INTRODUCTION

Symptoms of Attention-Deficit/Hyperactivity Disorder (ADHD) have been theorized as a developmental precursor to conduct problems (Lahey et al., 2000). One of the mechanisms proposed to account for the link between ADHD and conduct problems is affiliation with deviant peers. High levels of ADHD symptoms are associated with poor academic performance (DuPaul & Stoner, 2003), poor social skills (Muog, et al., 2001), and alienation from prosocial peers (Bagwell et al., 2001). Rejection from prosocial peers may lead some youth to affiliate with deviant peers who model and reinforce antisocial behavior (Parker & Asher, 1987; Ferguson & Horow, 1996). However, not all ADHD youth end up with conduct problems. This heterogeneity in outcomes suggests that there may be important moderators that influence the continuity from ADHD symptoms to conduct problems.

Several lines of evidence suggest that interpersonal conflict may increase the likelihood of the continuity from ADHD symptoms to conduct problems. First, interpersonal conflict disrupts attachment in parent-child interactions (Furman et al., 1985; Stone et al., 2002) and poor parenting is associated with school failure (Adams et al., 2000; Zeltman & Waterman, 1998), poor social skills and affiliation with deviant peers (Lahey & Loeb, 1984; Sibley et al., 2012). Second, high interpersonal conflict increases the likelihood of children developing negative schemas that include attributional biases and aggressive behavior across a variety of social contexts including peer relationships (Bascoe et al., 2009; Johnstone & Rosby, 1997; Pollak & Toley-Schell, 2004). Finally, ADHD is associated with heightened sensitivity and greater emotional and behavioral distress in response to recurring interpersonal conflict (Cummins et al., 1985; Kazakczynski & Cummings, 1989). Taken together these findings suggest that interpersonal discord may be particularly distressing and disruptive for youth with ADHD symptoms and may increase the likelihood of conduct problems.

Some developmental trajectories suggest that hyperactivity/symptoms are more strongly related to conduct problems (Sibley et al., 2012). HYPOTHESIS: We hypothesized that the relationship between ADHD symptoms and conduct problems would be moderated by interpersonal discord, such that ADHD symptoms would be prospectively associated with conduct problems when interpersonal discord was high. We tested this question for overall ADHD symptoms as well as for separate symptom clusters (inattention and hyperactivity/hyperactivity). There is evidence that the symptom clusters follow different developmental trajectories such that hyperactivity/impulsivity symptoms are more strongly related to conduct problems (Sibley et al., 2012).

RESULTS

Regression analyses were conducted to predict Time 2 conduct problems (parent- and adolescent-report of conduct problems were considered in separate models), controlling for Time 1 conduct problems, age, gender, and family income. Of particular interest were two-way interactions between interpersonal discord and ADHD symptoms. Significant interactions were identified in procedures following suggestions by Alkin and West (1991). We first considered overall ADHD symptoms and then inattention and hyperactivity/impulsivity symptoms separately.

PARENT-REPORT OF CONDUCT PROBLEMS

First-order effects suggested that combined ADHD symptoms (β = 0.16, p < 0.01) and interpersonal discord (β = 0.12, p < 0.01) were associated with parent-report of conduct problems one year later. The ADHD symptoms by interpersonal discord two-way interaction term was also statistically reliable (β = 0.15, p < 0.05). Simple slopes suggested that combined ADHD symptoms were associated with high levels of conduct problems at high (β = 0.28, p < 0.05) and low (β = 0.07, ns) levels of interpersonal discord (Figure 1). When ADHD symptom clusters were separated, statistically reliable effects included the first-order effect of impulsivity/ hyperactivity symptoms (β = 0.15, p < 0.05) and the two-way interaction effects by interpersonal discord interaction (β = 0.16, p < 0.05). Inattention symptoms prospectively predicted conduct problems at high (β = 0.17, p < 0.01), but not at low (β = 0.06, ns) levels of interpersonal discord.

ADOLESCENT-REPORT OF CONDUCT PROBLEMS

First-order effects indicated that combined ADHD symptoms (β = 0.17, p < 0.05) but not parent discord reliably predicted adolescent-report of conduct problems one year later. There was a statistically reliable interaction between ADHD symptoms and interpersonal discord (β = 0.10, p < 0.05). Simple slopes indicated that high levels of conduct problems at low (β = 0.26, p < 0.01) but not high (β = 0.06, ns) levels of interpersonal discord (Figure 2). When ADHD symptoms clusters were separated, the only statistically reliable effect was found for impulsivity/hyperactivity symptoms (β = 0.25, p < 0.01) in predicting conduct problems one year later. Neither symptom cluster entered into a reliable interaction with interpersonal conflict.

SUMMARY AND DISCUSSION

Our findings suggest that interpersonal discord moderates the prospective association between ADHD symptoms and conduct problems, but the nature of this moderating effect is different for parent- versus adolescent-report of conduct problems.

| Adolescents with high levels of ADHD symptoms were more likely to show increases in parent reported conduct problems one year later when interpersonal discord was HIGH (this supports our hypothesis). |
| Findings are consistent with some prior work showing that children with ADHD and CD diagnoses report qualitatively worse interpersonal discord in their families than children without a diagnosis of ADHD or with ADHD only (Wynne et al., 2008). |
| Several studies have shown that high levels of interpersonal discord are associated with childhood externalizing behaviors such as aggression, arguing, and delinquency (Dunn & Davies, 2001; Emm & Burman, 1995; Grych & Fincham, 2001; Schonerman et al., 2010). Our work shows that these outcomes are particularly likely for children with high levels of ADHD symptoms who also experience high levels of interpersonal conflict. |
| When faced with high levels of conflict at home, children have been theorized to develop negative schemas which increase their vulnerability to misinterpreting social situations, and exacerbates their risks for problematic behaviors (Goodwin et al., 2008). Furthermore, children with high levels of ADHD symptoms who also experience high levels of interpersonal conflict are more likely to be at high risk for conduct problems. |
| Adolescents with high levels of ADHD symptoms were more likely to show increases in adolescent reported conduct problems when interpersonal discord was LOW (opposite of our prediction). |
| This finding was unexpected, and it is unclear why ADHD symptoms would predict conduct problems in low discord homes. It will be important for this findings to be replicated before strong conclusions can be drawn about this effect. |

A second facet of this study was to examine symptom clusters, attempting to delineate inattentive from impulsivity/hyperactivity symptomatology.

Hyperactivity/impulsivity symptoms were predictors of conduct problems at all levels of interpersonal discord and across both parent- and adolescent-reporters. Current findings indicate that impulsivity/hyperactivity symptoms, in general, are more likely to lead to conduct problems regardless of parental conflict.

Impulsivity symptoms were also associated with conduct problems through interaction with interpersonal discord, but not for parent-report of conduct problems. Perhaps the impact of inattention symptoms are more subtle and their effect might depend more heavily on the environment. It is possible that adolescents with poor attention who come from disrupted home environments experience more stress at school and gravitate towards deviant youth who are also alienated from school. Such peers support and model conduct problems, resulting in the adolescent engaging in delinquent and antisocial behavior themselves (Haynie, 2001).

LIMITATIONS

- Our sample was limited to early adolescence; although this period is a critical time for the development of a conduct disturbance, it might be important for future studies to look at other developmental ages.
- Findings should not be generalized to samples with demographic characteristics different from our sample. For example, although our sample reflected the characteristics of the county from which it was selected, it was largely Caucasian and it is possible that the impact of family environment on the developmental course of ADHD into adolescence operates differently across racial and ethnic groups.

The Developmental Cascade from ADHD symptoms to Conduct Problems and the Moderating Role of Interparental Discord in a Community Sample

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