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What is This?
Acute Effects of MPH on the Parent–Teen Interactions of Adolescents With ADHD

William E. Pelham, Jr.¹, David L. Meichenbaum², Bradley H. Smith³, Margaret H. Sibley¹, Elizabeth M. Gnagy¹ and Oscar Bukstein⁴

Abstract
This study explored the nature of interactions between adolescent males with ADHD and their mothers, and the effects of methylphenidate (MPH) on an analogue parent–teen interaction task. Twenty-five adolescent males with ADHD (M = 13.6 years) and their mothers and 14 non-ADHD adolescent males (M = 13.4 years) and their mothers completed ratings of perceived dyadic conflict. Behavioral observations of dyads during 10-min conflict-resolution tasks were also collected. The ADHD dyads completed these tasks twice, with adolescents receiving either 0.3 mg/kg MPH or placebo. Videotaped sessions were coded using the Parent–Adolescent Interaction Rating Scale. Following the conflict-resolution task, participants rated their perceived conflict and affect during the interaction. Findings indicated higher conflict in the ADHD dyads, and minimal MPH effects on parent–teen interactions during the analogue task. Results suggest that stimulant medication does not produce meaningful acute effects on parent–teen interactions. (J. of Att. Dis. 2013; XX(X) 1-XX)

Keywords
ADHD, stimulant medication, adolescence

The Effect of Methylphenidate (MPH) on Parent-Directed Conflict Behavior in Adolescents With ADHD

In adolescence, parent-directed conflict behaviors intensify as teens attempt to increase personal independence (Larson, Richards, Moneta, Holmbeck, & Duckett, 1996; Laursen, Coy, & Collins, 1998; Steinberg & Morris, 2001). Youth with ADHD display poor emotion regulation skills, problem-solving deficits, and high rates of comorbid oppositional defiant disorder (ODD; Anderson, Williams, McGee, & Silva, 1987; Cantwell, 1986; Sobanski et al., 2010; Wehmeier, Schacht, & Barkley, 2010). These deficits contribute to impaired and strained relationships with family members, which further elevate parent–adolescent conflict (Barkley, Anastopoulos, Guevremont, & Fletcher, 1992; Edwards, Barkley, Laneri, Fletcher, & Metevia, 2001; Montemayor & Hanson, 1985).

A couple of studies highlight family impairment in adolescents with ADHD. Barkley, Anastopoulos, and colleagues (1992) found that parents of adolescents with ADHD reported higher levels of home conflict behavior than parents of non-ADHD controls. These authors also observed that when compared with non-ADHD control families, youth with ADHD and comorbid ODD displayed especially high levels of conflict behavior in a laboratory paradigm. Similarly, Edwards and colleagues (2001) found that when compared with non-ADHD controls, adolescents with ADHD and comorbid ODD displayed higher rates of parent–teen conflict on parent rating scales and in laboratory tasks. The sources of these conflicts are reported to include the teen’s failure to accept responsibility for performing routine tasks, difficulty obeying rules outside of the home, resistance to complying with requests of authority, and excessively high emotions (Barkley, Guevremont, Anastopoulos, & Fletcher, 1992). As a direct result of their son’s/daughter’s oppositional behavior, parents of adolescents with ADHD report high levels of stress (Evans, Sibley, & Serpell, 2009).

Evidence of elevated familial conflict should cause concern given the documented links between the parent–adolescent relationship and adjustment difficulties, psychopathology (e.g., major depressive disorder and conduct disorder [CD]), and substance abuse in adolescents.
(Dodge et al., 2009; Hoeve et al., 2009; Reinherz, Paradis, Giaconia, Stashwick, & Fitzmaurice, 2003). Dishion, Nelson, and Bullock (2004) present evidence that many parents of disruptive teens disengage from parenting. Subsequently, this disengagement predicts deviant peer affiliations in adolescence. Conversely, positive parent–adolescent relationships have been shown to buffer against the development of negative psychosocial outcomes (Brennan, Le Brocque, & Hammen, 2003). As a result, unhealthy parent–adolescent relationships warrant intervention in ADHD populations to promote positive outcomes and prevent more serious problem behaviors such as delinquency, substance use, and deviant peer affiliation.

Treatment programs were developed to target parent–adolescent interactions through communication and negotiation skills training (e.g., Barkley, Edwards, & Robin, 1999; Robin & Foster, 1989; Szapocznik et al., 1988). Although these psychosocial treatment programs showed some initial success (McLear & Ridley, 1999; Robin & Koepeke, 1990), the overall reported effectiveness of these parent–adolescent interventions is limited (Barkley, Edwards, Laneri, Flethcher, & Metevia, 2001)—for example, an improvement rate of 35% compared with the improvement rates for parent–child interventions of 60% to 65%. The limitations of current skills training programs with parents and adolescents with ADHD are further illustrated by Barkley and colleagues (1999) who found that although adolescents with ADHD improved following treatment, most did not show significant improvement relative to the functioning of control children. These researchers administered intensive behavior management, problem-solving and communication training, and/or structured family therapy to adolescents and their parents. Of the 61 teens targeted in therapy, only 5% to 30% showed clinically significant improvements in the number of family conflicts, and those improvements were maintained in only 5% to 20% of this sample at a 3-month follow-up. These findings have been replicated by Barkley et al. (2001) in a sample of comorbid ADHD/ODD adolescents and their parents. These authors found that only 23% of the families changed by either mid- or post-treatment. Thus, the limited efficacy of these psychosocial approaches raises the question of whether additional treatments for ADHD, namely, stimulant medication, better addresses problems in the parent–adolescent relationship.

Central nervous system stimulant medication is the most commonly used and widely studied medication for children and adolescents with ADHD (Smith, Barkley, & Shapiro, 2006). A large body of literature documents the efficacy of stimulant medication as a primary treatment for ADHD in children (Greenhill & Ford, 2002) and these effects have been replicated with adolescents (Berek et al., 2011; Findling et al., 2011). Stimulant medication can lead to decreases in classroom disruption and negative peer interactions and increases sustained attention, on-task behavior, classroom productivity, positive peer interactions, and compliance with adult requests (Evans et al., 2001; Smith et al., 1998). Stimulant medication can also improve parent–child relations by increasing a child with ADHD’s quantity of communication and level of compliance, decreasing negative responses from mothers, and increasing positive maternal responses (Barkley, 1985, 1989; Barkley & Cunningham, 1979, 1980; Barkley, Karlsson, Strzelecki, & Murphy, 1984; Chronis, Pelham, Gnagy, Roberts, & Aronoff, 2003; Humphries, Kinsbourne, & Swanson, 1978; Stein et al., 1996). However, the effect of pharmacotherapy on the interpersonal behavior of adolescents with their parents remains unstudied (Robin, 1998).

Despite a lack of direct empirical evidence, practice guidelines recommend stimulant medication to improve parent–adolescent interactions (e.g., American Academy of Pediatrics, 2011). In addition, given the growing number of adolescents prescribed stimulant medication (Centers for Disease Control, 2010), there is an urgent need to better understand the cumulative effects of medication on adolescent functioning. Thus, the purpose of this study is twofold. First, using self-report, parent-report, and observational measures, we compared parent–adolescent interactions in ADHD and control families in a mother–son conflict-resolution task. We hypothesized higher levels of parent–adolescent conflict in dyads with an ADHD teen. Second, we examined acute effects of a common dose of MPH (0.3 mg/kg) on mother–adolescent interactions during the same task. We hypothesized that stimulant medication would improve parent–teen interactions during the analogue task.

Method

Participants

The ADHD group included 25 adolescent males with ADHD, between the ages of 12 and 16 (M = 13.6 years old, SD = 1.2), and their mothers. The adolescents were enrolled in an 8-week summer treatment program (STP-A; Sibley et al., 2011; Smith et al., 1998) provided by the Attention Deficit Disorder Program at Western Psychiatric Institute and Clinic. Participants were part of a larger investigation of MPH effects on adolescents with ADHD (Evans et al., 2001; Smith et al., 1998). The present sample only included participants from the previous studies who were male and who had a mother who was willing to participate. All participants met the criteria for a Diagnostic and Statistical Manual of Mental Disorders (4th ed.; DSM-IV; American Psychiatric Association, 1994) diagnosis of ADHD, based on a structured parent interview and standardized parent and teacher Disruptive Behavior Disorders rating scales (Pelham, Gnagy, Greenslade, & Milich, 1992). To participate in this study, an adolescent was required to (a) meet...
diagnostic criteria for ADHD, (b) have his 12th birthday before the study began, (c) have a full-scale IQ higher than 80, and (d) have no conditions that precluded a trial of stimulant medication or full participation in the STP-A academic and athletic activities.

According to DSM-IV criteria, 68% of ADHD participants met criteria for ADHD-Combined Type and 32% for ADHD-Predominantly Inattentive Type. The sample also possessed a high rate of comorbid disruptive behavior disorders (ODD = 52%, CD = 36%). A small proportion of the sample (8%) met criteria for a learning disorder. Average full-scale IQ score was 99.76 and the median reported family income was US$48,750.

The control group consisted of 14 male adolescents (M age = 13.4 years, SD = 1.3) and their mothers. The control participants were selected from a group of older siblings of children who had been recruited via radio advertisements to participate as normal control participants in a study comparing ADHD children with comparison children. The adolescents were matched by age and grade level to the clinical sample. Adolescents in the control group could not have received MPH as part of an STP-A medication assessment. All participants previously received MPH as part of an STP-A medication assessment.

Adolescents with ADHD further received a double-blind, placebo-controlled assessment of the effects of MPH on parent–adolescent interactions. These dyads completed two separate sessions, 2 weeks apart. On one day, the ADHD adolescents received 0.3 mg/kg of MPH 90 min prior to the session; they received placebo on the other day in counterbalanced order. All participants previously received MPH as part of an STP-A medication assessment (Evans et al., 2001; Smith et al., 1998).

**Measures**

**IC.** The IC comprises 44 issues that are a common source of conflict between parents and adolescents (e.g., coming home on time, telephone calls, fighting with siblings). Raters assess the frequency and perceived anger intensity (rated on a 5-point scale; 1 = calm and 5 = angry) of specific disputes over the course of the last 2 weeks. The IC has been shown to discriminate between distressed and nondistressed families, and it correlates with other self-report and observational family interaction measures (Robin & Koepe, 1990; Robin & Weiss, 1980). Two scores were computed for evaluation. First, anger per discussion was obtained by multiplying each frequency estimate by its associated intensity, summing these cross products, then dividing by total frequency estimates (Barkley et al., 1999). In addition, the frequency of arguments endorsed during the last 2 weeks was calculated and divided by 14 to obtain the average frequency of arguments per day.

**CBQ.** The parent and adolescent version of the CBQ-20 (Robin & Foster, 1989) assessed the parent–teen relationship after each laboratory interaction. Respondents rated statements about the parent–teen relationship on a 1 to 5 Likert-type scale. The CBQ-20 is a 20-item scale that was adapted from the 73-item CBQ (Prinz et al., 1979). CBQ-20 items are the CBQ items that best discriminated distressed from nondistressed families. It yields a single score that correlates .96 with the full CBQ (Robin & Foster, 1989).

In addition, an item was included at the end of the CBQ that was presented following the laboratory-based interactions. This question asked the mothers and adolescents.

**Table 1. Sample Characteristics.**

<table>
<thead>
<tr>
<th></th>
<th>ADHD (n = 25)</th>
<th>Control (n = 14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years (adolescent)</td>
<td>13.6 (1.2)</td>
<td>13.4 (1.3)</td>
</tr>
<tr>
<td>Grade</td>
<td>7.2 (1.0)</td>
<td>7.3 (1.3)</td>
</tr>
<tr>
<td>IOWA Conners Parent Rating Scale*&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inattention/Hyperactivity subscale</td>
<td>10.2 (2.7)</td>
<td>1.9 (1.9)</td>
</tr>
<tr>
<td>Oppositional/Defiant subscale</td>
<td>8.5 (4.2)</td>
<td>1.4 (1.8)</td>
</tr>
<tr>
<td>IOWA Conners Teachers Rating Scale&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inattention/Hyperactivity subscale</td>
<td>9.3 (5.1)</td>
<td>1.5 (1.8)</td>
</tr>
<tr>
<td>Oppositional/Defiant subscale</td>
<td>6.9 (5.5)</td>
<td>0.6 (0.9)</td>
</tr>
</tbody>
</table>

<sup>a</sup>Loney and Milich (1982); Pelham, Milich, Murphy, and Murphy (1989).

*O’Leary, 1979; Robin & Foster, 1988). Research assistants collected these ratings and determined from the
whether the interaction in which they engaged was typical
of discussions they have in their home. On this item, 66% of
ADHD adolescents and 70% of their mothers (and 79% of
control dyads) indicated that the laboratory-based discus-
sions were similar to what transpired at home. These results
support the validity of the laboratory-based conflict-resolu-
tion task in tapping typical mother–son interactions.

**PANAS.** The PANAS is a 33-item, 5-point self-report
mood scale with items that range from not at all (1) to
extremely (5). The PANAS consists of two subscales: Posi-
tive Affectivity (PA) and Negative Affectivity (NA). The
13-item PA scale assesses activity and engagement level
and ranges from 13 (sadness, lethargy) to 65 (energy and
activity). The 20-item NA scale consists of 20 items, such
as irritation, anger, guilt, and fear, and can range in score
from 20 to 100, with higher scores indicating more nega-
tive mood states. Mothers and adolescents completed the
PANAS following their dyadic interactions. Only 14 of the
25 ADHD families were administered the PANAS because
the measure was added in the third cohort of data collection.

**Parent–Adolescent Interaction Rating Scale (PAIRS).** The
PAIRS (Meichenbaum, Pelham, Gnagy, & Smith, 1997) is
an observational coding system developed for this study. It
was modified from the 36-item Interaction Behavior Code
(IBC; Prinz & Kent, 1978) by converting the dichotomous
IBC items into a 7-point Likert-type system (1 = occurs
not all to 7 = occurs very much). Four items were also added
to help assess the quality of interactions (e.g., reasoning,
active engagement, expression of feelings, and off-task dis-
course).

A total of 23 of the items are evaluated separately for the
parent and adolescent, and 4 are evaluated for the dyad as a
unit. An exploratory, principal components factor analysis
with varimax rotation (see Table 2) was performed on the
PAIRS item scores from the ADHD dyads to reduce the
number of measures subject to data analysis. Considering
only the 23 PAIRS items that are evaluated separately, the
factor analysis indicated that these items load onto two fac-
tors: positive communication behaviors and negative com-
munication behaviors. Each item loaded in the direction of
its expected valence. Total negative and positive communic-
ation scores were thus computed by summing all of the
respective items, and were used as dependent measures
(range = 9–63 for positive score and 14–98 for negative
score). High scores on the behavioral indices reflect more
positive or negative communication behaviors during the
interaction.

Five separate PAIRS scores were analyzed: (a) overall
effectiveness of the dyad to demonstrate appropriate com-
munication and conflict-resolution skills (least effective = 1,
most effective = 7), (b) adolescent’s positive communication
score, (c) mother’s positive communication score,
(d) adolescent’s negative communication score, and (e)
mother’s negative communication score. The mean scores
across the five observers’ ratings were used in all analyses.
Interrater reliability was satisfactory, ranging from an alpha
coefficient of .87 for evaluating parent positive behaviors to
.94 for evaluating the overall effectiveness of the dyad, with
a mean alpha reliability coefficient across all PAIRS indices
of .93.

**Results**

All measures were evaluated for between-group differ-
ences using one-way ANOVAs. Repeated measures
ANOVs were used to detect medication effects. To
explore whether comorbid ODD/CD predicted response
to medication, we regressed conduct problems severity
(as measured by the IOWA Conners) on individual medi-
cation effect sizes for the CBQ filled out by the mother.
Prior to the analyses, assumptions were tested. When the
homogeneity of variance assumption was not met, a
robust F test for equality of means was used to evaluate
model significance (Welch’s F). Bonferroni adjustments
were made for each set of analyses to account for multiple
comparisons.

**Group Comparisons—Pre-Interaction**

On the preinteraction parent and adolescent rating IC, as
indicated in Table 3, there were no significant group differ-
ences after adjusting for multiple comparisons \((p < .01)\).
There was a marginal effect \((p = .10)\) such that adolescents
with ADHD reported greater pre-interaction anger intensity
and frequency on the IC than non-ADHD adolescents (see
Table 3).

**Group Comparisons—Post-Interaction**

Although between-group comparisons for several of the
postinteraction measures (see Table 4) yielded marginal
effects, only one comparison was significant after adjusting
for multiple comparisons \((p < .01)\). ADHD and control
dyads significantly differed in the degree of positive behav-
iors demonstrated by adolescents (see Table 4). Marginal
effects (see Table 4) included the following: adolescents
with ADHD reporting greater NA on the postinteraction
PANAS than adolescents in the control group, mothers of
adolescents with ADHD reporting lower PA on the postint-
eraction PANAS than mothers of adolescents in the control
group, mothers of adolescents with ADHD perceiving more
communication conflict on the postinteraction CBQ than
mothers of teens without ADHD, observations that ADHD
dyads problem-solved less effectively than control dyads,
and observations that maternal positive behavior was higher
in control dyads during the interaction task.
### Table 2. Factor Loadings for PAIRS.

<table>
<thead>
<tr>
<th>PAIRS item and valence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>1. Ridiculing, make fun ofa (-)</td>
</tr>
<tr>
<td>2. Repeat one’s opinion with insistencea (-)</td>
</tr>
<tr>
<td>3. Threateningb (-)</td>
</tr>
<tr>
<td>4. Interruptingb (-)</td>
</tr>
<tr>
<td>5. Stating the other’s opiniona (+)</td>
</tr>
<tr>
<td>6. Unresponsivenessa (-)</td>
</tr>
<tr>
<td>7. Making appropriate suggestionsa (+)</td>
</tr>
<tr>
<td>8. Arguing over small pointsa (-)</td>
</tr>
<tr>
<td>9. Monopolizing discussiona (-)</td>
</tr>
<tr>
<td>10. Attributing beliefs to other persona (-)</td>
</tr>
<tr>
<td>11. Humor (good natured joking)a (+)</td>
</tr>
<tr>
<td>12. Praising, complimentinga (+)</td>
</tr>
<tr>
<td>13. Asking what the other would likea (+)</td>
</tr>
<tr>
<td>14. Abrupt changes of subjectsa (-)</td>
</tr>
<tr>
<td>15. Angera (-)</td>
</tr>
<tr>
<td>16. Compromisinga (+)</td>
</tr>
<tr>
<td>17. Active engagement (+)</td>
</tr>
<tr>
<td>18. Demandinga (-)</td>
</tr>
<tr>
<td>19. Acquiescencea (-)</td>
</tr>
<tr>
<td>20. Criticisma (-)</td>
</tr>
<tr>
<td>21. Reasoning (+)</td>
</tr>
<tr>
<td>22. Off-task discourse (-)</td>
</tr>
<tr>
<td>23. Express feelings (+)</td>
</tr>
</tbody>
</table>

Items evaluated for the dyad
1. Degree of resolutiona (+) | .82 | -.42 |
2. Degree of put downsa (-) | -.41 | .82 |
3. Degree of friendliness/pleasantnessa (+) | .77 | -.49 |
4. Overall effectiveness at problem solvinga (+) | .87 | -.34 |

Note: PAIRS = Parent–Adolescent Interaction Rating Scale.
aItems derived from the Interaction Behavior Code (Prinz & Kent, 1978).

### Table 3. Adolescent and Mother Ratings of Typical Home Interactions.

<table>
<thead>
<tr>
<th>Issues Checklist—adolescent</th>
<th>ADHD</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of discussions (per day)</td>
<td>7.30 (11.30)</td>
<td>2.18 (1.72)</td>
</tr>
<tr>
<td>Anger per discussion</td>
<td>2.16 (.94)</td>
<td>1.67 (.70)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Issues Checklist—mother</th>
<th>ADHD</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of discussions (per day)</td>
<td>6.63 (5.57)</td>
<td>4.49 (3.42)</td>
</tr>
<tr>
<td>Anger per discussion</td>
<td>2.19 (.88)</td>
<td>2.01 (.70)</td>
</tr>
</tbody>
</table>

Note: Frequency of discussions represents the total number of discussions per day across all IC items. Anger per discussion represents the average anger intensity score per discussion across all IC items.
Medication Effects

The comparisons between the placebo and medicated sessions for the ADHD adolescents, as presented in Table 4, revealed no significant effects of medication on any measure after correcting for multiple comparisons ($p < .004$). Marginal effects were present for mother-rated conflict during dyadic interactions and mother’s level of PA (see Table 4). Effect sizes were computed by subtracting the placebo mean from the medication mean and dividing the difference by the standard deviation of the placebo condition (see Table 4). The mean effect size was 0.21 indicating a very small effect of medication.

Comorbid ODD/CD

ODD/CD severity was not significantly related to an adolescent’s magnitude of medication response, $F(1, 23) = .30$, $p = .59$, $R^2 = .01$, indicating that adolescents with and without significant levels of ODD/CD severity showed an equally poor response to stimulant medication.

Discussion

This study examined parent–teen interactions in adolescents with ADHD and whether stimulant medication produced acute effects on dyadic interactions during an analogue task. Our results indicated that (a) greater conflict is present in families of adolescents with ADHD and (b) stimulant medication does not produce meaningful acute effects on these interactions. These findings are discussed below.

Consistent with previous findings (Barkley, Anastopoulos, et al., 1992; Edwards et al., 2001), adolescents with ADHD displayed higher levels of conflict behavior with their parents according to parent-report and observations during the laboratory paradigm. It is important to note that some medium to large effects (see Tables 3 and 4) did not reach a level of statistical significance after correcting for multiple comparisons; however, all effects were in the expected direction and possessed similar magnitudes to those reported in previous studies (Barkley, Anastopoulos, et al., 1992; Edwards et al., 2001). One interesting finding of this study is that group differences in parent–adolescent conflict...
behavior tended to be larger for adolescent report than parent report (see Table 3). However, it appears that the source of this difference may have been a tendency for control parents to report far higher levels of conflict than their sons. Although we are not entirely sure how to interpret this trend, we speculate that inflated conflict ratings by control parents may have occurred as a reaction to newly arrived conflict behavior that emerges normatively in adolescence (Steinberg & Morris, 2001), reducing between-group effects. In contrast, the relationship between parents and adolescents with ADHD is likely to have been historically conflict ridden (Johnston & Mash, 2001), producing behavioral ratings that were similarly high, but more stable.

Mothers of adolescents with ADHD and of controls reported discussing a similar number of issues with their sons on an average day (ADHD M = 6.64 and control M = 4.49). We attempted to better understand this finding by exploring item-level endorsement patterns within each group. It appeared that although similar numbers of issues were discussed, the content of these discussions varied widely. For example, 76% of parents in the ADHD group identified talking back as a major issue, versus 43% of control mothers. Similarly, 38% of ADHD parents versus 0% of control parents endorsed discussing their adolescent getting into trouble at school, and 41% of mothers of ADHD adolescents versus 14% of mothers of non-ADHD adolescents discussed their son’s cursing. In contrast, the issues discussed most frequently in control families were related to parental efforts to monitor and supervise their teenagers (e.g., selecting new clothes, how the adolescents spend their time). These data suggest that there may be a qualitative difference in the types of parent–adolescent conflicts that emerge in ADHD versus control dyads.

Given the meager effects of family-based psychosocial treatments for adolescents with ADHD and the promise of stimulant medication in improving parent–child interactions (e.g., Chronis et al., 2003), the central aim of this study was to evaluate the effect of stimulant medication on parent–adolescent interactions. To our surprise, unlike in childhood, MPH did not produce acute effects on parent–adolescent interactions (see Table 4). This finding was stable across observational, self-report, and parent-report measures and across several interaction domains. Our failure to find MPH effects on parent–teen interactions is particularly noteworthy considering that in this same sample, highly significant acute effects of MPH were found on classroom behavior, academic performance, and social behavior with peers (Evans et al., 2001; Smith et al., 1998).

The lack of medication effects found in the observed interactions between ADHD adolescents and their mothers is even more surprising because many of the PAIRS items (e.g., interrupting, abrupt changes of subject, unresponsiveness) overlap with the core symptoms of ADHD (hyperactivity, impulsivity, and inattention).

One could argue that the limited effectiveness of medication in this study may have been mitigated by the use of a laboratory-based setting. However, 79% of parents and adolescents in the control group and approximately 70% of parents and adolescents in the ADHD group agreed that the laboratory-based discussions were typical of the discussions their families have in their home. Moreover, the adolescents with ADHD and their parents reported no differences in the typicality of the discussions they participated in as a result of the ADHD adolescents' medication status. It may also be the case that simultaneous participation in a treatment program that teaches conflict-resolution skills may have limited the effect of medication on parent/adolescent interactions. However, the failure of MPH to normalize parent/adolescent interactions (see Table 4) suggests that even combined treatment has a minimal effect on parent–teen conflict in adolescents with ADHD.

The absence of group-level acute medication effects on parent–teen interactions, however, does not preclude the potential therapeutic benefits of stimulant medication under certain circumstances. For example, the effect sizes of medication on CBQ scores and on the mothers’ report of PA approached moderate levels (d = .37-.43; see Table 4). These effects were largely a result of marked individual medication responses by a small subset of participants. However, our exploratory analyses suggested that these medication responses were unrelated to the severity of an adolescent’s oppositional behavior. In addition, it is possible that sustained stimulant medication treatment produces an eventual therapeutic benefit to parent–teen interactions, although there is little support for long-term effects of stimulant medication (Jensen et al., 2007).

There were limitations to this study. Because of our small sample and multiple comparisons, only very large effects in this study reached statistical significance. Further investigation is therefore needed with a larger sample. In addition, our sample consisted of clinic-referred adolescents who were currently participating in an intensive psychosocial treatment program. It may be the case that these findings would differ in an epidemiological sample or among youth who are not receiving psychosocial treatment for ADHD. In addition, our brief analogue task was designed to detect acute MPH effects, but not improvements to the parent–teen relationship that might be produced by sustained medication use.

In summary, the failure of stimulant medication to produce acute effects on parent–adolescent conflict behavior is noteworthy. An oft-cited benefit of long-acting stimulant medication is its ability to provide late-day coverage for evening home behavior. Our finding suggests that MPH alone may be insufficient to produce immediate reduction in family conflict. This finding is particularly concerning as research indicates that elevated family conflict provides risk for pathological behavior and adjustment difficulties.
Parent–teen conflict appears to be particularly resistant to psychosocial treatment as well (Barkley, Guay, & Pelham, 1992, 2001), which is the only other evidence-based treatment for ADHD. As a result, there is a pressing need to further develop psychosocial treatments that target this domain and to understand whether sustained medication treatment produces improvements in parent–teen interactions.

Declaration of Conflicting Interests
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Note
1. No significant differences were found in the nature of discussions of the adolescents’ and the mothers’ issues; therefore, the discussion of the adolescent’s issue was arbitrarily selected to evaluate the effects of medication and group differences.

References


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