, internal consistency coefficients for the social skills subscales were between .68 and .90 (parent report) and between .77 and .83 (youth report).

Results

Preliminary Analyses

Multicollinearity assumptions of logistic regression were met for most variables¹ (i.e., the proposed enhancing/risk factors correlated with dependent variables and had low or medium correlations with other predictors). Because anxiety did not correlate with the outcome variables (p 's > .05), this risk factor was eliminated from subsequent analyses. Descriptive statistics for independent variables are available in Table 1. Due to possible gender differences in social functioning, the analyses described below were initially conducted controlling for gender. However, given that including gender did not change the results, the findings are presented from analyses without gender. All analyses follow procedures described in Masten (2001).

Enhancing and Risk Factors

To identify enhancing and risk factors associated with two indices of social functioning, a dichotomous dependent variable (i.e., healthy vs. impaired social functioning) was created for both parent and youth SSIS scores from the social skills factor, hereafter noted P-SSIS and Y-SSIS. When considering parent report, 60.5% of adolescents fell in the impaired category and when considering self-report, 32.4% fell in that category. All proposed enhancers and risk factors were used as predictors in two separate sets of logistic regression analyses. Outliers falling at least 3 standard deviations (SDs) away from the regression line were screened for each analysis. When outliers were identified, the analysis was rerun without the outliers. As a rule, results are reported based on analyses without outliers only if the percent of correct classification of cases in the model without outliers was at least 2 percentage points higher than the percent in the model containing outliers (Hair, Black, Babin, & Anderson, 2010).

¹Correlations among enhancers ranged from .03 to .58 and among risk factors ranged from .004 to .70. Medium-sized correlations were expected for parenting variables and the disruptive behavior symptoms, but because different facets of these constructs were of interest in this study, these variables were kept. Multicollinearity is indicated when correlations are in the .80 or .90 range (Field, 2013). In our study, all correlations were under .70 with most of them being lower than .30. Significant correlations between enhancing/risk factors and the social skills variables ranged from .12 to .35.

The enhancer model (see Table 2 - a, b) contained five predictors (parent involvement, positive parenting, youth social acceptance, activity breadth, and activity intensity). The full model was statistically significant for P-SSIS, $\chi^2(5, N = 315) = 24.97, p < .001$ and Y-SSIS, $\chi^2(5, N = 314) = 29.51, p < .001$, indicating that the models distinguished between socially impaired and healthy youth. The full model explained 10.3% of the variance in P-SSIS and 12.5% of the variance in Y-SSIS with 62.9% of cases correctly classified² ($PCC^3 = 69\%$) with P-SSIS⁴ and 70.4% ($PCC = 70.1\%$) with Y-SSIS. Not all considered predictors made a unique significant contribution to the model. Specifically, based on P-SSIS, parent involvement and activity breadth were the only factors associated with membership in the healthy category. Participants with high activity breadth were 1.2 times more likely than those with low activity breadth to be socially healthy. Based on Y-SSIS, parent involvement, youth social acceptance and activity intensity were associated with group membership. Adolescents with high activity intensity were twice more likely than those with low activity intensity to be socially healthy.

The risk model (see Table 2 - c, d) contained six predictors (youth ADHD, ODD and CD severity, youth depressive symptoms, parental ADHD symptoms, and negative parenting). The full model was significant for P-SSIS, $\chi^2(6, N = 308) = 89.34, p < .001$ and Y-SSIS, $\chi^2(6, N = 306) = 52.86, p < .001$, indicating that the models distinguished between impaired and healthy youth. The full model explained 34.1% of the variance in P-SSIS and 22.2% of the variance in Y-SSIS with 71.4% ($PCC = 65.5\%$) of cases correctly classified when using P-SSIS and 71.9% ($PCC = 70.6\%$) when using Y-SSIS. Based on P-SSIS, youth CD symptom severity (hereafter CD severity) and negative parenting were the only characteristics associated with membership in the impaired category. Adolescents with high CD severity were 1.4 times more likely than those with low CD severity to be socially impaired. Based on Y-SSIS, CD severity, depression, and parent ADHD symptoms emerged as predictors of social functioning. Similar to the previous analyses, CD severity emerged as the most important predictor. Adolescents with high CD severity were 1.2 times more likely than those with low CD severity to be socially impaired.

There were mixed results regarding parent ADHD symptoms. Based on P-SSIS, the association between parent symptoms of ADHD and youth social impairment was nonsignificant. Based on Y-SSIS, a small odds ratio value ($OR = 1.036$) indicated that parent ADHD symptoms increase the likelihood of being socially healthy. These results were inconsistent with the hypothesis that parent ADHD symptoms would act as a risk factor to social impairment. Therefore, we did not retain this variable for further analyses.

²In logistic regression the percentage of correct classification of cases is considered the best representation of goodness of fit (Hair et al., 2010).

³The PCC (percentage of correct classification) represents the classification accuracy rate that is 25% greater than chance. The PCC represents the threshold to be met or surpassed by the actual/observed percentage of correct classification of cases in each analysis. With one exception, all analyses in this study fulfilled this criterion.

⁴This is the exception mentioned in the previous footnote. The correct classification of cases in this analysis is 14% above chance, rather than the recommended 25%.

Compensatory and Protective Effects

To identify buffers (i.e., significant main effects of enhancers in the presence of risk factors) and protective factors (i.e., significant enhancer-risk factor interaction effects in the presence of main effects of the risk factor and of the enhancer) to social functioning, we used risk factors and enhancers as predictors of social functioning in one hierarchical logistic regression analysis. Risk factor-enhancer pairs were tested in separate logistic analyses to determine buffering and protective effects. All analyses included screening for outliers.

Hierarchical logistic regression analyses were conducted with the risk factors entered at step 1 and enhancers entered at step 2 (see Table 3). Only factors that were significant predictors of the outcome variable in the analyses above were used for these analyses. Two hierarchical logistic regression analyses were performed (one for P-SSIS and one for Y-SSIS) to assess the association between enhancers and the outcome variables in the presence of risk factors.

The model examining associations related to P-SSIS contained two risk predictors (i.e., CD severity and negative parenting) entered at step 1 and two enhancing predictors (i.e., parent involvement and activity breadth) entered at step 2 (see Table 3a). The full model was significant, $\chi^2(4, N = 321) = 93.91, p < .001$ and explained 34.4% of the variance in P-SSIS and correctly classified 70.7% ($PCC = 65.4\%$) of cases. Notably, in the presence of CD severity, negative parenting, and parent involvement; high activity breadth increased the likelihood of being socially healthy by 1.2 times.

The model examining associations related to Y-SSIS contained two risk predictors (i.e., CD severity, depressive symptoms) entered at step 1 and three enhancing predictors (i.e., parent involvement, youth social acceptance, and activity intensity) entered at step 2 (see Table 3b). The full model was significant, $\chi^2(5, N = 298) = 67.34, p < .001$ and explained 28.4% of the variance in Y-SSIS and correctly classified 73.2% ($PCC = 71\%$) of cases. These results are based on the model without outliers. In the presence of all other risk and enhancing factors in the model, high activity intensity increased the likelihood of being socially healthy by 3.2 times.

Identifying buffers and protective factors to social functioning using risk-enhancer pairs—Factors emerging as significant in the previous set of analyses were used to create pairs of risk and enhancer factors to be tested in the same hierarchical logistic regression (i.e., resilience model), with each of the social functioning variables. The risk factor was entered at step 1, the enhancer was entered at step 2, and the interaction between the risk factor and the enhancer was entered at step 3. A significant main effect (i.e., compensatory effect) of the enhancer (step 2) indicates that the respective enhancer buffers the effect of the risk factor on social functioning (Masten, 2001). A significant interaction (i.e., protective effect; step 3) indicates that the enhancer protects against the effects of the risk factor on social functioning at a higher degree for one level of the risk factor (i.e., high or low) than the other level (Masten, 2001). The following results are grouped by dependent variable. Compensatory (i.e., main; buffering) effects are presented first, followed by protective (i.e., interaction) effects.

Testing risk-enhancer pairs pertaining to P-SSIS—The following two risk-enhancer pairs were constructed: (1) CD severity and activity breadth (noted as CD-breadth); and (2) negative parenting and activity breadth (noted as neg.parent-breadth). At step 2 (see Table 4a), the CD-breadth model was significant, $\chi^2(2, N = 321) = 85.36, p < .001$, explained 31.6% of the variance in P-SSIS and correctly classified 70.7% ($PCC = 65.4\%$) of cases. Activity breadth buffered ($p = .001$) against the effects of CD severity on social functioning and increased the likelihood of being socially healthy by 1.3 times. At step 2 (see Table 4b), the neg.parent-breadth model was also significant, $\chi^2(2, N = 322) = 36.17, p < .001$, explained 14.4% of the variance in P-SSIS and correctly classified 66.1% ($PCC = 65.5\%$) of cases. Activity breadth buffered ($p = .001$) against the effects of negative parenting on social functioning and increased the likelihood of being socially healthy by 1.3 times.

Although both the CD-breadth and the neg.parent-breadth models were significant at step 3 (see Table 4 – c, d), $\chi^2(3, N = 321) = 85.70, p < .001$ and $\chi^2(3, N = 322) = 39.68, p < .001$, the interaction terms tested in these models yielded nonsignificant results. Activity breadth (i.e., the enhancer from both models) did not emerge as a protective factor in any of the P-SSIS analyses.

Testing risk-enhancer pairs pertaining to Y-SSIS—Four risk-enhancer pairs were constructed, as follows: (1) CD severity and activity intensity (noted as CD-intensity); (2) CD severity and parent involvement (noted as CD-involvement); (3) youth depressive symptoms and activity intensity (noted as RADS-intensity); and (4) youth depressive symptoms and parent involvement (noted as RADS-involvement). At step 2 (see Table 5), the CD-intensity model was significant, $\chi^2(2, N = 317) = 30.13, p < .001$, explained 12.7% of the variance in Y-SSIS and correctly classified 71.9% ($PCC = 70.8\%$) of cases. Activity intensity buffered ($p = .003$) against the effects of CD severity on social functioning and increased the likelihood of being socially healthy by 2.8 times. The CD-involvement model was also significant at step 2, $\chi^2(2, N = 320) = 28.25, p < .001$, explained 11.8% of the variance in Y-SSIS and correctly classified 70.6% ($PCC = 70.1\%$) of cases. Parent involvement buffered ($p = .004$) against the effects of CD severity on social functioning and increased the likelihood of being socially healthy by 1.1 times. At step 2, the RADS-intensity model was significant, $\chi^2(2, N = 315) = 35.52, p < .001$, explained 14.9% of the variance in Y-SSIS and correctly classified 70.8% ($PCC = 70.3\%$) of cases. Activity intensity buffered ($p = .004$) against the effects of depressive symptoms on social functioning and increased the likelihood of being socially healthy by 2.7 times. The RADS-involvement model was also significant at step 2, $\chi^2(2, N = 318) = 36.71, p < .001$, explained 15.2% of the variance in Y-SSIS and correctly classified 70.8% ($PCC = 69.8\%$) of cases. Parent involvement buffered ($p = .002$) against the effects of depressive symptoms on social functioning and increased the likelihood of being socially healthy by 1.1 times.

Although both the CD-intensity and the CD-involvement models were significant at step 3 (see Table 5), $\chi^2(3, N = 317) = 30.27, p < .001$ and $\chi^2(3, N = 320) = 30.50, p < .001$, the interaction terms tested in these models yielded nonsignificant results. In other words, neither activity intensity nor parent involvement had a protective effect against youth CD severity in the analyses pertaining to Y-SSIS. The RADS-intensity and the RADS-involvement models were also significant at step 3, $\chi^2(3, N = 315) = 36.19, p < .001$ and χ^2

(3, $N = 318$) = 36.76, $p < .001$, but yielded nonsignificant interaction effects. Neither activity intensity nor parent involvement had a protective effect against youth depressive symptoms in the analyses pertaining to Y-SSIS. For a summary of findings directly related to the two research questions, please see Table 6.

Discussion

This is the first study in which findings from the ADHD and developmental research were considered in a comprehensive risk-resilience model evaluating the contribution of youth and parent factors to the likelihood of being socially healthy or impaired. Both parent and adolescent perspectives of social functioning were considered and the independent variables were characteristics and behaviors of the children and parents. The three risk factors associated with social impairment were youth CD severity, youth depression, and negative parenting. Similar to Griggs and Mikami (2011) who found mixed results about the contribution of parent ADHD symptoms to social impairment in 6- to 10-year olds, our study also showed mixed results in an older sample. Parent symptoms of ADHD were not associated with parent-reported social impairment and showed a negligible association with the likelihood of healthy social functioning based on youth report. This finding points to no definitive conclusion about the role of parent ADHD symptoms with regard to youth social functioning. Activity participation (breadth and intensity) and parent involvement showed buffering effects (i.e., were associated with healthy social functioning, despite the presence of risk factors for impairment). No enhancers displayed protective effects, meaning that the positive effect of the enhancer did not differ based on the level of severity of the risk factor (i.e., the interaction term between the risk factor and the enhancer was not significant). Please see Table 6 for results overview.

The findings regarding CD severity and depression as risk factors are partially consistent with prior findings indicating that comorbid diagnoses with ADHD have either no effect on or exacerbate the social impairment of youth with ADHD (Becker et al., 2012; Becker et al., 2015). Dissimilar from Becker et al., we found that ODD severity was not associated with social impairment. This may be due to CD accounting for the variability relevant to ODD, given the high correlation between ODD and CD. Consistent with the Becker et al. findings, in our study, CD severity and depression (but not anxiety) increased the risk of social impairment. Our study also extended Kaiser et al.'s (2011) finding of negative parenting as a contributor to social impairment to older youth with ADHD (i.e., ages 10–14 versus ages 5–11).

Four factors (i.e., parent involvement, youth activity breadth, activity intensity and social acceptance) increased the odds of healthy social functioning. Of these, only parent involvement and activity participation variables retained their effects in the presence of risk factors, hence displaying buffering properties. In other words, parent involvement and youth activity breadth and intensity compensated for the negative effect of risk factors on social functioning. The identification of parent involvement and activity breadth as enhancers to healthy social functioning in the P-SSIS analyses should, however, be interpreted with caution because the goodness of fit for the resilience model was below the expected proportional chance criterion (albeit above chance). Nevertheless, given that this analysis

was intended to simply identify potential factors to consider in the risk-resilience models, both enhancers were retained for the subsequent analyses. Parent involvement was previously identified in both the ADHD (Kaiser et al., 2011) and the developmental (El Nokali et al., 2010) literature as a predictor of optimal social functioning and thus its buffering effect in this study comes as an additional confirmation of its relationship to social functioning with this population. Importantly, the emergence of activity participation variables as buffers is unique to the ADHD literature, despite their established positive role for social functioning from developmental research. For the first time, this study provides data consistent with the importance of participation in sports and leisure activities for the likelihood of being socially healthy, when risk factors for social impairment are present. This is important because parents are sometimes concerned that, by having their child involved in activities, they are only adding to the child's frustration without yielding any benefit. This may be a legitimate concern as activity breadth and intensity may be markers for other variables that are causally related to social functioning. Nevertheless, these findings indicate that the role of social involvement for youth with ADHD warrants more examination as it may be a salient buffer to social impairment for some youth.

Although multiple enhancers yielded compensatory effects in that they buffered against the effect of risk factors on social functioning, no protective effects emerged as part of any of the analyses. Enhancers did not show differential resilience influences at high versus low levels of a risk factor. This implies that youth at all levels of the risk factors are likely to benefit from the presence of the enhancer with regard to their social functioning. For example, parent involvement increased the likelihood of healthy social functioning, despite the presence of conduct problems, regardless of the severity of the conduct problems.

Buffers against the Effect of Conduct Problems on Social Functioning

The number of activities in which the adolescent is involved (i.e., activity breadth) increases the likelihood of being socially healthy (per parent report) despite the presence of conduct problems. Perhaps being involved in multiple activities (e.g., sport or leisure) decreases the time that the adolescent can spend in deviant endeavors and affords the child with a non-deviant peer group. In contrast, analyses of youth report of social functioning revealed that it is the amount of time spent in one activity (i.e., activity intensity) rather than the number of activities that creates this positive effect. Indeed, investing time in a specific activity may increase the opportunity for social interactions, hence producing a buffering effect. Furthermore, spending a lot of time in an activity may be an indicator of success with that activity and that success may yield social benefits. Parent involvement had a lower, yet significant, buffering effect of conduct problems on social functioning compared to the activity participation variables. Much of the parent involvement construct on the APQ pertains to the parent's supportive role of the adolescent's involvement in activities (e.g., driving the adolescent to the activity; discussing plans for activities with the adolescent; volunteering in parent organizations). Therefore, although the impact of parent involvement on social functioning may appear to be smaller than the activity variables, it could be that parent involvement enables participation in activities and thus facilitates activity breadth and intensity.

Buffers against the Effect of Negative Parenting on Social Functioning

Activity breadth buffered against the negative parenting effect on social functioning. This finding was unique to analyses pertaining only to parent report of social functioning. Perhaps involvement in multiple activities offers youth an opportunity to engage with other adult figures (e.g., soccer coach) whose interactional style may be less coercive (i.e., more consistent discipline, lack of corporal punishment) and who may provide positive social models. Therefore, an adolescent who, at home, may be exposed to negative parenting, may have an opportunity to diminish the negative effects of such aversive exposure on social functioning by learning from other adult models. Additionally, youth who participate in leisure activities may use such activities as escapes and coping strategies against negative parenting, again diminishing the negative effect of negative parenting on social functioning.

Buffers against the Effect of Depression Symptoms on Social Functioning

No buffers against depression emerged when considering parent report of social functioning. It is possible that, core symptoms of depression (e.g., anhedonia) are responsible for the deficit in social functioning, suggesting a different mechanism of social impairment than that associated with ADHD (e.g., Becker et al., 2016). To this end, factors that buffer against risk factors for ADHD-related social impairment may not be good enough to counteract the negative effect of depressive symptoms.

Based on youth report of social functioning, activity intensity and parent involvement emerged as significant buffers. Engaging in sports or other activities may not only facilitate good social interactions, but it can also help counteract problems associated with depression, including social withdrawal, anhedonia and time spent engaging with negative cognitions. Parent involvement may help provide support for engaging in such activities.

Source of Ratings of Social Functioning

Our results show the contrast between parent and youth reports of social functioning in that twice as many adolescents were considered impaired based on parent report than based on self-report. The findings also highlight both agreement and disagreement with regard to factors associated with social functioning. Conduct problems emerged as a significant risk factor to social impairment regardless of informant on the outcome variable. Agreement was also found with regard to parent involvement as an enhancer of healthy social functioning. This indicates that parent-teen communication regarding the teen's friends and family activities, as well as parents support of the youth's participation in extra-curricular activities enhance both parent- and self-rated social functioning. Additionally, activity participation increased the odds of parent- and self-rated healthy social functioning, even in the presence of risk factors such as CD, depressive symptoms, and negative parenting. However, the analyses with parent-rated social skills emphasized the compensatory role of activity breadth, whereas the results of those with self-rated social skills highlighted parent involvement and activity intensity as buffers against identified risk factors. Overall, our findings highlight the importance of considering multiple informants in evaluating risk-resilience models in young adolescents.

Limitations

Although the current study represents a starting point for a comprehensive evaluation of risk-resilience models in young adolescents with ADHD, there are limitations. First, the study entailed conducting numerous logistic regression analyses with multiple variables, posing potential problems related to Type I error. Second, no assumptions can be made with regard to causal relationships among the examined variables. Therefore, findings represent associations rather than predictions. Examining relationships between social functioning and risk/enhancing factors over time could substantially add to our understanding of social functioning within a dynamic framework. Third, the current study may be limited by construct validity issues pertaining to social functioning. The SSIS-RS is one indicator of social functioning, but it is not necessarily the best possible indicator. Research contributing to enhancing construct validity of social functioning in adolescence would offer an improved platform for investigating risk-resilience models in adolescents with ADHD. Lastly, the current study is limited in providing a single message about contributors to social functioning due to issues related to informants. Specifically, especially in adolescence, it is difficult to determine who the best informant is (e.g., parent, child, peer, teacher) and how discrepant findings across different informants should be interpreted (see Kwon, Kim, & Sheridan, 2012). However, as opposed to prior studies in which only parent-report was obtained (e.g., Graziano et al., 2011), the current study represents a step toward considering two informants. As suggested by De Los Reyes and Kazdin (2006), inconsistent findings across multiple informants may be attributed to the context in which the informant observes behavior. Compared to parents of young children, parents of adolescents have less opportunity to observe their youth's social behavior and thus their report is confined to what they can observe. Combining parent and adolescent perspectives is an attempt to reconcile both reports, but it may not be a more accurate way of capturing relationships between risk/enhancing factors and social functioning due to other possible confounding variables.

Conclusion and Future Directions

For the first time, the important association between activity participation and good social outcomes shown in the developmental literature was found in youth with ADHD. However, in our study, activity participation included multiple types of activities such as individual and team sports, as well as leisure activities. Future research should examine whether or not the specific type of activity (i.e., team sport, individual sport, leisure activity) matters with regard to the magnitude of contribution to healthy social functioning. For example, being successful in a team sport or club may require better social functioning than individual sports or hobbies given the need to collaborate and interact with others. Furthermore, there may be characteristics of the social interactions in the activities that facilitate social functioning (e.g., acceptance of child, success in activity) and others that do not (e.g., being bullied). In addition, our findings suggest that part of the importance of the relationship between parenting and social functioning may be how the parents facilitate the child's participation in social activities. For example, it may be easier for teenagers to be involved in activities if their parents volunteer to help with various activities (e.g., chaperon a trip to a sportive event, assist with fundraising for boy/girl scouts) or drive them to activities outside the school (e.g., youth church groups). These findings and future related studies have important implications for interventions for youth with ADHD.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Funding: This research was supported by a grant to the second and third authors from the National Institute of Mental Health (NIMH; R01MH082864 & R01MH082865). The contents of this article do not necessarily represent the views of the National Institute of Health and do not imply endorsement by the federal government.

References

- Achenbach, TM. Manual for child behavior checklist and revised child behavior profile. Burlington, VT: University Associates in Psychiatry; 1991.
- Achenbach, T., Rescorla, L. Manual for the ASEBA school age forms & profiles. Burlington: University of Vermont Research Center for Children, Youth, & Families; 2001.
- Becker SP, Langberg JM, Evans SW, Girio-Herrera E, Vaughn AJ. Differentiating anxiety and depression in relation to the social functioning of young adolescents with ADHD. *Journal of Clinical Child and Adolescent Psychology*. 2015; 44:1015–1029. [PubMed: 25010226]
- Becker SP, Luebke AM, Langberg JM. Co-occurring mental health problems and peer functioning among youth with attention-deficit/hyperactivity disorder: A review and recommendations for future research. *Clinical Child and Family Psychology Review*. 2012; 15:279–302. DOI: 10.1007/s10567-012-0122-y [PubMed: 22965872]
- Booster GD, DuPaul GJ, Eiraldi R, Power TJ. Functional impairments in children with ADHD: Unique effects of age and comorbid status. *Journal of Attention Disorders*. 2012; 16:179–189. DOI: 10.1177/1087054710383239 [PubMed: 20876886]
- Collins, WA. Parent-child relationships in the transition to adolescence: Continuity and change in interaction, affect, and cognition. In: Montemayor, R.Adams, G., Gullotta, T., editors. *Advances in adolescent development (Vol. 2. The transition from childhood to adolescence)*. Beverly Hills, CA: Sage; 1990.
- Conners, CK., Erhardt, D., Sparrow, EP. *Conners' adult ADHD rating scales: Technical manual*. New York, NY: Multi-Health Systems; 1999.
- De Los Reyes A, Kazdin AE. Conceptualizing changes in behavior in intervention research: The range of possible changes model. *Psychological Review*. 2006; 113:554–583. [PubMed: 16802881]
- Dirks MA, Treat TA, Weersing VR. Integrating theoretical, measurement, and intervention models of youth social competence. *Clinical Psychology Review*. 2007; 27:327–347. DOI: 10.1016/j.cpr.2006.11.002 [PubMed: 17270330]
- El Nokali NE, Bachman HJ, Votruba-Drzal E. Parent involvement and children's academic and social development in elementary school. *Child Development*. 2010; 81:988–1005. [PubMed: 20573118]
- Erdhardt D, Epstein JN, Conners CK, Parker JD, Sitarenios G. Self ratings of ADHD symptoms in adults: II. Reliability, validity, and diagnostic sensitivity. *Journal of Attention Disorders*. 1999; 3:153–158.
- Evans SW, Langberg JM, Schultz BK, Vaughn A, Altaye M, Marshall SA, Zoromski AK. Evaluation of a school-based treatment program for young adolescents with ADHD. *Journal of Consulting and Clinical Psychology*. 2016; 84:15–30. [PubMed: 26501496]
- Evans SW, Owens JS, Bunford N. Evidence-based psychosocial treatments for children and adolescents with attention-deficit/hyperactivity disorder. *Journal of Clinical Child and Adolescent Psychology*. 2014; 43:527–551. DOI: 10.1080/15374416.2013.850700 [PubMed: 24245813]
- Fabiano GA, Pelham WE, Washbush DA, Gnagy EM, Lahey BB, Chronis AM, ... Burrows-Maclean L. A practical measure of impairment: Psychometric properties of the impairment rating scale in samples of children with attention deficit hyperactivity disorder and two school-based samples. *Journal of Clinical Child and Adolescent Psychology*. 2006; 35:369–385. [PubMed: 16836475]
- Field, A. *Discovering Statistics Using IBM SPSS Statistics*. 4. Washington DC: Sage; 2013.

- Fredricks JA, Eccles JS. Developmental benefits of extracurricular involvement: Do peer characteristics mediate the link between activities and youth outcomes? *Journal of Youth and Adolescence*. 2005; 34:507–520. DOI: 10.1007/s10964-005-8933-5
- Gould AW, Mazzeo J. Age and sex differences in early adolescent's information sources. *Journal of Early Adolescence*. 1990; 2:283–292.
- Graziano PA, Geffken GR, McNamara JP. Atypical behaviors and comorbid externalizing symptoms equally predict children with attention-deficit/hyperactivity disorder's social functioning. *Child Psychiatry and Human Development*. 2011; 42:377–389. DOI: 10.1007/s10578-011-0224-7 [PubMed: 21479512]
- Gresham, F., Elliott, SN. Social skills improvement system (SSIS) rating scales. Bloomington, MN: Pearson Assessments; 2008.
- Griggs MS, Mikami AY. The role of maternal and child ADHD symptoms in shaping interpersonal relationships. *Journal of Abnormal Child Psychology*. 2011; 39:437–449. DOI: 10.1007/s10802-010-9464-4 [PubMed: 20931275]
- Hair, JF., Black, WC., Babin, BJ., Anderson, RE. *Multivariate data analysis*. 7. Upper Saddle River, New Jersey: Prentice Hall; 2010.
- Harter, S. *Manual for the self-perception profile for children*. Denver: University of Denver; 1985.
- Holmbeck, GN., Devine, KA., Wasserman, R., Schellinger, K., Tuminello, E. Guides from developmental psychology for therapy with adolescents. In: Kendall, PC., editor. *Child and adolescent therapy. Cognitive-behavioral perspectives*. 4. New York: The Guildford Press; 2012. p. 429-470.
- Kaiser KM, McBurnett K, Pfiffner LJ. Child ADHD severity and positive and negative parenting as predictors of child social functioning: evaluation of three theoretical models. *Journal of Attention Disorders*. 2011; 15(3):193–203. DOI: 10.1177/1087054709356171 [PubMed: 20424006]
- Kwon K, Kim EM, Sheridan SM. A contextual approach to social skills assessment in the peer group: Who is the best judge? *School Psychology Quarterly*. 2012; 27:121–133. [PubMed: 22731871]
- Landau S, Milich R. Social communication patterns of attention-deficit-disordered boys. *Journal of Abnormal Child Psychology*. 1988; 16:69–81. [PubMed: 3361031]
- Mahoney JL, Stattin H. Leisure activities and adolescent antisocial behavior: The role of structure and social context. *Journal of Adolescence*. 2000; 23:113–127. DOI: 10.1006/jado.2000.0302 [PubMed: 10831137]
- March, JS. *Manual for the multidimensional anxiety scale for children (MASC)*. Toronto: Multi-Health Systems; 1997.
- March JS, Parker JD, Sullivan K, Stallings P, Conners CK. The multidimensional anxiety scale for children (MASC): Factor structure, reliability, and validity. *Journal of the American Academy of Child & Adolescent Psychiatry*. 1997; 36:554–565. [PubMed: 9100431]
- Masten AS. Ordinary magic: resilience processes in development. *American Psychologist*. 2001; 56:227–238. DOI: 10.1037//0003-066X.56.3.227 [PubMed: 11315249]
- McElhaney KB, Antonishak J, Allen JP. “They Like Me, They Like Me Not”: Popularity and adolescents' perceptions of acceptance predicting social functioning over time. *Child Development*. 2008; 79:720–731. [PubMed: 18489423]
- Mikami AY, Hinshaw SP. Buffers of peer rejection among girls with and without ADHD: The role of popularity with adults and goal-directed solitary play. *Journal of Abnormal Child Psychology*. 2003; 31:381–397. [PubMed: 12831228]
- 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. DOI: 10.1007/s10802-006-9062-7 [PubMed: 17051436]
- Mikami AY, Ransome ML, Calhoun CD. Influence of anxiety on the social functioning of children with and without ADHD. *Journal of Attention Disorders*. 2011; 15:473–484. DOI: 10.1177/1087054710369066 [PubMed: 20574058]
- Modesto-Lowe V, Yelunina L, Hanjan K. Attention-deficit/hyperactivity disorder: a shift toward resilience? *Clinical Pediatrics*. 2011; 50:518–524. [PubMed: 21262756]
- Mrug, S., Hoza, B., Gerdes, AC. Children with attention-deficit/hyperactivity disorder: Peer relationships and peer-oriented interventions. In: Damon, W.Nangle, DW., Erdley, CA., editors.

- New directions for child and adolescent development: No 91. The role of friendship in psychological adjustment. San Francisco: Jossey-Bass; 2001. p. 51-77.
- MTA Cooperative Group. A 14-month randomized clinical trial of treatment strategies for attention-deficit/hyperactivity disorder. *Archives of General Psychiatry*. 1999; 56:1073–1086. [PubMed: 10591283]
- Nijmeijer JS, Minderaa RB, Buitelaar JK, Mulligan A, Hartman CA, Hoeskstra PJ. Attention-deficit/hyperactivity disorder and social dysfunctioning. *Clinical Psychology Review*. 2008; 28:692–708. [PubMed: 18036711]
- Pelham WE, Gnagy EM, Greenslade KE, Milich R. Teacher ratings of DSM-III-R symptoms for the disruptive behavior disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1992; 31:210–218. [PubMed: 1564021]
- Reynolds, WM. Reynolds adolescent depression scale-2: Professional manual. Odessa, FL: Psychological Assessment Resources; 2002.
- Rose-Krasnor L. The nature of social competence: A theoretical review. *Social Development*. 1997; 6:111–135.
- Rose-Krasnor L, Busseri MA, Willoughby T, Chalmers H. Breadth and intensity of youth activity involvement as contexts for positive development. *Journal of Youth and Adolescence*. 2006; 35:385–499. DOI: 10.1007/s10964-006-9037-6
- Shelton KK, Frick PJ, Wootton J. Assessment of parenting practices in families of elementary school-age children. *Journal of Clinical Child Psychology*. 1996; 25:317–329.
- Steinberg L. We know some things: Parent-adolescent relationships in retrospect and prospect. *Journal of Research on Adolescence*. 2001; 11:1–19.
- Van Eck K, Finney SJ, Evans SW. Parent report of ADHD symptoms of early adolescents: A confirmatory factor analysis of the Disruptive Behavior Disorders Scale. *Educational and Psychological Measurement*. 2010; 70:1042–1059.
- Wechsler, D. Wechsler intelligence scale for children. 4. San Antonio, TX: Harcourt Assessment; 2003.
- Weller, EB., Weller, R., Rooney, MT., Fristad, MA. Children’s interview for psychiatric syndromes (ChIPS). Washington, DC: American Psychiatric Association; 2009.
- Zoromski AK, Owens JS, Evans SW, Brady CE. Identifying ADHD symptoms most associated with impairment in early childhood, middle childhood, and adolescence using teacher report. *Journal of Abnormal Child Psychology*. 2015; 43:1243–1255. [PubMed: 25899878]

Table 1

Descriptive Statistics of Enhancers and Risk Factors

	Groups based on P-SSIS		Groups based on Y-SSIS	
	Socially healthy (N=127)	Socially impaired (N=196)	Socially healthy (N=216)	Socially impaired (N=105)
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
(a) Enhancers				
APQ Parent Involvement	39.87 (4.88)	37.48 (4.98)	39.24 (4.82)	36.89 (5.20)
APQ Positive Parenting	25.59 (2.80)	24.79 (3.37)	25.38 (2.93)	24.54 (3.53)
Harter Social Acceptance	2.94 (.74)	2.92 (.72)	3.03 (.69)	2.73 (.77)
Activity Breadth	5.67 (1.65)	4.97 (1.88)	5.37 (1.80)	4.95 (1.85)
Activity Intensity	2.17 (.36)	2.09 (.38)	2.17 (.34)	2.03 (.42)
(b) Risk factors				
DBD – ADHD severity	26.93 (9.69)	32.76 (10.52)	30.44 (10.32)	30.42 (10.97)
DBD – ODD severity	6.62 (4.44)	11.53 (5.83)	8.79 (5.64)	11.21 (5.96)
DBD – CD severity	1.23 (1.52)	4.15 (4.07)	2.34 (2.97)	4.28 (4.35)
RADS Total T-score	43.13 (7.86)	45.32 (10.02)	42.62 (8.53)	48.32 (9.63)
MASC Anxiety Index	49.47 (12.01)	47.39 (12.38)	48.11 (11.78)	48.38 (13.17)
CAARS ADHD Index	45.99 (9.56)	47.38 (10.76)	47.54 (10.72)	45.57 (9.51)
APQ Negative Parenting	32.84 (5.77)	36.51 (6.87)	34.37 (6.58)	36.49 (6.76)

Note: P-SSIS = parent report on the Social Skills Improvement System Rating Scale; Y-SSIS = youth report on the Social Skills Improvement System Rating Scale; *N* = sample size; *M* = mean; *SD* = standard deviation; APQ = Alabama Parenting Questionnaire; DBD = Disruptive Behavior Disorders rating scale; ADHD = attention deficit/hyperactivity disorder; ODD = oppositional defiant disorder; CD = conduct disorder; RADS = Reynolds Adolescent Depression Scale-2; MASC = Multidimensional Anxiety Scale for Children; CAARS = Conners' Adult ADHD Rating Scales.

Table 2

Logistic Regression – Enhancers & Risk Factor Models Predicting Social Functioning

	B	S.E.	Wald	df	p	Odds Ratio	95.0% C.I. for Odds Ratio	
							Lower	Upper
(a) P-SSIS – Enhancers of Healthy Social Functioning								
APQ Parent Involvement	.079	.033	5.757	1	.016	1.082	1.015	1.154
APQ Positive Parenting	.003	.049	.004	1	.950	1.003	.911	1.104
Harter Social Acceptance	-.009	.166	.003	1	.958	.991	.716	1.373
Activity Breadth	.175	.071	6.036	1	.014	1.191	1.036	1.370
Activity Intensity	.327	.336	.949	1	.330	1.387	.718	2.679
Constant	-5.169	1.325	15.208	1	<.001	.006		
(b) Y-SSIS – Enhancers of Healthy Social Functioning								
APQ Parent Involvement	.067	.033	4.094	1	.043	1.069	1.002	1.141
APQ Positive Parenting	.020	.049	.164	1	.685	1.020	.926	1.124
Harter Social Acceptance	.514	.174	8.700	1	.003	1.672	1.188	2.353
Activity Breadth	.062	.074	.706	1	.401	1.064	.920	1.231
Activity Intensity	.698	.340	4.226	1	.040	2.010	1.033	3.912
Constant	-5.585	1.347	17.202	1	<.001	.004		
(c) P-SSIS – Risk Factors for Impaired Social Functioning								
DBD – ADHD severity	.002	.016	.022	1	.881	1.002	.971	1.035
DBD – ODD severity	-.068	.038	3.123	1	.077	.934	.867	1.007
DBD – CD severity	-.333	.088	14.325	1	<.001	.717	.603	.852
RADS Total T-score	-.021	.015	1.929	1	.165	.979	.950	1.009
CAARS ADHD Index	.003	.014	.042	1	.838	1.003	.976	1.031
APQ Negative Parenting	-.071	.025	7.724	1	.005	.932	.887	.979
Constant	4.041	1.210	11.156	1	.001	56.891		
(d) Y-SSIS – Risk Factors for Impaired Social Functioning								
DBD – ADHD severity	.030	.017	2.979	1	.084	1.030	.996	1.065

	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	<i>Odds Ratio</i>	95.0% C.I. for Odds Ratio	
							<i>Lower</i>	<i>Upper</i>
DBD – ODD severity	-.031	.036	.737	1	.391	.969	.903	1.041
DBD – CD severity	-.136	.054	6.433	1	.011	.873	.786	.970
RADS Total T-score	-.068	.015	20.859	1	<.001	.934	.907	.962
CAARS ADHD Index	.035	.015	5.778	1	.016	1.036	1.007	1.066
APQ Negative Parenting	-.026	.022	1.414	1	.234	.974	.934	1.017
Constant	2.960	1.085	7.446	1	.006	19.298		

Note: P-SSIS = parent report on the Social Skills Improvement System Rating Scale; Y-SSIS = youth report on the Social Skills Improvement System Rating Scale; *S.E.* = standard error; *df* = degrees of freedom; APQ = Alabama Parenting Questionnaire; DBD = Disruptive Behavior Disorders rating scale; ADHD = attention deficit/hyperactivity disorder; ODD = oppositional defiant disorder; CD = conduct disorder; RADS = Reynolds Adolescent Depression Scale-2; CAARS = Conners' Adult ADHD Rating Scales.

Table 3
 Logistic Regression – Enhancers Predicting Likelihood of Being Socially Healthy in the Presence of Risk Factors

	<i>B</i>	<i>S.E.</i>	Wald	<i>df</i>	<i>p</i>	Odds Ratio	95.0% C.I. for Odds Ratio	Lower	Upper
(a) P-SSIS									
Step 1									
DBD – CD severity	-.422	.074	32.795	1	<.001	.656	.568	.758	
APQ Negative Parenting	-.055	.024	5.295	1	.021	.946	.903	.992	
Step 2									
APQ Parent Involvement	.035	.030	1.417	1	.234	1.036	.977	1.098	
Activity Breadth	.208	.080	6.829	1	.009	1.231	1.053	1.439	
Constant	-.078	1.513	.003	1	.959	.925			
(b) Y-SSIS									
Step 1									
DBD – CD severity	-.145	.041	12.481	1	<.001	.865	.799	.938	
RADS Total T-score	-.060	.016	13.949	1	<.001	.941	.912	.972	
Step 2									
APQ Parent Involvement	.058	.030	3.848	1	.050	1.060	1.000	1.123	
Harter Social Acceptance	.379	.204	3.446	1	.063	1.461	.979	2.180	
Activity Intensity	1.150	.384	8.944	1	.003	3.157	1.486	6.705	
Constant	-1.687	1.689	.997	1	.318	.185			

Note: P-SSIS = parent report on the Social Skills Improvement System Rating Scale; Y-SSIS = youth report on the Social Skills Improvement System Rating Scale; *S.E.* = standard error; *df* = degrees of freedom; APQ = Alabama Parenting Questionnaire; DBD = Disruptive Behavior Disorders rating scale; CD = conduct disorder; RADS = Reynolds Adolescent Depression Scale-2.

Table 4
P-SSIS – Compensatory (i.e., Buffering) and Protective (i.e., Interaction) Effects

	<i>B</i>	<i>S.E.</i>	Wald	<i>df</i>	<i>p</i>	Odds Ratio	95.0% C.I. for Odds Ratio	Lower	Upper
(a) The compensatory effect of activity breadth, in the presence of youth conduct problems									
DBD – CD severity	-.468	.074	39.977	1	<.001	.626	.541	.724	
Activity Breadth	.246	.076	10.485	1	.001	1.278	1.102	1.483	
Constant	-.714	.431	2.744	1	.098	.490			
(b) The compensatory effect of activity breadth, in the presence of negative parenting									
APQ Negative Parenting	-.095	.020	21.568	1	<.001	.910	.874	.947	
Activity Breadth	.227	.069	11.002	1	.001	1.255	1.097	1.435	
Constant	1.617	.770	4.407	1	.036	5.038			
(c) The protective effect of activity breadth, in the presence of youth conduct problems									
DBD – CD severity	-.598	.241	6.152	1	.013	.550	.343	.882	
Activity Breadth	.206	.101	4.144	1	.042	1.229	1.008	1.499	
CD x Act. Breadth	.022	.039	.332	1	.564	1.023	.948	1.104	
Constant	-.497	.571	.758	1	.384	.608			
(d) The protective effect of activity breadth, in the presence of negative parenting									
APQ Negative Parenting	.010	.059	.031	1	.861	1.010	.899	1.135	
Activity Breadth	.918	.387	5.614	1	.018	2.504	1.172	5.350	
Neg. Parent x Act. Breadth	-.020	.011	3.324	1	.068	.980	.959	1.002	
Constant	-1.950	2.074	.885	1	.347	.142			

Note: P-SSIS = parent report on the Social Skills Improvement System Rating Scale; *S.E.* = standard error; *df* = degrees of freedom; APQ = Alabama Parenting Questionnaire; DBD = Disruptive Behavior Disorders rating scale; CD = conduct disorder; Act. Breadth = activity breadth; Neg. Parent = negative parenting.

Table 5

Y-SSIS – Compensatory (i.e., Buffering) Effects and Protective (i.e., Interaction) Effects

	<i>B</i>	S.E.	Wald	<i>df</i>	<i>p</i>	Odds Ratio	Lower	Upper
(a) The compensatory effect of activity intensity, in the presence of youth conduct problems								
DBD – CD severity	-.155	.036	18.411	1	<.001	.856	.798	.919
Activity Intensity	1.028	.341	9.105	1	.003	2.795	1.434	5.450
Constant	-.901	.721	1.564	1	.211	.406		
(b) The compensatory effect of parent involvement, in the presence of youth conduct problems								
DBD – CD severity	-.127	.036	12.134	1	<.001	.881	.820	.946
APQ Parent Involvement	.074	.026	8.281	1	.004	1.077	1.024	1.133
Constant	-1.703	1.011	2.835	1	.092	.182		
(c) The compensatory effect of activity intensity, in the presence of youth depressive symptoms								
RADS Total T score	-.068	.014	23.923	1	<.001	.934	.909	.960
Activity Intensity	.992	.343	8.359	1	.004	2.698	1.377	5.286
Constant	1.730	.944	3.359	1	.067	5.642		
(d) The compensatory effect of parent involvement, in the presence of youth depressive symptoms								
RADS Total T-score	-.062	.014	20.841	1	<.001	.940	.915	.965
APQ Parent Involvement	.081	.026	9.948	1	.002	1.084	1.031	1.140
Constant	.444	1.189	.140	1	.708	1.560		
(e) The protective effect of activity intensity, in the presence of youth conduct problems								
DBD – CD severity	-.235	.216	1.184	1	.277	.790	.517	1.208
Activity Intensity	.902	.475	3.605	1	.058	2.464	.971	6.253
CD x Act. Intensity	.038	.100	.142	1	.706	1.038	.854	1.263
Constant	-.637	1.002	.404	1	.525	.529		
(f) The protective effect of parent involvement, in the presence of youth conduct problems								

	<i>B</i>	S.E.	Wald	<i>df</i>	<i>p</i>	Odds Ratio	95.0% C.I. for Odds Ratio	
							Lower	Upper
DBD – CD severity	.219	.226	.939	1	.333	1.245	.799	1.941
APQ Parent Involvement	.108	.035	9.727	1	.002	1.114	1.041	1.192
CD x Involvement	-.010	.006	2.339	1	.126	.991	.978	1.003
Constant	-2.955	1.319	5.019	1	.025	.052		
(g) The protective effect of activity intensity, in the presence of youth depressive symptoms								
RADS Total T-score	-.005	.078	.005	1	.945	.995	.854	1.158
Activity Intensity	2.385	1.750	1.857	1	.173	10.857	.352	335.188
RADS x Act. Intensity	-.030	.036	.663	1	.416	.971	.904	1.043
Constant	-1.204	3.716	.105	1	.746	.300		
(h) The protective effect of parent involvement, in the presence of youth depressive symptoms								
RADS Total T-score	-.086	.105	.675	1	.411	.917	.747	1.127
APQ Parent Involvement	.051	.131	.153	1	.696	1.053	.814	1.360
RADS x Involvement	.001	.003	.053	1	.817	1.001	.995	1.006
Constant	1.580	5.053	.098	1	.754	4.857		

Note: Y-SSIS = youth report on the Social Skills Improvement System Rating Scale; *S.E.* = standard error; *df* = degrees of freedom; APQ = Alabama Parenting Questionnaire; DBD = Disruptive Behavior Disorders rating scale; CD = conduct disorder; RADS = Reynolds Adolescent Depression Scale-2; Act. Intensity = activity intensity

Table 6

Summative Description of Findings

	P-SSIS	Y-SSIS	
Research Question 1			
Significant risk factors	<ul style="list-style-type: none"> • Conduct problems severity (<i>OR</i>=.717) • Negative parenting (<i>OR</i>=.932) 	<ul style="list-style-type: none"> • Conduct problems severity (<i>OR</i>=.873) • Depression symptoms (<i>OR</i>=.934) 	
Significant enhancers	<ul style="list-style-type: none"> • Parent involvement (<i>OR</i>=1.082) • Activity breadth (<i>OR</i>=1.191) 	<ul style="list-style-type: none"> • Parent involvement (<i>OR</i>=1.069) • Activity intensity (<i>OR</i>=2.010) • Self-perceived social acceptance (<i>OR</i>=1.672) 	
Research Question 2			
	conduct problems	<ul style="list-style-type: none"> • Activity breadth (<i>OR</i>=1.278) 	<ul style="list-style-type: none"> • Activity intensity (<i>OR</i>=2.795) • Parent involvement (<i>OR</i>=1.077)
Buffers against	negative parenting	<ul style="list-style-type: none"> • Activity breadth (<i>OR</i>=1.255) 	<ul style="list-style-type: none"> • N/A
	depression symptoms	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • Activity intensity (<i>OR</i>=2.698) • Parent involvement (<i>OR</i>=1.084)
Protective factors against	conduct problems	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None
	negative parenting	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None
	depression symptoms	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None

Note: P-SSIS = parent report on the Social Skills Improvement System Rating Scale; Y-SSIS = youth report on the Social Skills Improvement System Rating Scale; Odds ratios (*OR*) pertain to the likelihood of being socially healthy.