

Friendship Intimacy Exchange Buffers the Relation between ADHD Symptoms and Later Social Problems among Children Attending an After-School Care Program

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Abstract The friendships of children displaying symptoms of attention-deficit/hyperactivity disorder (ADHD) have been understudied, particularly in comparison to the domain of peer rejection. This study tested whether friendship intimacy exchange buffers the prospective relation between ADHD symptoms and social problems 1 year later in a sample of children attending a community-based after-school program. Children ($N=131$; 53 % boys; 66 % African American) ranging from 5 to 13 years of age participated in this study. At baseline, children reported on friendship intimacy exchange with their identified best friend, and program staff rated children on ADHD symptoms and social problems. Staff ratings of children's social problems were collected again 1 year later. Multiple regression analyses indicated that, after controlling for demographic variables and

baseline social problems, friendship intimacy exchange significantly moderated the association between ADHD symptoms and social problems at the one-year follow-up. Specifically, the relation between ADHD and social problems was no longer significant for children reporting high levels of friendship intimacy exchange. This moderation was not further qualified by either child age or sex, although boys were more likely than girls to report low rates of friendship intimacy exchange. These findings indicate the importance of friendship intimacy for children displaying ADHD symptoms, who often experience significant peer problems. Friendship quality may be a promising target for prevention and intervention efforts in mitigating some of the long-term social problems associated with ADHD symptomatology, and future research is needed to extend these findings to other domains of friendship quality and clinical samples of children with ADHD.

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The peer problems of children displaying elevated rates of attention-deficit/hyperactivity disorder (ADHD) symptoms are well-documented (see Hoza 2007; Nijmeijer et al. 2008, for reviews). Youth with ADHD are more likely to experience poor peer relations compared to their typically developing peers (Becker et al. 2012a; Greene et al. 2001; Hoza et al. 2005), and ADHD symptoms predict peer problems prospectively (Bagwell et al. 2001; Lee et al. 2008; Mikami and Hinshaw 2006). In addition, children with ADHD who experience peer problems are at elevated risk for additional difficulties such as comorbid mental health problems, substance use, and global psychosocial impairment (Greene et al. 1997; Mrug et al. 2012). Further, the link between ADHD and social problems is not limited to clinical

samples, as community-based studies also demonstrate that ADHD symptoms are associated with peer difficulties (Diamantopoulou et al. 2005; Rielly et al. 2006). Given these findings, it is especially concerning that the peer relation difficulties among youth displaying ADHD symptoms are noted as being particularly pervasive, long-lasting, and treatment resistant (Hoza 2007; Pelham and Fabiano 2008).

Peer functioning is a heterogeneous construct, however, and is often conceptualized as encompassing the correlated yet distinct dimensions of peer group acceptance and friendship success (Parker et al. 2006). Of these two dimensions, the majority of ADHD-related research to date has focused on peer group status, although the need to more systematically study friendship among youth with ADHD has been identified as a current research priority (Mikami 2010; Normand et al. 2007). Youth with ADHD are commonly rejected by the larger peer group (Erhardt and Hinshaw 1994; Hoza et al. 2005), and research with school-based and community samples suggests that individual friendships may play an especially important protective role against negative social outcomes (Deater-Deckard 2001; Hartup 1996; Laursen et al. 2007; Oh et al. 2008; Parker and Asher 1993). Although fewer studies exist, there is some evidence for a protective role of dyadic friendships in research considering ADHD specifically. For example, the presence of at least one reciprocated friendship was found to mitigate the risk for peer victimization among 6- to 12-year old girls with and without ADHD (Cardoos and Hinshaw 2011). However, Mrug et al. (2012) recently found that the presence of a mutual friendship in childhood did not protect against the negative long-term effects of peer rejection in a large sample of children with ADHD. As a result, Mrug and colleagues suggested that it might not be the mere *presence* of a dyadic friendship that buffers children with ADHD from long-term adverse outcomes, but rather the *quality* of the friendship. When children with ADHD are able to establish a mutual friendship (which is not always the case; Bagwell et al. 2001; Blachman and Hinshaw 2002; Hoza et al. 2005), it tends to be of poorer quality (Bagwell et al. 2001; Blachman and Hinshaw 2002; Heiman 2005; Normand et al. 2011). Even children with subclinical attention problems have poorer friendship quality compared to their peers (Rielly et al. 2006). As such, friendship quality is important to examine as a potential buffer of the relation between ADHD symptoms and future social problems.

Indeed, not all friendships are alike, and certain aspects of friendship may be especially likely to buffer the relation between ADHD symptoms and later social problems. One domain of friendships that might shed some light on the mitigating effects of friendships on the risk of social problems is intimacy exchange. Friendship intimacy exchange is characterized by the degree of personal disclosure and

feelings within a dyadic friendship (Parker and Asher 1993). As noted by Mikami (2010), in order “to create a mutual, close relationship between two children, an emotional supportiveness and reciprocal understanding of the other person is key” (p. 185). In turn, friendship intimacy is linked to the use of more constructive conflict strategies within the friendship (Sanderson et al. 2005) and greater friendship satisfaction (Jones 1991). The positive effects of intimacy exchange also extend beyond the dyadic friendship itself, as friendship intimacy is associated with lower anxiety/depression, higher self-esteem, and general social competence (Buhrmester 1990). Unfortunately, children with ADHD view intimacy and emotional support with less importance in their best friend relationships compared to children without ADHD (Heiman 2005), and children with subclinical attention problems report lower rates of friendship intimacy exchange compared to their peers (Rielly et al. 2006). Nonetheless, when high rates of intimacy exchange *do* occur within the context of a dyadic friendship, it is hypothesized that the relation between ADHD symptomatology and general social difficulties may be reduced.

It is important to consider the child’s sex and age when evaluating the effects of friendship intimacy exchange on the relation between ADHD symptoms and social problems, as it is plausible that the buffering effect of intimacy exchange will be stronger among older than younger children, and among girls compared to boys. Children as young as 5 years of age provide reliable reports of friendship quality that are associated with greater friendship satisfaction and stability (Ladd et al. 1996). This is consistent with reports that young children have higher rates of intimacy and self-disclosure with their friends than with acquaintances or unknown peers (Berndt and Perry 1986; Howes et al. 1992). Interestingly, children ranging from 7 to 13 years of age were not found to differ in their desire for intimacy (Buhrmester and Furman 1987). As children enter into adolescence, however, intimacy and personal disclosure become increasingly more important (Bagwell and Schmidt 2011; Buhrmester 1990; Jones and Dembo 1989), suggesting that the mitigating effect of friendship intimacy on social outcomes may be stronger among older children.

Although the general social impairments of youth with ADHD are similar for boys and girls (Greene et al. 2001), studies of both children without ADHD (Jones and Dembo 1989; Parker and Asher 1993) or with subclinical attention problems (Rielly et al. 2006) find that boys report lower rates of friendship intimacy exchange than girls. These findings are consistent with research indicating that girls value support and emotional intimacy in their friendships more than boys, who tend to interact in larger playgroups and engage in more rough-and-tumble play (Rose and Rudolph 2006). Hence, although friendship intimacy might mitigate the risk of future social problems among both boys

and girls with ADHD symptoms, the buffering effect might be stronger for girls than for boys.

The Present Study

In summary, the purpose of the present study was to test the hypothesis that friendship intimacy exchange would moderate the relation between ADHD symptoms and general social difficulties in a community sample of children attending an after-school program. First, ADHD symptoms were hypothesized to be inversely related to intimacy exchange. Age and sex differences were expected with girls and older children reporting higher rates of intimacy exchange in their self-identified best friend relationships. Next, high levels of intimacy exchange were hypothesized to buffer the effect that ADHD symptoms was expected to have on social problems 1 year later. Finally, friendship intimacy was hypothesized to be more protective for girls than for boys, as well as for older than for younger children.

These hypotheses were tested with a sample of children attending a community-based after-school care program using a longitudinal, multi-informant design. Boys and girls ranging from 5 to 13 years of age participated in this study. This age range was selected to maximize the inclusion of children for whom friendship intimacy is salient while also including the age range for which referrals for ADHD are common (Sax and Kautz 2003) and for whom friendship interventions for children with ADHD have been developed (Hoza et al. 2003; Mikami et al. 2010a). Further, sampling from this population increased the likelihood of examining the full range of ADHD symptom severity among children in an ecologically-valid context and increase the generalizability of the findings to moderately at-risk, community-based populations.

Methods

Participants

Study participants attended a community-based after-school program in the southeastern United States. The program provides low-cost care for 200 to 300 school-age children daily. Announcements about the study were posted at the program's center for 1 week. Parents interested in participating contacted the researchers as instructed in the announcement. Although 147 parents provided informed written consent for their children to participate, only 131 children were present and able to participate during data collection. Participants ranged from 5 to 13 years of age ($M=8.2$, $SD=2.01$), with boys comprising 52.7 % ($n=69$) of the sample. The majority of the sample was African

American (66.4 %), with the remainder of the sample identified by their caregivers as Caucasian (21.4 %), Hispanic/Latino (5.3 %), or other/biracial (6.9 %). The majority of study participants (95.4 %) received a fee reduction for their children to attend the program, and approximately 86 % of all children received government assistance for paying program fees. Approximately 90 % of the children attended the program daily. The demographic characteristics and average daily attendance of the present sample are representative of the program's population.

Procedures

Data collection from all informants (children and program staff) occurred after obtaining Institutional Review Board approval and endorsement from the program administration. Primary caregivers provided informed consent and child assent was obtained after confirming parental consent. Assent forms were read aloud to the children, and the children were encouraged to ask questions prior to signing the form. Children were also instructed throughout the interview that they could stop at anytime without any penalty. No children whose parent provided consent declined to participate in the study.

Child data were collected over the course of 1 week. Surveys were administered to children in small groups that ranged from 3 to 15 children. For younger children (kindergarten through second grade), one or more research staff members per two children were available to assist the children. For older children (third grade and higher), one or more staff members per five children were available to assist. Each child had their own packet of measures on which to record their responses, but all items were read aloud by a research staff member to help ensure children understood the items. Other research staff circled the room to ensure that children were able to follow along with the questions being read and understood response options, while also keeping an adequate distance from children in order to avoid influencing children's responses. Questions from children were addressed confidentially and individually, with children alerting staff of questions by raising their hand. Although no time limit was set for the completion of the measures, in a few cases (<10) children were unable to maintain the pace of the group. When this occurred, research staff worked with the child individually. The surveys were completed in approximately 25 min and children received \$5.00 for participation. The after-school program staff were not present during survey administration and did not have access to the children's answers to ensure the confidentiality of the participants' responses.

The program director and the education director responded to questions regarding the child participants at both baseline and one-year later. The education director's

role in the program is similar to that of a teacher and, therefore, was selected to report on the children's behavior and social functioning given his familiarity with each child participating in the study. Specifically, he had daily interactions with each child in various individual, small-group, and large-group academic and social situations (e.g., tutoring sessions, life skills training, sports activities, field trips), spending on average 30 h a week with the children. Also note that the education director had a supervisory position, and as such, was kept apprised of children's behavior by other staff. The program director was selected to report on demographic information and program status due to his accessibility to child records. Program staff members provided written consent just prior to their participation at both baseline and one-year follow-up. They then reported on each child using Medialab interview software. The education director's surveys took less than 5 min per child to complete. He was compensated with \$3.00 per child at baseline and with a \$250 gift card at follow-up. The program director's surveys were completed in less than 5 min per child. The director was compensated with \$2.00 per child at baseline and with a \$250 gift card at follow-up.

Measures

Demographic Variables The program director reported on child age, gender, and race. Demographic information was obtained from applications that the caregivers completed for program enrollment.

ADHD Symptoms The program's education director completed the 18 ADHD items of the Disruptive Behavior Disorder checklist (DBD; Pelham et al. 1992b) at baseline. Each item is rated on a 4-point scale (1 = *not at all*, 4 = *very much*), and items were dichotomously re-coded to indicate symptom absence or presence. Consistent with previous research (Milich et al. 1993; Pelham et al. 1992a), DBD items rated as occurring "*pretty much*" or "*very much*" (three or four) were considered to be positive endorsements of a symptom whereas items rated as occurring "*not at all*" or "*just a little*" (one or two) were considered to be negative endorsements of a symptom. Sum scores of this count variable were computed and used for analyses. Pelham et al. (1992a) reported that the ADHD scale had very high internal consistency ($\alpha=.95$), and the internal consistency of the total ADHD symptoms score was high in the present study ($\alpha=.99$), with sum scores ranging from 0 to 18 (i.e., the full range of possible ADHD symptoms).

Friendship Intimacy Exchange Children reported on friendship intimacy exchange with their identified best friend at baseline using the 6-item intimate exchange subscale of the Friendship Quality Questionnaire (FQQ; Parker and Asher

1993). Consistent with the recommended administration of this measure, children were first asked whether they had a best friend and, if so, to write the first name of their self-identified best friend. All children indicated having an identified best friend that they saw in at least one setting (e.g., school, neighborhood, sport team/club). Children used a 5-point scale (0 = *not at all true*, 1 = *a little true*, 2 = *somewhat true*, 3 = *pretty true*, 4 = *really true*) to report their perceptions of the level of personal information and feelings that they shared with their best friend. Sample items include "*My best friend and I tell each other secrets*" and "*My best friend and I always tell each other our problems.*" The FQQ has been established as a valid and reliable measure of friendship quality in children as young as 4 years old (Howe and Parke 2001; Parker and Asher 1993). Mean scores were computed and used for analyses. Internal consistency in the current sample was good ($\alpha=.77$).

Social Problems The education director's reports of social problems were collected at baseline and one-year later using four items ("*doesn't get along with other kids*", "*feels others are out to get him/her*", "*gets teased a lot*", and "*not liked by other kids*") from the Teacher Report Form (TRF; Achenbach and Rescorla 2001). Each item was rated on a 3-point scale (1 = *not true*, 2 = *somewhat or sometimes true*, 3 = *very or often true*). This shortened TRF subscale has been used in previous research and is related to other peer variables (e.g., Fite et al. 2012), providing evidence of construct validity. Items were averaged and used for analyses. Internal consistency of the scale was excellent at both time points (baseline $\alpha=.90$, follow-up $\alpha=.95$).

Missing Data

A relatively high rate of turnover is expected among at-risk children attending after-school care programs (e.g., Weisman and Gottfredson 2001), and similar rates of attrition occurred in the present study. Therefore, the education director reported on the social problems of the 70 (53.4 %) children who continued to attend the program at the one-year follow-up. Importantly, no differences were found for the baseline variables (i.e., child demographics, staff-reported social problems and ADHD symptoms, self-reported friendship intimacy) between those children who did and did not have follow-up data (all $ps>.05$). Furthermore, missing data were not predicted by other study variables as demonstrated by Little's Missing Completely at Random (MCAR) test, $\chi^2(6)=7.23, p=.30$. Across all study variables, including demographic, baseline, and follow-up data, only 6.7 % of data were missing. As such, missing social problems data at the one-year follow-up were multiply imputed using the multiple imputation (MI) capabilities

in IBM SPSS, Version 19. In imputing missing values, MI produces unbiased parameter estimates based on all available data and is also robust to departures from normality assumptions and high rates of missing data (Graham 2009; Wayman 2003). Consistent with current MI recommendations (Graham 2009; Wayman 2003; Widaman 2006), all study variables, including demographic and predictor variables at baseline, social problems at follow-up, and product terms, were included in the imputation model. Ten imputed datasets were created, and analyses were conducted for each imputed dataset and results “pooled” across the analyses to produce an overall estimate of results.

Results

Preliminary Analyses

Means, standard deviations, and intercorrelations among study variables are presented in Table 1. At the bivariate level, girls had higher rates of friendship intimacy exchange and lower rates of baseline social problems than boys. The child’s age was found to be positively related to baseline social problems. Child-reported friendship intimacy exchange was not associated with staff-reported ADHD symptoms at baseline or social problems at either baseline or the one-year follow-up. In contrast, ADHD symptoms at baseline were strongly correlated with both baseline and follow-up social problems. Child race/ethnicity was not associated with any of the predictor or outcome variables and is, therefore, not considered further in analyses.

Primary Analyses

Regression analyses were conducted to examine whether the relation between baseline ADHD symptoms and social problems at follow-up was moderated by friendship intimacy exchange above and beyond social problems at baseline and demographic variables (i.e., child age, sex). Following model-testing recommendations (e.g., Cohen et al. 2002), continuous variables were mean-centered prior to creating interaction terms to reduce multicollinearity and to aid in the interpretation of significant interactions. All VIF values were below 3.0 (values >10 are typically considered problematic) and all tolerance values were above .35 (values <.10 are typically considered problematic; Cohen et al. 2002), indicating that our regression models did not suffer from problems with multicollinearity. The overall model was significant in the original dataset and all ten imputed datasets. Regression coefficients, standard errors, and *t*-values from the pooled estimate are shown in Table 2. A significant ADHD symptoms \times friendship intimacy exchange interaction emerged. Of note, this interaction was significant in the original dataset (original dataset $b=-.01$, $SE=.01$, $\beta=-.23$, $p=.03$), each of the ten imputed datasets, and for the overall pooled estimate (shown in Table 2; see also the Table 2 note for similar findings using the original, non-imputed dataset).

The significant pooled interaction was plotted and is shown in Fig. 1. As displayed, at high levels of friendship intimacy exchange, ADHD symptoms were unrelated to social problems 1 year later ($b=.004$, $p=.41$). However, ADHD symptoms were marginally associated with social

Table 1 Means, standard deviations, and intercorrelations of study variables

Variable	1	2	3	4	5	6	7
1. Race ^a	–						
2. Sex ^b	-.12	–					
3. Age ^c	.10	-.08	–				
4. T1 ADHD symptoms	-.11	-.17	.14	–			
5. T1 intimacy exchange	-.09	.25**	.11	.03	–		
6. T1 social problems	-.13	-.19*	.28**	.66***	.02	–	
7. T2 social problems	.04	-.12	.18	.62***	-.04	.56***	–
<i>M</i>	–	–	8.23	3.88	3.28	1.25	1.24 ^d
<i>SD</i>	–	–	2.01	6.96	1.14	0.44	–

N=131. T2 Social Problems is a one-year longitudinal follow-up from T1 (baseline). Because race and sex are dichotomous variables, correlation coefficients that include these demographic variables represent point-biserial correlations. ADHD attention-deficit/hyperactivity disorder

^a For race, Non-caucasian = 0, Caucasian = 1

^b For sex, boys = 0, girls = 1

^c Age is calculated in years

^d Multiple imputation was used for T2 Social Problems, and as a result, no standard deviation from the pooled datasets is available. In the original dataset (follow-up *n*=70), T2 Social Problems *M*(*SD*)=1.12(0.36)

* $p<.05$. ** $p<.01$. *** $p<.001$

Table 2 Regression results of ADHD symptoms, friendship intimacy exchange, and their interaction predicting T2 social problems above and beyond demographic characteristics and T1 social problems

Predictors	T2 social problems		
	B	SE	t
Intercept	1.23	.04	28.12***
Sex ^a	.01	.06	.10
Age ^b	.01	.01	.83
T1 social problems	.34	.10	3.32**
T1 ADHD symptoms	.02	.01	1.85 [†]
T1 friendship intimacy exchange	-.02	.03	-.67
ADHD × friendship intimacy exchange	-.01	.01	-2.32*

N=131. Overall model fit statistics and standardized β coefficients unavailable due to using the pooled multiple imputation data results. Original dataset overall model fit: $F(6, 63)=9.09, p<.001, R^2=.46$. Imputed datasets overall model fit range: $F(6, 124): 10.87–25.66$, all $ps<.001, R^2=.35–.55$. Original dataset interaction term $\beta=-.23$. Imputed dataset interaction term β range=-.16 to -.37. Continuous variables were mean-centered prior to being entered in the model. T2 Social Problems is a one-year longitudinal follow-up from T1 (baseline). ADHD attention-deficit/hyperactivity disorder

^a For sex, boys = 0, girls = 1

^b Age is calculated in years

[†] $p=.08$. * $p<.05$. ** $p<.01$. *** $p<.001$

problems 1 year later at mean levels of friendship intimacy ($b=.02, p=.08$) and significantly associated with social problems at low levels of friendship intimacy ($b=.03, p=.01$). Descriptively, 25 children (16 boys, 9 girls) in the current sample reported rates of friendship intimacy below the low threshold (i.e., -1 SD), and 32 children (22 boys, 10 girls) reported rates below the mean, indicating that approximately 44 % of the sample fell in the range of low intimacy

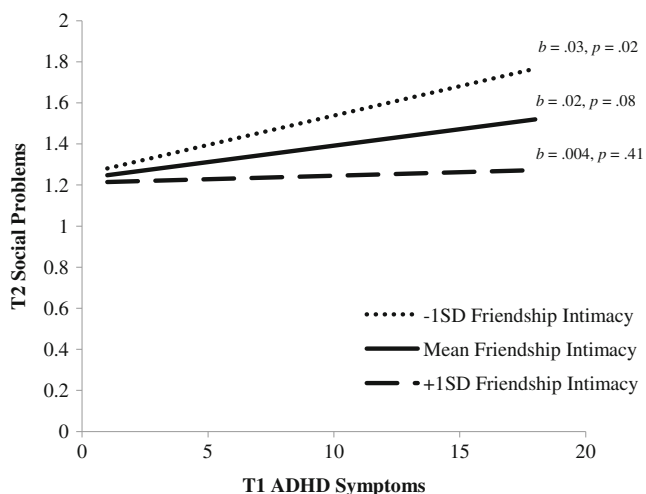


Fig. 1 Friendship intimacy exchange moderates the longitudinal relation between attention-deficit/hyperactivity disorder (ADHD) symptoms and social problems

exchange whereby ADHD symptoms were prospectively associated with increased social problems 1 year later. Conversely, friendship intimacy exchange was a buffer for the remaining 74 children (31 boys, 43 girls) who had friendship intimacy exchange rates above the mean, such that the link between ADHD symptoms and social problems was no longer present. Consistent with the significant bivariate correlation between female sex and friendship intimacy exchange noted above, a higher proportion of boys had friendship intimacy exchange rates below the mean compared to girls, $\chi^2(1)=7.93, p=.005$.

Finally, we tested the possibility that child age or sex would further qualify the significant interaction between ADHD symptoms and friendship intimacy exchange (again with the imputed data in order to achieve adequate statistical power). Regression models examining child age and sex were conducted separately, with all two-way interactions entered prior to the three-way interaction including age or sex. In contrast to expectations, the three-way interaction involving ADHD symptoms, friendship intimacy, and age was not significant, $b=.0001, t=.02, p=.98$. Likewise, the three-way interaction of ADHD symptoms, friendship intimacy, and sex was not significant, $b=.01, t=.87, p=.39$.

Discussion

Although substantial research has focused on the general social and peer group difficulties found among children with ADHD symptoms, far less research has examined the friendships of children with ADHD symptoms (Hoza 2007; Mikami 2010). Even when friendships have been studied, *friendship presence* has more frequently been assessed as opposed to dimensions of *friendship quality* such as intimacy exchange. The extant research to date, however, suggests that intimacy exchange is linked to greater friendship satisfaction as well as more general social competence (Buhrmester 1990; Jones 1991; Sanderson et al. 2005). The current study makes an important contribution by extending these findings to ADHD symptoms specifically, which are commonly associated with significant peer impairments (Hoza 2007). By using a multi-informant longitudinal design of children attending a community-based after-school program, results of the present study indicated that friendship intimacy exchange mitigated the prospective relations between ADHD symptoms and general social problems even after controlling for demographic variables and baseline social problems. Interestingly, this effect did not differ as a function of the child’s age or sex.

Results of the present study suggest a nuanced relation between ADHD symptoms and general social problems or friendship intimacy exchange. As hypothesized, ADHD symptoms were strongly associated with general social

problems linked to peer rejection at both baseline and 1 year later. In contrast, and contrary to expectations, neither ADHD symptoms nor social problems were associated with friendship intimacy exchange. The measure of social problems used in the present study largely measured adult-perceived peer rejection, and it is known that some rejected children have friends just as some popular children do not (Gest et al. 2001; Parker and Asher 1993). Therefore, it is possible that children were able to identify a friend with whom they perceived having a positive friendship, perhaps with a peer not attending the after-school program, whereas staff only reported on the children's general social problems as observed in the after-school setting. In addition, the current study used a community-based sample of children, and although the full range of ADHD symptomatology was present, it is possible that the relation between friendship intimacy and social problems or ADHD symptoms more clearly emerges among children diagnosed with ADHD who, by definition of diagnosis, experience clinically significant impairment. Finally, it is also possible that cross-rater differences contributed to the nonsignificant correlations between staff-reported ADHD symptoms and social problems and the child's self report of friendship intimacy. Children with ADHD frequently display a positive illusory bias (PIB), that is, a tendency to overestimate their competencies despite frequent failure across behavioral, academic, and social domains of functioning (Owens et al. 2007). Interestingly, although children with ADHD self-report having more friendships compared to others' reports (Bagwell et al. 2001; Glass et al. 2012; Heiman 2005), friendship quality may be less susceptible to overestimation (Glass et al. 2012; Normand et al. 2011). For instance, Normand et al. (2011) found that children with ADHD perceived fewer positive features and more negative features in their friendships compared to children without ADHD, suggesting that children with ADHD may not overestimate the qualities of their dyadic friendships. Clearly, future research is needed to examine whether results of the present study are due to use of a community versus clinical sample and/or possible overestimation in children's reports of friendship intimacy exchange.

Despite these considerations, our results indicate that children's self-reported friendship intimacy should not be discarded or considered invalid. Even though there was not an association between intimacy exchange and either ADHD symptoms or social problems, perceptions of intimacy exchange did emerge as a buffer of later staff-rated social problems. This finding indicates that even self-perceived friendship intimacy can matter in terms of later social difficulties as observed by others. The precise mechanisms that contribute to this buffering effect remain untested. However, it is plausible that children who are able to establish a mutual friendship that is characterized by high

levels of self-disclosure and the sharing of feelings develop improved social skills as a result (Buhrmester 1990), which subsequently translates to improvements within the broader peer group. Further, friendship intimacy is linked to the use of more constructive strategies for dealing with conflict (Sanderson et al. 2005), and constructive conflict strategies learned in the context of a relatively safe friendship may generalize to other peer relationships. As such, strengthening the degree of friendship intimacy among children with ADHD symptoms may be a gateway to increased acceptance in the broader peer group.

Child Age and Sex

We also examined whether the buffering role of friendship intimacy exchange differed as a function of age or sex. Consistent with previous research (Parker and Asher 1993; Rielly et al. 2006), boys in the present study rated their self-identified best friendships as possessing less intimacy exchange than girls. Nonetheless, the protective role of high intimacy exchange did not differ for boys or girls. These findings suggest that even if boys generally rate their best friendships as having lower intimacy exchange in comparison to girls, the risk of social problems among both boys and girls exhibiting ADHD symptoms is lower when they perceive their best friendships as including high rates of disclosure and emotional support.

In contrast to expectations, child age was not associated with friendship intimacy exchange, nor did age affect the buffering role of friendship intimacy. Although friendship intimacy generally increases in importance as children approach adolescence (Bagwell and Schmidt 2011), children's perceptions may change in regarding *what* constitutes intimacy-eliciting disclosures or the relative *importance* of such disclosures compared to other friendship characteristics (e.g., companionship, conflict resolution) but not necessarily the *degree* to which such disclosures occur (Bagwell and Schmidt 2011). This intriguing possibility is speculative given the absence of data in our study to extract such nuances, but is a promising area for future research.

Findings from this study suggest that friendship intimacy is a potentially important target for peer and friendship-specific interventions and may be beneficial for boys and girls as well as younger and older children. Although both having a dyadic friendship and peer status are stable, the former is somewhat less stable (Mrug et al. 2012; Pedersen et al. 2007), making friendship a potentially worthwhile focus of interventions for children who frequently have problems in the broader peer network (Blachman and Hinshaw 2002; Hoza et al. 2003; Mikami et al. 2010a, b; Mrug et al. 2001). As noted above, there is an important distinction between friendship presence and friendship quality. Still, a child has to first establish a mutual friendship in

order for friendship quality to be targeted, which is often a challenge in and of itself among children with ADHD symptoms (Bagwell et al. 2001; Blachman and Hinshaw 2002; Hoza et al. 2005). After a mutual friendship is established, our results suggest that enhancing friendship quality, and intimacy exchange specifically, may be a critical component to include in such interventions.

Thus, successful friendship interventions must likely be multi-faceted, including components that address both making and selecting friends as well as friendship quality domains such as intimacy exchange. It is also important to implement prevention strategies or interventions at broader levels within after-school programs since this approach may positively affect both peer group and friendship processes for typically developing children as well as children displaying ADHD symptoms or other behavioral difficulties (Buysse et al. 2003; Mikami et al. 2010b). In fact, in addition to having an opportunity to intervene with children who are often at-risk, a recent meta-analysis demonstrated that after-school programs increase positive social behaviors and reduce problem behaviors (Durlak et al. 2010). Although care must be taken to ensure adequate supervision and use of an effective behavior management system in order to avoid the possibility of “deviancy training” (see Hoza 2007), fostering positive friendship qualities in these programs may be an important step towards reducing the long-term effects of ADHD symptomatology on social impairments.

Limitations and Future Directions

There are several limitations of the present study that highlight important areas for future research. First, only children were included in this study and results may not generalize to preschoolers or adolescents, and given the nature of the after-school care program may not generalize to broader community or school-based samples. Also, it is important to note that the children in the current study were not diagnosed with ADHD, nor were they seeking treatment for ADHD-related difficulties. Although using a community-based sample allowed for the full range of ADHD symptom endorsement to be present (categorizing the Likert-type scale to indicate symptom presence or absence), staff ratings are not sufficient for assessing ADHD. Further, impairment due to ADHD symptoms was not assessed, and data regarding any medication use in this sample were not available. Both functional impairment and medication use should be considered in future studies. Given this, findings may not apply to clinical samples of children with ADHD. Replicating the results of the present study in a clinical sample of children with ADHD is needed, especially given the potential treatment implications of the results. Future research should also examine the extent to

which the buffering role of friendship intimacy among children displaying ADHD symptoms is affected by comorbid mental health problems such as oppositionality, anxiety, or depression (Becker et al. 2012b; Mikami 2010).

Another limitation of the present study was the singular, self-reported measure of friendship functioning. Intimacy exchange was the only friendship domain that was measured, leaving other facets of friendship quality (e.g., companionship, recreation, conflict and conflict resolution) and characteristics of friendship (e.g., presence, duration) unexamined. Therefore, it is possible that the presence of friendship quality generally, as opposed to intimacy exchange specifically, may buffer the relation between ADHD symptoms and social problems, and future research that includes multiple indicators of friendship quality will be needed to tease apart the unique role of friendship intimacy specifically. Moreover, we only assessed friendship intimacy from the perspective of the child, who self-identified a “best friend” that was not validated through ratings from the target friend, sociometric nominations, or observational methods. Examining other facets of friendship quality in addition to the perspectives of both friends in the relationship will be especially important in future studies. In addition, examining the perspectives of both friends in the relationship will be especially important in future studies given the possibility that a PIB exists across social and friendship domains of children displaying symptoms of ADHD.

In addition, although the education director who provided ratings on children’s ADHD symptoms and social functioning spent considerable time with each child included in this study, our use of a single individual’s ratings of these domains should be taken into consideration. It will be important for future research to replicate our findings when ratings from teachers and/or parents are considered. Finally, community-based after-school programs working with at-risk youth typically experience a high degree of turnover (Weisman and Gottfredson 2001), and a relatively high rate of attrition at the one-year follow-up did occur in this study. In some regard, this speaks to the generalizability of the results since the study included children in an ecologically-valid, real-life setting with a racially diverse sample of children from families of relatively low socioeconomic status. Still, the rate of attrition in the present study should be taken into consideration when interpreting the results. In order to include all participants’ data and reduce potential bias, best-practice MI strategies were used in handling missing data (Graham 2009; Wayman 2003; Widaman 2006). Nonetheless, it is important to note that results were unchanged when analyses were conducted with only the original, non-imputed data and the participants in our study who did and did not have follow-up data did not differ on any study variable. Still, future work in after-school programs should examine more fully the degree to which attrition is

linked to more adverse outcomes, particularly given research showing that children most at-risk are also more likely to withdraw from after-school programs (Weisman and Gottfredson 2001).

Conclusions

In sum, this study identified friendship intimacy exchange as a buffer of the relation between ADHD symptoms and social problems 1 year later. This finding is important given the often-reported peer group and friendship difficulties experienced by children displaying symptoms of ADHD. Among children in our sample who reported high levels of friendship intimacy exchange, the prospective link between ADHD symptomatology and social problems became statistically nonsignificant. Further, this buffering role was similar for boys and girls, as well as younger and older children, suggesting that promoting friendship intimacy may be an important component to incorporate in existing interventions or in the development of new prevention and intervention programs. Ongoing attention to the friendships of children in both community and clinical samples is needed, particularly in uncovering the processes by which friendship intimacy can be leveraged to ensure it has a protective effect on long-term developmental outcomes.

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