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Evaluation of a School-Based Treatment Program for Young Adolescents With ADHD

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Objective: This study compared 2 school-based training interventions for adolescents with attention deficit-hyperactivity disorder (ADHD): the Challenging Horizons Program–after school version (CHP-AS) and Challenging Horizons Program–mentoring version (CHP-M) with each other and with a community care (CC) condition. ***Method:*** Participants were 326 students (sixth through eighth grade) diagnosed with ADHD. Interventions were conducted for 1 academic year. CHP-AS occurred twice weekly and included organization, social functioning, and academic study skills interventions. In CHP-M, students were paired with a mentor (e.g., teacher) who was trained by a consultant and delivered a subset of the CHP-AS interventions during school. No direct intervention was provided in CC. Participants were assessed at pretreatment, 4 occasions during the intervention year, posttreatment, and at a 6-month follow-up. ***Results:*** Intent-to-treatment analyses using hierarchical linear modeling to compare outcomes between the 3 conditions indicate participation in the CHP-AS intervention is associated with moderate effect size improvements in parent-rated organization and time-management skills, homework problems, and ADHD symptoms of inattention, and with small improvements in overall academic functioning and grade point average (GPA). These improvements were in comparison to CC and to CHP-M. Gains were sustained into the next school year and even increased in magnitude for several of the measures. ***Conclusions:*** The CHP-AS program leads to significant benefits for adolescents with ADHD compared with the services provided in the CHP-M and CC. The persistence of improvements over time supports the use of training interventions that teach skills for adolescents.

What is the public health significance of this article?
The results of this study suggest that the CHP interventions provided for approximately 5 hr per week may be an effective treatment for the academic impairment associated with adolescents with ADHD.

Keywords: ADHD, adolescents, treatment, school

Attention-deficit/hyperactivity disorder (ADHD) is a prevalent and chronic mental health disorder associated with significant adverse outcomes at school and throughout the life span. Although ADHD symptoms decline with increased chronological age, ADHD-related impairments often persist and change in relation to the developmental period (Willoughby, 2003). For example, problems unique to adolescents may include substance use, driving accidents, and teenage pregnancy (Wolraich et al., 2005). Furthermore, serious academic and behavior problems at school frequently persist or increase during adolescence (Langberg et al., 2011; Massetti et al., 2008; Molina et al., 2009) and can lead to increased risk for school suspensions, academic failure, classroom behavior problems, homework completion difficulties, and school dropout (Kent et al., 2011; Kuriyan et al., 2013). Evidence suggests that young adolescence may be a particularly difficult developmental period for children with ADHD (Jacobson, Williford, & Pianta, 2011; Langberg et al., 2008). Specifically, the increased academic demands and expectations for independence, challenging social context, and exposure to risky adolescent behaviors may be particularly difficult for young adolescents with ADHD to navigate.

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Empirically supported treatments for children and adolescents with ADHD include behavior management, medication, and some training interventions (Evans, Owens, & Bunford, 2014; Sibley, Kuriyan, Evans, Waxmonsky, & Smith, 2014). Because of doubts about the benefits of stimulant medication on academic functioning in natural settings (Langberg & Becker, 2012) and a reluctance on the part of teenagers to take medication (Molina et al., 2009), there has been a focus on the development of psychosocial treatments (see Sibley et al., 2014). The majority of that work has targeted school-based interventions given the large and important access advantages for school-based care over clinic-based care (Evans, Langberg, Egan, & Molitor, 2014). However, providing services through schools is also associated with significant challenges given that parents may be involved minimally in treatment or, may choose to not be involved at all. This is in sharp contrast to the vast majority of intervention research for youth with ADHD completed to date that has been clinic-based and relies heavily on parent involvement for generalization of treatment outcomes (Evans, Owens et al., 2014). To date, there has not been a large randomized trial of a psychosocial treatment for adolescents with ADHD published and as such, there is a critical lack of evidence for determining evidence-based approaches for this population. The Challenging Horizons Program (CHP) is a school-based intervention for young adolescents with ADHD that has demonstrated promise in multiple pilot studies that are described in the following paragraphs.

Intervention development for the CHP began in 1999 and focused on academic and social impairment. Organization interventions were first tested with students with ADHD in this setting to address the disorganization of materials and assignments (Storer, Evans, & Langberg, 2014). Study skills including note-taking (Evans, Pelham, & Grudberg, 1995) and flash cards were incorporated to help students improve their comprehension of written and spoken information. An interpersonal skills group (ISG) was developed to help adolescents improve their relations with peers and adults and took a novel approach, incorporating common developmental challenges facing adolescents. These interventions were provided within the context of an afterschool program offered for 2 hr 15 min per day two to three times per week at a public middle school.

Given concerns about the feasibility of offering afterschool programs, a modified version of the CHP was developed that involved providing a subset of the interventions to middle school students in the context of a mentoring relationship (CHP-M). Students met with a school staff member approximately once per week and received the organization interventions noted earlier. Although more feasible than the afterschool version (CHP-AS), there was much less time spent with students, an absence of a social cohort, and an almost exclusive focus on organization.

Regardless of the delivery model, the CHP interventions are primarily training interventions as opposed to behavior management (see Evans, Owens et al., 2014). Behavior management includes interventions that involve the manipulation of contingencies in the environment where changes in the targeted behavior are measured (e.g., parent training, classroom management). The theory of change is operant conditioning, and it involves adults modifying the schedules and contingencies for rewards and punishment in such a way that the targeted behavior change occurs. In contrast, training interventions involve teaching participants skills, practicing those skills, and promoting generalization without any manipulation of contingencies in the targeted setting. Thus, training interventions involve instruction and extensive practice to establish routines that enhance functioning in the targeted environment. Although there is some use of behavior management in CHP, the primary theory of change centers on training interventions. We hypothesize that training interventions are developmentally appropriate for adolescents and may be more likely to generalize across settings and time than traditional behavior management strategies.

Early evaluations of the benefits of the CHP-AS and CHP-M were conducted comparing each version with a treatment-as-usual control group. Studies of the CHP-AS have examined varying program schedules, including (a) 2 days per week for 10 weeks in the fall semester (Molina et al., 2008; $N = 23$); (b) 4 days per week for 3 months (Langberg et al., 2006; $N = 48$); (c) 3 days per week for most of a school year (Evans, Langberg, Raggi, Allen, & Buvinger, 2005; $N = 27$); (d) 3 days per week for between 2 and 6 months (Evans, Axelrod, & Langberg, 2004; $N = 7$); and (d) 2 days per week for 5 months in the spring semester (Evans, Schultz, Demars, & Davis, 2011; $N = 49$). Perhaps because of the small sample sizes and varying doses, only two of these studies reported statistically significant Group $\times$ Time effects (the other studies resulted in nonsignificant but encouraging effect sizes). In the first study, significant results were found in parent ratings of participant behavior but not teacher ratings (Langberg et al., 2006). In the second, significant benefits were found mainly among teacher ratings of participant behaviors (Evans et al., 2011). In sum, the results of these two studies were not consistent with each other, but given that the largest sample was $N = 49$ ($n = 31$ receiving CHP-AS) and there was considerable variability in how the program was offered, additional research is needed with large samples and a consistent approach to implementation to adequately evaluate the CHP. In addition, no study has evaluated whether improvements associated with CHP-AS are maintained over time. This is particularly relevant to the CHP because maintaining or increasing gains after treatment ends is consistent with a training approach. Overall, there is preliminary evidence suggesting benefit for the CHP-AS, but a randomized trial with a large sample and follow-up assessment is needed.

In contrast to the CHP-AS, there has only been one study of the mentoring model (Evans, Serpell, Schultz, & Pastor, 2007; $N = 79$; $n = 42$ received treatment). Results indicated that treatment effects for CHP-M are small after 1 year of treatment, but there are meaningful gains (effects in the moderate to large range) after 2 consecutive years of treatment across multiple outcome measures. This study has never been replicated and as such, it remains unclear whether 1 year of treatment in CHP-M is sufficient to improve the functioning of adolescents with ADHD. A rigorous and adequately powered evaluation of CHP-M in comparison to community care (CC) is needed to determine the efficacy of this model.

In addition to comparing both the CHP-AS and CHP-M to CC, it will be valuable to compare each model with the other. With the variability in sample sizes and findings reported previously for both versions of CHP, it is not possible to make direct comparisons of effects. Although the amount of time students receive services is greater in the CHP-AS than in the CHP-M, the mentoring model is much more feasible and less likely to have students drop out

during the year. Staying after school 2 days per week for an entire academic year is a challenge for many students and parents, as evidenced by participant attrition in the pilot studies. Dropout has not been a problem in the mentoring condition because school staff meet with the students during the school day, thereby avoiding many potential barriers to care for families (e.g., transportation). Rather, challenges in the CHP-M have centered around treatment fidelity (see Evans et al., 2007). Given the much reduced expense of providing CHP-M compared with the afterschool program, similar treatment effects may lead to conclusions of relative benefits for the CHP-M over CHP-AS. Ultimately, cost-benefit analyses will reveal the relative value of each model, but it is vital to establish initial comparisons of outcomes to provide an estimate of differential treatment gains.

In large randomized controlled trials, intervention efficacy is often initially established using intent-to-treat (ITT) analyses. In ITT analyses, data from all participants are examined, even from those who drop from treatment prematurely. Thus, the findings answer questions from the perspective of a stakeholder (e.g., a school district) considering the extent to which students may benefit from a program, given the considerable variability that is likely to occur in actual attendance. Attrition and other forms of noncompliance are a postrandomization alteration to the research design that reduces the benefits of random assignment. So although subsample efficacy analyses are appropriate to answer some questions, an ITT analysis is the preferred approach to estimate efficacy based on group assignment alone (Lachin, 2000). This is particularly important when treatments are evaluated in the community, where treatment nonadherence is inevitable (Ten Have et al., 2008).

In previous studies of the CHP, we have had difficulties related to the interpretation of data from teachers. Although teachers are a clear stakeholder in school-based interventions, middle school teachers only see students for approximately 50 min per day in uniquely structured settings, and in the course of a day they usually teach over 100 students. This is in contrast to elementary school teachers, who see 20 to 30 students for several hours each day in a variety of structured and semistructured settings. For this reason, many clinical researchers studying adolescents do not rely on teacher ratings for diagnosis or outcomes, even though they are widely used with children (e.g., Barkley, Edwards, Laneri, Fletcher, & Metevia, 2001; Biederman, Wilens, Mick, Spencer, & Faraone, 1999; Lahey et al., 1994). We have questioned the value of teacher ratings in our studies because the patterns of responding have been inconsistent with other indices (Evans, Langberg, et al., 2005; Evans et al., 2007; Langberg, Epstein, Becker, Girio-Herrera, & Vaughn, 2012), and agreement between teachers is often poor (Evans, Allen, Moore, & Strauss, 2005). Although teacher ratings are used in this study, given the questions about their validity, we prioritized parent ratings and ecologically valid data such as grades in this first adequately powered study of CHP efficacy.

The purpose of the current study is to evaluate the CHP-AS and CHP-M models of the CHP in relation to each other and in comparison to a CC control condition. Both models were provided over the course of an entire school year, with a sample size adequate to detect medium (d = .4) effects in a randomized clinical trial. In this initial report of the findings, we conducted ITT analyses to evaluate the following: (a) potential benefits of the CHP-AS and CHP-M on the social and academic functioning of young adolescents with ADHD compared with each other and compared with CC; and (b) potential benefits of the CHP-AS and CHP-M on the symptoms of young adolescents with ADHD compared with each other and compared with CC. Based upon the pilot data reviewed earlier, it was hypothesized that participants in both the CHP-AS and CHP-M conditions would exhibit significantly improved parent ratings of homework problems, organizational skills, and overall academic impairment compared with the CC group. Furthermore, it was hypothesized that participants in CHP-AS would make significantly greater improvements on these same ratings in comparison to CHP-M. Finally, given the difficulties associated with teacher-report in a middle school settings, it was hypothesized that teacher ratings of organization, homework, and academic progress would be in the expected direction, but not large enough to detect statistical significance. These findings will provide a foundation for future subsample efficacy analyses and answer questions related to the likely advantages school staff may see if they choose to provide CHP.

Method

The present multisite study was conducted in nine urban, suburban, and rural middle schools. In a three-group parallel design, stratified for site and medication status at baseline, participants were randomly assigned within middle school to either (a) CHP-AS; (b) CHP-M, or (c) CC in a 1:1:1 ratio. Site institutional review boards approved the study, and all participants completed informed consent/assent procedures.

Participants

Participants were 326 students in sixth through eighth grades recruited in three cohorts over 3 successive academic years (Table 1; Figure 1). Recruitment was conducted through three primary methods during the spring of the year preceding participation: Study announcement letters were mailed to the parents of all students attending the middle school, school staff directly informed parents of some students about the opportunity to participate, and fliers were posted in each school. Primary caregivers (hereafter "parents") who contacted the investigators in response to these recruitment activities were given additional information and completed an eligibility screening. To be scheduled for an eligibility evaluation, parents had to report that either their child had a prior diagnosis of ADHD or they endorsed their child as currently exhibiting at least four of nine *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text revision; *DSM–IV–TR*) symptoms of inattention.

Those meeting the screening criteria were scheduled for an evaluation to determine eligibility. Criteria for inclusion in the study required that children (a) attended one of the participating schools; (b) met full *DSM–IV–TR* diagnostic criteria for either ADHD–Predominantly Inattentive Type or ADHD–Combined Type ADHD based on the Parent Children's Interview for Psychiatric Syndromes (P-ChIPS; Weller, Weller, Fristad, Rooney, & Schecter, 2000) or combined with teacher ratings on the Disruptive Behavior Disorders Rating Scale (DBD; Van Eck, Finney, & Evans, 2010); (c) demonstrated impairment based on parent or teacher report on the Impairment Rating Scale (IRS; scores ≥3

Table 1
Baseline Demographics by Treatment Group

	Group					
	After school		Mentoring		Community care	
Demographics	*N*	%	*N*	%	*N*	%
Boys	79	70.5	76	69.1	77	74.0
Grade						
6	43	38.4	45	40.9	43	41.3
7	42	37.5	41	37.3	31	29.8
8	27	24.1	24	23.1	30	28.8
Race/ethnicity[a]						
African American	8	7.1	16	14.5	15	14.4
White	83	74.1	86	78.2	83	79.8
Biracial	16	14.3	6	5.5	5	4.8
Other	5	4.5	2	1.8	1	1.0
Hispanic	3	2.7	6	5.5	1	1.0
Family status						
Two parents	53	47.3	44	40.0	38	36.5
Single/blended	46	41.1	46	41.8	49	47.1
Other	13	11.6	20	18.2	17	16.3
Medication usage	49	43.8	57	51.8	47	45.4
ADHD-C	55	49.1	55	50.0	49	47.1
IEP/504 plan	41	36.6	28	25.5	32	30.1
Anxiety disorder[b]	22	19.6	23	21.1	18	17.3
Depression[b]	9	8.0	12	10.9	8	7.7
	M	*SD*	*M*	*SD*	*M*	*SD*
Household income[c]	56.5	45.2	61.5	52.4	63.5	55.5
Mom's education[d]	14.1	2.2	13.7	2.3	14.0	2.3
Child FSIQ[e]	100.3	14.2	99.2	13.1	101.4	13.7
Child achievement[f]						
Basic reading	94.8	15.1	94.7	12.9	96.5	14.5
Mathematics	91.5	15.4	88.4	13.0	93.1	15.8
Written expression	95.6	13.7	93.2	11.2	97.3	14.3
Child age	12.1	.9	12.1	.9	12.2	1.0
CP symptoms[g]						
ODD	4.5	2.3	4.7	2.3	4.4	2.2
CD	2.1	1.9	1.9	1.3	1.7	1.4

Note. ADHD-C = attention-deficit/hyperactivity disorder, combined subtype (all other cases were predominately inattentive); IEP = individual education program (special education); FSIQ = full-scale IQ; CP = conduct problems; ODD = oppositional defiant disorder; CD = conduct disorder. There were no statistically significant differences between groups on any of the variables.
[a] Race/ethnicity figures to not sum to 100% because ethnicity (Hispanic) was asked separate from race. [b] Met criteria for any anxiety disorder or depressive disorder as determined by child self-report on semi-structured diagnostic interview. [c] Reported in thousands. [d] Reported in grade equivalents. [e] Based on the highest 2, 3, or 4 subtest short-form of the Wechsler Intelligence Scale for Children, Fourth Edition. [f] Based on selected cluster scores of the Wechsler Individual Achievement Test—Third Edition. [g] Conduct problems.

constitute impairment; Fabiano et al., 2006); (d) demonstrated an IQ of 80 or above as estimated using the Wechsler Intelligence Scale for Children—Fourth Edition (WISC-IV; Wechsler, 2003); and (e) did not meet diagnostic criteria for a pervasive developmental disorder or any of the following on the P-ChIPS: bipolar disorder, psychosis, or obsessive–compulsive disorder. Each participant's comprehensive assessment data were reviewed by two doctoral level psychologists to determine eligibility and diagnosis. These procedures resulted in 326 eligible participants who were randomized to one of the three conditions (see Consort Diagram, Figure 1).

Study Interventions

CHP-AS. The CHP-AS occurred 2 days per week for 2 hr 15 min per day beginning in September and continuing through the following May. Between six and 10 students were assigned to attend the program at each school. Each afterschool program day was composed of five daily activities, including a meeting between the participant and a designated staff member (primary counselor time), a group intervention targeting social impairment (ISG), recreation/game time (recreation time), an education/study skills group (education group), and an individual education time for homework completion (individual education time). During the program, a level system was used, with levels determined by daily behavior in the program and reports from teachers about work completion.

The CHP-AS was staffed by undergraduate students (referred to as primary counselors, PCs) and a site supervisor (graduate student/postdoc fellow) who supervised the PCs and led group activities. All staff received 9 hr of training prior to beginning the program, and PCs received 15 to 30 min of individual supervision and 60 to 90 min of group supervision weekly during the school year. All staff were required to score 90% or greater on tests of manual content and intervention procedures prior to beginning treatment. All procedures for each intervention, decision rules for modifying and progressing through interventions, and forms for tracking progress were included in the CHP-AS manual.

Participants were randomly assigned to a PC, with no more than two students assigned to one PC. PCs focused on developing a therapeutic relationship, managing progress on the level system, coordinating interventions, and regularly communicating with the students' teachers. At the beginning of the academic year, PCs helped participants organize their binders, bookbags, and lockers according a list of organization criteria in the CHP manual. During the academic year, PCs checked their belongings to monitor continuous adherence to the checklists. Binders and bookbags were checked every day of the program and lockers checked every other week. Students corrected the organization of their materials after every check by the PC. PCs also checked students' planners/agendas to track the accuracy of homework/assignment recording. Assignments were verified by teacher signatures, an electronic grading system, or other means.

Education group in the CHP-AS focused on study skills, note-taking, summarizing, and writing skills. Each skill was introduced with direct instruction, which involved demonstration of mastery during the program, and was followed by an application component, which involved application of the skill at home or in a class. The ISG is designed to help each student improve their social functioning with peers and adults. Students identify personal social goals and work with their PCs to discuss the degree to which the student's behavior is consistent with his or her goals (Sadler, Evans, Schultz, & Zoromski, 2011). Early in the treatment, the focus is on behavior exhibited during the CHP-AS, but this progressed to targeting social behavior in settings outside of the program. In addition to the activities during ISG, recreation time also served as an opportunity to practice aligning behavior with social goals as well as to enhance sports skills and knowledge of rules. In addition, three parent meetings were held over the course of the academic year, and the CHP-AS interventions were explained to parents during those meetings.

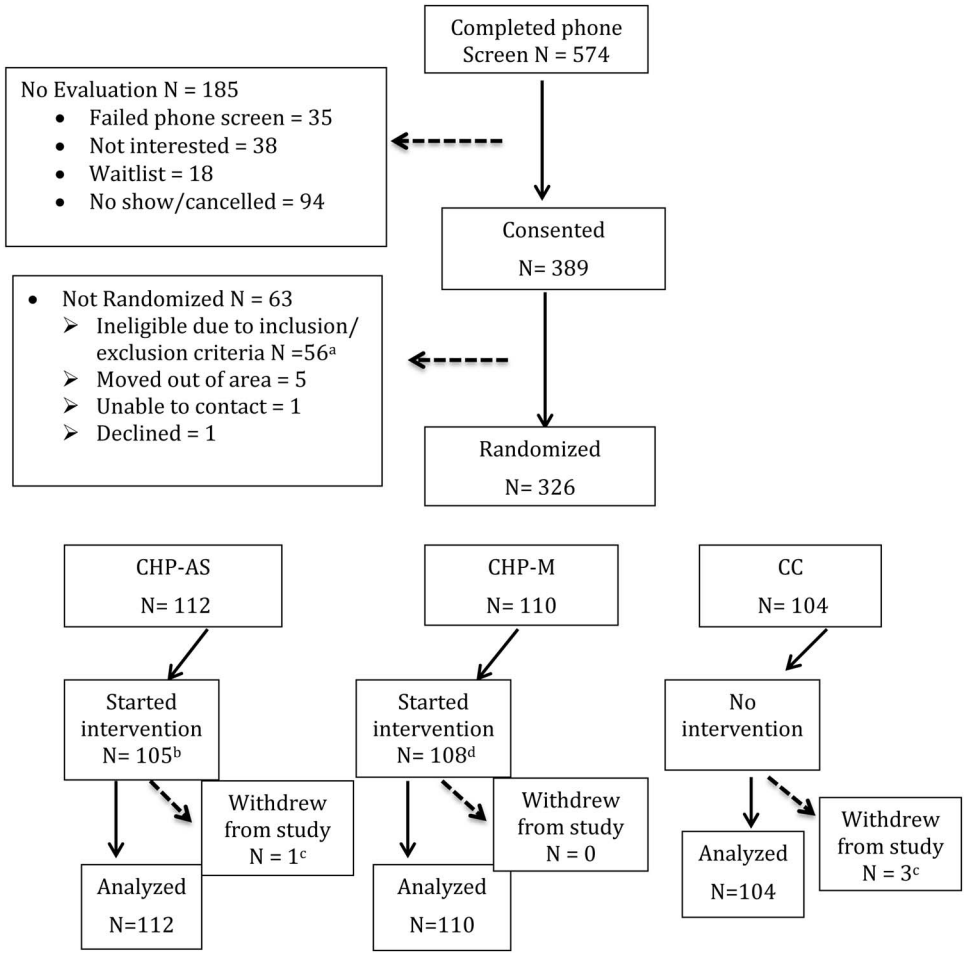

Figure 1. Participant flow chart. Flow diagram of treatment study. [a]Reasons for exclusion varied and included low cognitive ability, excluded comorbid diagnoses, impairment inconsistent with attention deficit hyperactivity disorder (ADHD), and participant did not attend participating school. [b]Seven did not attend any Challenging Horizons Program–after school version (CHP-AS) sessions (including the one who withdrew). [c]There were four study withdrawals across the two treatment conditions. One child passed away. One participant's parent passed away. Two were no longer interested in participating and requested no further contact. [d]Two participants transferred schools before the academic year started. CHP-M = Challenging Horizons Program–mentoring version; CC = community care.

CHP-M. Students who were randomized to the CHP-M condition received intervention provided by a teacher or other staff member in their school (referred to as a "mentor"). Mentor participation was voluntary, and mentors received a small stipend ($100) for participation. Mentors agreed to meet weekly with their student and biweekly with research staff (i.e., the consultant) over the course of the academic year. Across sites, 99 school staff members served as mentors. Eighty-eight of the mentors worked with one student each, 10 worked with two students each, and one worked with three students. Also, because of unavoidable staffing changes (e.g., teacher going on maternity leave), seven students switched to a second mentor at some point during the academic year.

The mentors met with students at varying times during the school day, but most often meetings occurred in the morning before classes, during homeroom, at lunch, or during study halls. Like the PCs in the CHP-AS, the mentors focused on establishing a strong supportive relationship while implementing some of the CHP interventions (range = 1–4; see CHP-M Adherence section for more details). As a result, the students in CHP-M received a small portion of the CHP-AS interventions using a service model developed to optimize efficiency and feasibility (see Evans et al., 2007).

The consultants were doctoral students in a clinical or school psychology program or postdoc fellows who received training and supervision from the lead investigators. Consultants followed procedures outlined in the CHP-M manual for reviewing graphs of the student data tracked by the mentors and considering the need for intervention modifications. After these meetings, the mentors were encouraged to schedule a feedback meeting with the students to review progress and discuss any revisions.

CC. Participants randomized to the CC condition received a list of available resources in their community at the start of the school year. Resource lists were developed in collaboration with school staff to include locally available child and family psychosocial and pharmacological intervention options. When families requested, with consent from a legal guardian, a summary report from the intake evaluation was sent to the identified service providers. The researchers did not provide any direct intervention to the individuals in this condition.

Intervention Adherence and Attendance

CHP-AS. In the first year of the study, an 18-item adherence form was created to assess implementation of core treatment components (0 = *not implemented as intended*, 1 = *fully implemented as intended*). In the second and third years of the study, a team of independent observers were trained to assess adherence during live observations of the CHP-AS. Each observer was required to achieve at least 90% interobserver agreement with a designated lead observer on three consecutive live observations to complete training. Thirty percent of all observed sessions were double-coded, with interobserver agreement calculated and discrepancies discussed. If interobserver agreement dropped below 90%, booster retraining sessions occurred. In total, the average interobserver agreement was 95.32%. For the purpose of assessing treatment adherence, 24.32% (n = 81) of all program sessions implemented with cohorts 2 and 3 were randomly selected to be observed and analyzed. Across all observed sessions, treatment adherence was high, because 85.06% of the program components on average were implemented as intended.

The average number of CHP-AS sessions offered each year was 53.80 (ranging from 47 to 68; median = 53.5). Differences occurred because of variability in snow days, early dismissal, and other variations in school calendars. Students attended a mean of 31.85 sessions (SD = 18.75, ranging from 0 to 59; median = 36). Of the 112 students assigned to the after-school program condition, 105 (94%) attended at least one session. Twenty-two percent of the participants withdrew from treatment during the academic year. The average number of meetings attended by parents was 1.67 (SD = 1.23, ranging from 0 to 3; median = 2).

CHP-M. In the first year of the study, a 12-item adherence measure was developed to assess implementation of key components of the mentoring intervention (0 = *not implemented as intended*, 1 = *fully implemented as intended*). Two sources of clinical data were used to complete the adherence measure. First, consultants provided copies of all graphs used by the mentors during the feedback sessions to review student progress. Second, all mentors in cohorts 2 and 3 were asked to audio-record their feedback sessions. The majority of mentors complied with this request, as 81% of all feedback sessions were recorded. Trained research assistants randomly selected 30% of mentors in cohorts 2 and 3 and completed the adherence measure following listening to the recordings and reviewing graphs. To evaluate interrater agreement, three feedback sessions were double-coded by the two lead research assistants and interrater agreement was 100%. On average, the randomly selected mentors implemented 80.98% of the components of the feedback sessions as intended.

The average number of consultant-mentor meetings was 13.39 (SD = 3.65, ranging from 0 to 22; median = 14) and the average consultant-mentor meeting duration was 19.59 min (SD = 6.47, ranging from 8 to 44 min; median = 18.00). The average number of mentor–student meetings (intervention sessions) was 25.17 (SD = 17.14; median = 22.5), and the average number of mentor–student feedback sessions completed was 1.84 (SD = 0.99; median = 2). The average mentor–student intervention session duration was 12.12 min (SD = 7.17, ranging from 2 to 53 min; median = 10.33). Seventy-five percent of the mentor–student interventions involved organizational skills, 53% involved homework recording accuracy in assignment notebooks, 30% involved daily report cards (DRCs), 20% involved missing assignment checks, 10% involved study skills, and 3% involved some other type of intervention. Thirty percent of the mentor–student pairings involved only one intervention, 50% of the mentor–student pairings involved two interventions, 18% involved three interventions, and 2% involved four interventions. Three percent of the participants withdrew from treatment during the academic year (i.e., student discontinued meetings with mentor).

Outcome Measures

All participants were assessed six times across the study: initial assessment (spring of pretreatment year, T1), four equally spaced occasions during the intervention year (T2, T3, T4, and T5 [posttreatment]), and 6 months after treatment ended (T6, follow-up; approximately halfway through the subsequent school year). Parents completed measures at all six time points, and teachers completed measures at T2 through T6. The outcome measures are listed here and are organized by the five assessment domains indicated by a number preceding the name of the measure: (1) organization and time management; (2) homework problems; (3) interpersonal functioning; (4) academic functioning; and (5) ADHD and oppositional defiant disorder (ODD) symptoms. Cronbach's alphas derived from our sample are reported in the description of the measures.

1. Children's Organizational Skills Scale (COSS). The COSS (Abikoff & Gallagher, 2009) is a parent-completed rating scale assessing organization, time management, and planning difficulties. The parent version is composed of 58 items, each with a 4-point rating scale (1 = *hardly ever or never*; 2 = *sometimes*; 3 = *much of the time*; 4 = *just about all of the time*). The COSS has good discriminative validity and is sensitive to treatment effects (Pfiffner et al., 2007). T scores for all three subscale scores (materials management, α = .82; organized actions, α = .64[1]; and task planning, α = .81) were included in the analyses.

2. Classroom Performance Survey (CPS). The CPS (Brady, Evans, Berlin, Bunford, & Kern, 2012) is a 15-item teacher-completed rating scale assessing the unique performance demands of secondary schools and consisting of two subscales (academic competence, α = .93, and interpersonal competence, α = .85). Each item is rated using a 5-point Likert response format ranging from 1 (*always*) to 5 (*never*). As such, higher scores represent poorer classroom performance. Two additional items ask teachers to report the percentage of assignments completed on time by the

[1] One item on this factor appears to have compromised the alpha. Item 50 asks parents to rate whether other children do not like to work on projects with their child because of disorganization. It is possible that parents of young adolescents do not know this. Without this item, α = .82.

student being assessed and the percentage of assignments completed on time by the average student in the class. The percentage completed by the target student was used as a variable in the homework problems domain because it has been found to correspond with teacher ratings of impairment on other teacher ratings of academic performance (Brady et al., 2012).

2. Homework Problems Checklist (HPC). The HPC (Anesko, Schoiock, Ramirez, & Levine, 1987) is 20-item, parent-completed rating scale assessing performance on homework. It includes a factor related to *inattention and avoidance of homework* (Factor 1; $\alpha = .91$) and another related to *poor productivity and nonadherence with homework rules* (Factor 2; $\alpha = .88$; Power, Werba, Watkins, Angelucci, & Eiraldi, 2006). Concurrent validity was supported by examining correlations between the HPC and other parent and teacher ratings of related behavior (Power et al., 2006). Both HPC factors were included in the analyses.

3. Impairment Rating Scale (IRS). The IRS (Fabiano et al., 2006) is a 7-item parent- and teacher-completed rating scale assessing broad areas of impairment (academic, social, and adult–child relationships). Separate parent and teacher versions focus on impairment at home or school. Items are scored on a 7-point scale ranging from 1 = *no problem, definitely does not need to treatment or special services* to 7 = *extreme problem, definitely needs treatment or special services*. Past research supports good test–retest reliability, convergent/discriminant validity, and internal consistency (Fabiano et al., 2006). Reliability statistics are not available for this sample because there is only one question per domain of functioning. The parent- and teacher-rated items addressing relationships with other children were used in this domain. A subsample of parents ($n = 99$) completed another version of the IRS postrandomization that asked about their expectations for improvement on each of the IRS domains so we could compare expectations for improvement across the groups.

3. Social Skills Improvement System (SSIS). The SSIS (Gresham, Elliott, Vance, & Cook, 2011) is a parent-rated scale assessing three domains, including social skills, problem behaviors, and academic competence. Ratings were completed on a 4-point scale regarding frequency of a behavior. Parents and children were also asked how important each social skill is to their child's social skill development using a 3-point scale (*not important*, *important*, *critical*). Extensive validity, reliability, and internal consistency data are available (Gresham et al., 2011). Standardized scores ($M = 100$) on the social skills factor ($\alpha = .94$) were used in the analyses.

3. CPS (Interpersonal factor). As described previously, this is a teacher rating scale that includes a factor addressing interpersonal behavior in the classroom. The five items on this factor focus on interactions with other students and the teacher.

4. IRS (Academic progress). Both parents and teachers rated the participants' impairment on academic progress on this item using a 7-point scale described previously. Scores from both raters were used in these analyses as an index of academic functioning.

4. CPS (Academics factor). As described previously, this is a teacher rating scale that includes a factor addressing academic performance in the classroom. The 10 items on this factor focus on timely work completion, quality of work on assignments and tests, and arriving on time to class with necessary materials.

4. Grade point average (GPA). Grades for each participant were collected from the school offices at the end of each academic year. All grades were converted into GPAs for core subject areas (English/Language Arts, Social Studies, Math, Science), with a range from 0.0 to 4.0 (4.0 = A; 0 = F). School grades were collected for the year of recruitment (i.e., end of year grades; prior to treatment), at four points during the treatment year (i.e., four quarters of school year), and at four points during the year following treatment (i.e., four quarters of the follow-up year).

5. Disruptive Behavior Disorders Rating Scale (DBD). The DBD (Pelham, Evans, Gnagy, & Greenslade, 1992) is a 45-item parent-rated checklist for symptoms of ADHD (inattention [IA] $\alpha = .88$; hyperactivity/impulsivity [HI] $\alpha = .89$), ODD ($\alpha = .90$), and CD ($\alpha = .84$) on a Likert scale (*not at all*, *just a little*, *pretty much*, *very much*). The version completed by teachers had only 26 items (no CD symptoms). Support for the reliability of the measure and the results of factor analyses for the DBD were reported for parents of young adolescents (Van Eck et al., 2010).

Services Use

Participants' use of medication and other treatment for ADHD was documented at baseline and tracked by asking parents at each assessment point for information about their child's service use. If parents reported that their child took medication, they were asked how many days per week the child took medication and when changes were made. Similar to the methodology used in the MTA Study (The MTA Cooperative Group, 1999), these data were used to create a variable indicating the percentage of days the child was taking medication in between each of the assessment occasions. This variable was examined as a time-varying covariate in all of the analyses.

Analytic Plan

Analyses were conducted to compare outcomes between the three conditions across five separate domains of functioning: (1) organization, time management, and planning skills (three factor scores from the COSS parent ratings); (2) homework problems (two factor scores from the HPC parent ratings and the percentage of assignments turned in as reported by teachers on the CPS); (3) overall academic functioning (IRS academic progress item as rated by parents and teachers, CPS Academic Factor score as rated by teachers, and GPA); (4) interpersonal functioning (IRS relationship with other children item as rated by parents, IRS relationship with peers item as rated by teachers, SSIS Social Skills Total score as rated by parents, and CPS Interpersonal Factor score as rated by teachers); and (5) ADHD/ODD symptoms (inattention, hyperactivity/impulsivity, and ODD factors scores from the DBD as rated by parents and teachers). To test for a Group × Time interaction up to postintervention for GPA, quarter 4 grades from the previous school year (corresponding with the initial evaluation), and quarter 1, 2, 3, and 4 grades from the intervention year are included in the models. To test for a Group × Time interaction up to follow-up for GPA, quarters 1, 2, 3, and 4 from the follow-up year (school year after the intervention had ended) were added to the model.

All analyses used an ITT approach, including all participants who were randomized to condition (see Consort Diagram, Figure 1). Data were analyzed using hierarchical linear modeling (HLM) via linear mixed effect model (PROC MIXED) in SAS 9.1. The basic model includes group assignment, time, and the interaction

between group and time. In addition, this modeling approach allowed us to account for the nested nature of the data (i.e., students nested within school for parent outcome and students nested within teachers and teachers nested within school for teacher outcome data), as well as the repeated measures obtained from each student across time. We used a random intercept to account for variation of students nested within school and a repeated statement to account for the correlation induced by data collected from the same subject in multiple occasions. In both cases, we examined different correlation structures by evaluating the Bayesian Information Criteria (BIC) between two models that contained the same set of fixed variables but two different covariance structures. We examined four different covariance structures: AR(1), unstructured, compound symmetry, and variance components. Once we established the variance structure with the smallest BIC, we added the five identified covariates to the basic model. All analyses included five covariates shown to be associated with academic and interpersonal functioning in prior research: (1) psychotropic medication status, (2) achievement scores (Wechsler Individual Achievement Test—Third Edition; Wechsler, 2009), (3) intelligence estimate (WISC-IV), (4) family income, and (5) parent education (highest level mother or father). Medication use and changes assessed using the Services for Children and Adolescents-Parent Interview (SCAPI; Jensen et al., 2004) conducted at each of the six study time points and was included as a time-varying covariate. The impact of covariates is not the central interest of this study, so associations between covariates and outcomes are not reported in the tables. Overall, the covariates were inconsistently associated with the outcomes of interest.

The Group × Time interaction was the main outcome of interest because a significant interaction would indicate that groups changed differently over time. Group × Time interaction outcomes are presented in Table 2. The potential for site effects (i.e., differential impact of the intervention at the two study sites) was investigated by including a Group × Time × Site interaction term in our models. The interaction with site was not significant for any of the outcomes, but site was nevertheless retained as a covariate. In addition, the potential impact of school and cohort effects was investigated, and there were no significant effects for any of the outcomes of interest. However, because students are nested within school, school is retained as a nested factor. When the Group × Time interactions were significant, they were followed with post hoc contrasts comparing the change scores from baseline to postintervention and baseline to follow-up between the three groups (i.e., CHP-AS vs. CC; CHP-AS vs. CHP-M; and CHP-M vs. CC). The *p* values reported for these comparisons (Table 3) are adjusted for multiple testing using the Tukey-Kramer method. Effect sizes corresponding to these comparisons are provided in Table 3.

Missing data at postintervention ranged from 14% to 17% across outcomes. Mixed model analysis with the restricted maximum likelihood estimate is valid for analyzing data with missing

Table 2
Group × Time Interactions

	Group × Time			
	T1–T5		T1–T6	
Variable	*F*(*df*)	*p*	*F*(*df*)	*p*
Organization and time management				
COSS Task planning	4.10 (4, 728)	.003	3.62 (6, 946)	.002
COSS Organized actions	2.97 (4, 727)	.019	3.19 (6, 945)	.004
COSS Memory materials manage	2.67 (4, 728)	.031	2.37 (6, 946)	.028
Homework problems				
HPC Factor I	1.61 (8, 1,219)	.117	2.13 (10, 1,439)	.020
HPC Factor II	1.97 (8, 1,219)	.043	2.14 (10, 1,439)	.019
Percentage of assignments turned in	1.06 (6, 2,490)	.387	1.62 (8, 2,862)	.115
Interpersonal functioning				
SSIS Social skills	1.01 (2, 529)	.366	.54 (4, 748)	.707
IRS Parent relation with children	1.23 (8, 1,193)	.279	1.14 (10, 1,411)	.328
IRS Teacher relation with peers	.71 (6, 2,462)	.64	1.19 (8, 2,818)	.299
CPS Interpersonal Factor	1.06 (6, 2,552)	.386	.99 (8, 2,927)	.439
Academic functioning				
IRS Parent academic progress	2.48 (8, 1,209)	.0115	2.01 (10, 1,427)	.029
IRS Teacher academic progress	1.67 (6, 2,533)	.125	1.14 (8, 2,900)	.332
CPS Academic factor	.93 (6, 2,556)	.474	1.00 (8, 2,932)	.435
GPA	1.95 (8, 1,431)	.0494	1.37 (16, 2,461)	.146
ADHD and ODD symptoms				
DBD Parent inattention	3.38 (8, 1,221)	.0008	3.20 (10, 1,442)	.0004
DBD Parent hyperactivity/impulsivity	1.66 (8, 1,221)	.105	1.52 (10, 1,442)	.126
DBD Parent ODD	1.09 (8, 1,221)	.369	1.45 (10, 1,442)	.152
DBD Teacher inattention	1.63 (6, 2,553)	.134	1.46 (8, 2,927)	.168
DBD Teacher hyperactivity/impulsivity	2.03 (6, 2,553)	.059	1.60 (8, 2,927)	.118
DBD Teacher ODD	1.50 (6, 2,553)	.174	1.21 (8, 2,927)	.291

Note. COSS = Children's Organizational Skills Scale; HPC = Homework Problems Checklist; SSIS = Social Skills Improvement System; IRS = Impairment Rating Scale; CPS = Classroom Performance Survey; GPA = grade point average; ADHD = attention-deficit/hyperactivity disorder; ODD = oppositional defiant disorder; DBD = Disruptive Behavior Disorders Rating Scale.

Table 3
Post Hoc Contrasts at Postintervention and Follow-Up Using Tukey-Kramer Adjustment for Multiple Tests

	Post-hoc contrasts T5						Post-hoc contrasts T6					
	CHP-AS vs. CHP-M		CHP-AS vs. CC		CHP-M vs. CC		CHP-AS vs. CHP-M		CHP-AS vs. CC		CHP-M vs. CC	
Variable	*p*	*d*	*P*	*d*	*p*	*d*	*p*	*d*	*p*	*d*	*p*	*d*
COSS Task planning	.0716	.3061	.0067	.5147	.5833	.1487	.0011	.5892	.0007	.5734	.9971	.1270
COSS Organized action	.6085	.1324	.1240	.3164	.5291	.1673	.0621	.3575	.3290	.2352	.6624	.1455
COSS Materials manage	.2089	.2427	.0056	.4844	.2735	.2389	.0430	.4006	.0010	.5516	.4603	.2082
IRS-Parent academic progress	.3444	.2193	.6360	.1336	.9003	.0634	.4793	.1936	.2018	.2665	.8533	.0873
HPC Factor I	.6111	.1398	.0137	.4391	.1265	.2862	.0098	.4852	.0004	.6069	.6247	.1506
HPC Factor II	.6640	.1345	.0116	.4226	.0939	.3078	.0971	.3474	.0330	.3801	.9056	.0704
DBD-Parent inattention	.1139	.3019	.0018	.5102	.2554	.2337	.0026	.5507	.0003	.6282	.8132	.0972

Note. CHP-AS = Challenging Horizons Program–after school version; CHP-M = Challenging Horizons Program–mentoring version; CC = community care; COSS = Children's Organizational Skills Scale (*T* scores); IRS = Impairment Rating Scale; HPC = Homework Problems Checklist; DBD = Disruptive Behavior Disorders Rating Scale. Grade point average (GPA) results are not reported here because their collection did not correspond with the assessment time points of the other measures.

values assuming that the data are missing at random. We also imputed data under this assumption using the multiple imputation method implemented in SAS PROC MI and PROC Analyze. Because our data had an arbitrary missing pattern, the fully conditional specification method was used (van Buuren, 2007), which assumes a joint distribution for all variables. Linear regression or discriminate analysis were used to impute the missing values for continuous and class variables, respectively. Ten data sets were generated, and each dataset was analyzed using the specified model. The results from this individual analysis were then combined to generate the Type III fixed effect values (Rubin, 1987). For all outcome measures, the results from the imputed data were nearly identical (e.g., same variables were significant at similar *p* values for the Group × Time interactions) to the results from analyzing all available. Hence, the results presented in the Tables 1 through 4 are based on the analysis from all available data.

Results

Organization, Time Management, and Planning (OTMP) Skills

There was a significant Group × Time interaction for all three factors of the COSS (Task Planning, TP; Organized Actions, OA; and Memory and Materials Management, MMM) from baseline to postintervention and to follow-up. Post hoc analyses compared the difference between groups at postintervention and follow-up after adjusting for baseline measurement. The post hoc analyses revealed significant differences in the hypothesized direction between CHP-AS and CC at postintervention and at follow-up for two of the three COSS subscales (TP and MMM). The effect size as measured by Cohen's *d* was in the moderate range at follow-up ($d = .57$ and .55). It is interesting that there were not significant differences between CHP-AS and CHP-M groups at postintervention after correcting for multiple tests, but there were at the 6-month follow-up for the TP and MMM scales in favor of the CHP-AS group ($d = .58$ and .40, respectively). The difference between CHP-AS and CHP-M on the third COSS subscale (OA) approached significance at follow-up ($p = .06$; $d = .36$). There were no significant differences between the CC and CHP-M conditions at either occasion and the magnitude of the difference was small.

Homework Problems

There was a significant Group × Time interaction for Factor 2 of the HPC across all time points up to postintervention and for both factors of the HPC across all time points up to the 6-month follow-up. Post hoc analyses revealed significant differences in the hypothesized direction between CHP-AS and CC on both factors of the HPC at postintervention and again at follow-up. The magnitude of the difference between groups increased substantially for HPC Factor I from the postintervention to follow-up occasions ($d = .44$; .61, respectively). There were no significant differences between the CHP-AS and CHP-M groups postintervention for HPC Factor 1, but there was a significant difference at the follow-up assessment and the magnitude of the difference was moderate ($d = .49$). The difference between the CHP-M and CC groups at postintervention on HPC Factor 2 approached significance and was in the expected direction ($d = .31$), but this difference was not maintained at the follow-up assessment. In contrast, the Group × Time interaction for the teacher reported percentage of assignments completed was not significant. However there was a significant main effect of time ($F = 6.12$, $p < .001$; $F = 4.57$, $p = .001$) for the trends up to the postintervention and follow-up occasions, respectively (Table 2 and Figure 3).

Academic Functioning

There was a significant Group × Time interaction for the parent-rated IRS academic progress variable across all time points up to the postintervention and follow-up times. In terms of post hoc contrasts, there were no significant between group differences on the parent IRS academic progress variable at postintervention or follow-up after controlling for multiple tests. Although not significant, the magnitude of the difference between the CHP-AS and CC groups at follow-up was $d = .27$. In contrast, there was not a significant Group × Time interaction or main effect of group for either the teacher IRS academic variables or for the percentage of assignments completed on the teacher-rated CPS academic factor

Table 4
Means and SD by Treatment Group for Outcomes

	M (*SD*)								
	CHP-AS			CHP-M			CC		
Variable	Pre (Parent - T1; Teacher—T2)	Post (T5)	Follow (T6)	Pre (Parent - T1; Teacher—T2)	Post (T5)	Follow (T6)	Pre (Parent - T1; Teacher—T2)	Post (T5)	Follow (T6)
Organization and time management									
COSS Task planning	67.69 (12.48)	58.60 (12.42)	55.27 (12.38)	64.38 (11.62)	59.53 (12.44)	59.58 (12.42)	63.40 (10.96)	61.65 (12.28)	58.91 (13.53)
COSS Organized actions	62.32 (5.42)	58.99 (7.85)	58.20 (7.89)	61.73 (6.17)	59.34 (8.37)	60.21 (8.23)	62.32 (5.36)	60.94 (6.41)	59.75 (7.30)
COSS Materials manage	67.62 (11.80)	59.83 (12.68)	56.76 (12.32)	67.64 (11.78)	62.62 (12.92)	61.91 (13.49)	65.90 (11.90)	64.11 (12.44)	61.98 (12.48)
Homework problems									
HPC Factor I	34.43 (7.64)	26.61 (8.23)	22.91 (8.91)	34.12 (6.73)	26.85 (8.24)	26.51 (8.40)	33.46 (7.26)	29.24 (8.56)	27.22 (8.53)
HPC Factor II	16.52 (4.67)	12.74 (4.70)	12.00 (4.95)	17.02 (4.49)	13.87 (4.57)	14.32 (4.92)	16.25 (4.38)	14.88 (4.59)	14.23 (5.17)
% Assignments turned in	79.22 (22.86)	80.15 (25.04)	72.06 (28.48)	79.58 (22.68)	75.97 (25.03)	72.02 (25.27)	75.38 (24.81)	75.43 (24.97)	69.59 (28.59)
Interpersonal functioning									
SSIS Social skills	82.14 (15.20)	85.11 (16.57)	87.01 (17.14)	79.99 (15.10)	86.21 (15.74)	86.14 (17.01)	84.23 (14.78)	86.83 (15.17)	88.09 (14.76)
IRS-P Relation with children	2.63 (2.09)	2.31 (2.02)	1.76 (1.89)	2.63 (2.04)	2.04 (1.97)	1.67 (1.78)	2.70 (2.07)	2.01 (1.71)	1.80 (1.69)
IRS-T Relation with peers	1.74 (1.91)	1.70 (1.84)	1.93 (1.91)	1.93 (1.84)	2.03 (1.89)	1.97 (1.83)	1.80 (1.78)	1.99 (1.90)	1.72 (1.94)
CPS Interpersonal factor	10.22 (4.30)	10.11 (4.40)	10.25 (4.44)	10.40 (4.00)	10.29 (4.03)	10.57 (4.30)	10.34 (3.98)	10.34 (4.07)	9.99 (4.32)
Academic functioning									
IRS-P Academic progress	4.59 (1.77)	3.35 (2.00)	2.88 (2.12)	4.57 (1.62)	3.67 (1.93)	3.42 (2.07)	4.59 (1.60)	3.66 (2.00)	3.57 (2.01)
IRS-T Academic progress	2.82 (2.08)	2.48 (2.13)	2.69 (2.13)	2.88 (1.98)	3.01 (2.10)	3.18 (2.01)	2.94 (2.05)	2.94 (2.04)	2.78 (2.16)
CPS Academic factor	23.07 (8.49)	22.71 (9.28)	23.83 (9.27)	23.91 (8.70)	24.30 (8.92)	25.60 (9.00)	24.41 (8.63)	24.48 (8.36)	24.66 (9.26)
ADHD and ODD symptoms									
DBD-P inattention	19.31 (5.42)	12.87 (6.07)	10.82 (6.56)	18.37 (5.37)	13.33 (6.27)	13.09 (7.03)	18.48 (5.53)	15.16 (6.16)	13.98 (6.55)
DBD-P Hyper/Imp	12.26 (6.82)	9.04 (6.12)	7.00 (5.43)	11.25 (6.62)	8.95 (5.79)	7.59 (6.23)	11.71 (6.59)	9.33 (6.06)	8.20 (5.99)
DBD-P ODD	10.26 (6.00)	8.60 (5.59)	6.79 (5.32)	9.53 (5.92)	8.00 (5.48)	7.14 (5.69)	8.85 (5.45)	8.55 (5.32)	8.07 (5.24)
DBD-T Inattention	10.67 (7.03)	9.79 (7.54)	9.60 (7.44)	10.87 (6.67)	11.07 (6.81)	10.72 (6.84)	10.92 (7.30)	11.05 (7.20)	10.36 (7.65)
DBD-T Hyper/Imp	5.77 (6.58)	4.87 (5.60)	4.99 (6.29)	5.54 (5.97)	5.71 (6.08)	5.02 (5.87)	5.20 (5.53)	6.10 (5.92)	5.74 (6.78)
DBD-T ODD	4.06 (5.93)	4.04 (6.05)	4.05 (5.68)	3.45 (4.99)	4.33 (5.15)	3.88 (4.91)	3.53 (5.13)	4.34 (5.18)	3.75 (5.67)

Note. CHP-AS = Challenging Horizons Program–after school version; CHP-M = Challenging Horizons Program–mentoring version; CC = community care; COSS = Children's Organizational Skills Scale (*T* scores); HPC = Homework Problems Checklist; SSIS = Social Skills Improvement System; IRS-P = Impairment Rating Scale Parent Version; IRS-T = Impairment Rating Scale Teacher Version; CPS = Classroom Performance Survey; GPA = grade point average; ADHD = attention-deficit/hyperactivity disorder; ODD = oppositional defiant disorder; DBD-P = Disruptive Behavior Disorders Rating Scale Parent Version; DBD-T = Disruptive Behavior Disorders Rating Scale Teacher Version; Hyper/Imp = hyperactivity/impulsivity symptoms.

score. However, there was a significant effect of time for the latter ($F = 6.12$, $p < .001$; $F = 4.57$, $p = .001$) up to the postintervention and follow-up time points, respectively. There was a significant Group × Time interaction for GPA from the final grading period of the year preceding treatment to the final grading period of the treatment year (Table 2 and Figure 2). Although not significantly different at the end of the academic year (Time Point 5), the diverging trend in GPA between CHP-AS and the two other groups had clearly started. Instead of the one follow-up measurement point with other outcome measures (T6), we analyzed grade data across all four grading periods of the year following treatment to determine whether there was an effect of group. There was a significant effect of group with CHP-AS GPA higher than CHP-M ($t = 2.50$; $p < .05$) and CC ($t = 2.68$; $p < .05$). Effect sizes (d) of differences at each grading period in the follow-up year ranged from 0.15 to 0.22 for differences between the two active treatment conditions and from 0.11 to 0.24 between CHP-AS and CC.

Interpersonal Functioning

As shown in Table 2, there were no significant Group × Time interactions or main effects of group in the interpersonal functioning domain. However there was a significant main effect of time for the SSIS Social Skills factor ($F = 15.4$, $p < .0001$; $F = 13.3$, $p < .0001$) and IRS relationships with other children item ($F = 5.95$, $p < .0001$; $F = 8.81$, $p < .0001$) at the postintervention and follow-up occasions, respectively.

ADHD/ODD Symptoms

For ADHD and ODD symptoms, there was a significant Group × Time interaction for symptoms of inattention on the parent-rated DBD up to postintervention and up to follow-up. Post hoc analyses revealed that CHP-AS significantly outperformed the CC group postintervention for ADHD symptoms of inattention ($d = .51$) and this group difference remained significant and increased in magnitude at the follow-up assessment ($d = .63$). In addition, although there was not a significant difference between the CHP-AS and CHP-M groups on ADHD symptoms of inattention postintervention ($d = .30$), there was at the follow-up assessment and the magnitude of the difference was moderate ($d = .55$). There were no significant differences between the CHP-M and CC groups at the postintervention or follow-up assessments for the ADHD symptoms of inattention. There was also not a significant Group × Time interaction or main effect of group for parent-rated hyperactive/impulsive or ODD symptoms. However there was a significant main effect of time for hyperactive/impulsive symptoms ($F = 23.27$, $p < .0001$; $F = 19.16$, $p < .0001$) trend up to the postintervention and follow-up time points respectively. Similarly, a significant main effect of time was observed for ODD ($F = 7.83$, $p < .0001$; $F = 10.57$, $p < .0001$) for the trend up to the postintervention and follow-up time, respectively. There were not significant Group × Time interactions or significant main effects of group or time for any of the teacher-rated symptom variables except for a main effect of time for ODD ($F = 4.5$, $p = 004$; $F = 6.2$, $p < .001$) at post and follow-up.

Parents' ratings of expected improvement across each of the domains of the IRS resulted in no significant differences between parents in the two treatment groups, with means between three and five (0 = *no improvement*; 6 = *extreme improvement*) for all domains. Means for parent ratings in the mentoring condition were equal to or slightly greater than ratings for the afterschool program.

Discussion

This large randomized, controlled trial is the first adequately powered study to our knowledge to evaluate treatment and follow-up effects of school-based treatments for adolescents with ADHD. The results of this study indicate that the CHP-AS provides meaningful benefit to young adolescents with ADHD on organization and time management, homework problems, academic functioning, and inattention symptoms. These are critically important areas of impairment for adolescents with ADHD. The effect sizes for significant group differences between CHP-AS and CC were between .42 and .51 at the post assessments and between .38 and .63 at the 6-month follow-up (Table 3). These medium effect sizes were obtained primarily by using a training approach (in contrast to behavior management; see Evans, Owens, et al., 2014) and with minimal teacher and parent involvement. Furthermore, these results are based on ITT analyses and include participants who received minimal or no treatment in the treatment condition. Finally, there were also significant benefits of CHP-AS over the CHP-M condition. The inclusion of two active treatment conditions in this study reduces concerns about nonspecific therapeutic effects potentially driving outcomes and also about source bias (Sonuga-Barke et al., 2013), because parents' expectations of improvement gathered at baseline were as high or higher for CHP-M as CHP-AS. Overall, these findings suggest that the intervention dosage, breadth of services, and delivery method matter, with the CHP-AS participants making larger improvements that persisted well into the next school year (Table 3 and Figures 2 and 3).

Although the findings provide support for the benefits of CHP-AS, they also raise questions about CHP-M. Previous research with the CHP-M intervention reported small effect sizes after 1 academic year of treatment; however, many between-groups effect sizes increased to the medium and large range after 2 years of continuous treatment (Evans et al., 2007). Differences between

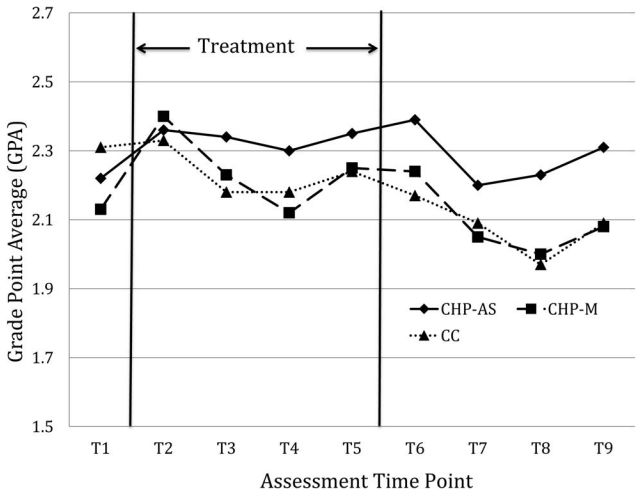

Figure 2. Grade point average (GPA) over time.

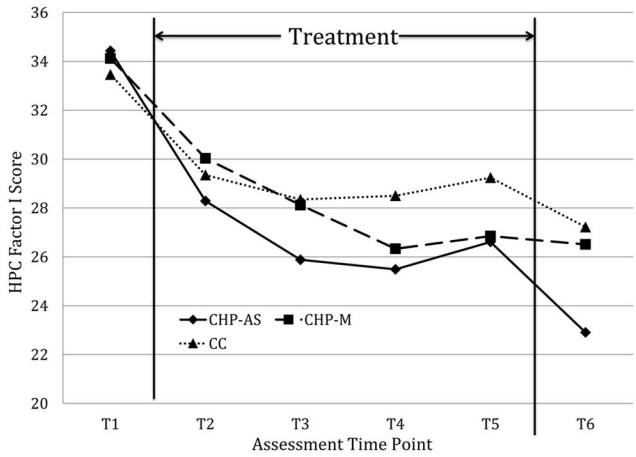

Figure 3. Homework Problems Checklist (HPC) over time. CHP-AS = Challenging Horizons Program–after school version; CHP-M = Challenging Horizons Program–mentoring version; CC = community care.

CHP-AS and CHP-M outcomes may be because of differences in dosage, omission of key interventions (e.g., study skills, ISG), format (group or individual), and school staff implementing the CHP-M (effectiveness) while research staff implemented the CHP-AS (efficacy). In addition, comparing CHP-M outcomes with other mentoring programs is not warranted because in many mentoring program evaluations research staff implemented the interventions (e.g., Sinclair, Christenson, Evelo, & Hurley, 1998; Check & Connect). It will be important to determine whether there is a subgroup of participants for whom the CHP-M was effective (maybe those less impaired) or whether there are a subset of interventions from CHP-AS that could be provided in a mentoring model and result in enhanced benefit.

Social and Academic Functioning

The lack of gains in social functioning was not anticipated as a substantial portion of the CHP-AS focuses on interventions targeting social impairment Past research has found medium between-groups effect sizes with the CHP-M on social outcomes, although these emerged only after more than 2 years of continuous treatment (Evans et al., 2007) and benefits for social functioning in a past CHP-AS study were not statistically significant and effect sizes were small (Evans et al., 2011). Nevertheless, other research has indicated benefit for the ISG intervention (Sadler et al., 2011). One potential reason for the lack of findings in this study may be that almost 40% of participants were rated by parents as being in the normal range of social functioning on the SSIS at baseline (39.2% of participants; Table 4). Furthermore, parent ratings of social functioning on the SSIS and IRS showed improvement for all three groups from baseline to follow-up with effect sizes ranging from .26 to .47 (*d*). Our tools for measuring the social functioning of adolescents are much less developed than they are for academic functioning and may not be sensitive enough to differentiate maturation and treatment effects. Although there are norms for adolescents for many measures, as a field we have not adequately addressed measurement issues as they pertain to the unique social behaviors and networks of adolescents, parents and teachers reduced opportunities to observe social behaviors, and the variety of possible methods for exhibiting healthy social behavior. Future moderation analyses with these data are needed to evaluate the possibility that participants who start treatment in the clinical range on social functioning measures may benefit from treatment.

In spite of the limited findings pertaining to the effectiveness of CHP-M and the effect on social functioning, these results with the CHP-AS addressed some of the main limitations in the literature as reported in a recent meta-analysis by DuPaul, Eckert, and Vilardo (2012). Organization of homework materials has been identified as a critical skill for successful academic functioning for youth with ADHD (Evans et al., 2009; Langberg et al., 2011), and recent treatment development work has focused on these skills (Abikoff et al., 2013; Langberg et al., 2012). Our results indicate that there are significant gains for students in the CHP-AS condition compared with those in CC on two factors on the COSS and the benefits are even greater in the analyses of data from halfway through the subsequent school year (d = .57 and .55 at follow-up). The group mean for participants in the CHP-AS condition shifted from the impaired range to the normal range with the T scores dropping by almost 12 points. T scores for those in the other two groups remained at or near the impaired range and diminished by only 4 or 5 points. A similar effect for the treatment year and follow-up is found with parents' reports of inattention and avoidance of homework. There were significant benefits for the CHP-AS participants over those in the CC condition on both factors of the HPC at postintervention and at follow-up (Factor I, d = .61; Factor II, d = .38, at follow-up), and significant benefits compared with the CHP-M participants on Factor I at 1-year follow-up. It is important to note that the analyses did not indicate significant differences between groups with parent ratings on the COSS Organized Actions scale or the IRS academic progress item. Although effects were in the expected direction when comparing the groups on these measures at postintervention and follow-up, the effect sizes were small (d ranged from .13 to .36). It is interesting that the mean parent ratings on the academic item of the IRS changed from 4.59 at baseline to 3.35 at postintervention to 2.88 at follow-up for those in the CHP-AS condition (possible range 0 to 6). The cut-off score for impairment is three (Fabiano et al., 2006). As a result, this change meets one of the criteria for clinical significance according to Jacobson and Truax (1991; movement into the normal range), and no mean score on this item was ever below three for either other group. Given the lack of statistical significance, this finding should be interpreted with caution; however, the change in mean ratings from well-above the impairment cut-off to below it is encouraging. These benefits to homework and organization may explain why grades for CHP-AS participants did not decline during the study.

There was a significant Group × Time interaction for GPA during the treatment year with grades for participants in the CHP-AS condition remaining consistent over the course of the year and grades for participants in the other two groups declining after the initial grading period and only partially recovering at the final grading period for the year (Figure 2). This pattern of decline over the year with a partial recovery at the end was repeated during the follow-up year for participants in the CHP-M and CC condition, although at a lower GPA than comparable time-points during the treatment year. We have reported this pattern of declining grades during the year with a slight improvement at the final

grading period in other studies (e.g., Evans, Langberg, et al., 2005). We have also reported similar benefits for grades in the CHP-AS that are consistent with avoiding the decline and not necessarily improving the grades (Evans, Langberg, et al., 2005). The new finding in this study is that the benefits of CHP-AS to grades continued into the year after treatment. There is a significant main effect of group on grades in the follow-up year with the CHP-AS participants experiencing the decline noted for the others, but they start the year better and they do not decline as far as participants in the other two groups. The GPA advantage for participants in the CHP-AS condition reflect an approximate difference of one letter grade in one of the four core courses that comprised GPA (or one-quarter letter grade in each) and the difference between the CHP-AS and the other two continuously increased over time.

Clinical Implications

These findings call into question typical practices for treating adolescents with ADHD. The most common services provided to students with ADHD in middle schools include extended time on tests and other services that reduce expectations for these students (Spiel, Evans, & Langberg, 2014). Not only is there no evidence supporting the benefits of these most frequently provided services (see Harrison, Bunford, Evans, & Owens, 2013), there is also no expectation that by consistently providing these services students will improve their ability to meet age appropriate expectations (e.g., complete work on time). In contrast, these findings suggest that training interventions intended to improve students' academic performance even after the interventions have been discontinued may be a more effective strategy. Training students to organize materials, improve planning, and track tasks can better prepare them for meeting expectations at school and eliminate the need to reduce those expectations (e.g., do not penalize late assignments). Furthermore, compared with behavior management, a training approach may not only be more feasible (i.e., does not require intensive parent or teacher involvement), but it may also be more developmentally appropriate and likely to result in long-term benefits. Finally, for this population, a realistic expectation for treatment for academic functioning may be to prevent decline over an academic year instead of improving behavior and performance.

Our results also suggest that making long-term changes to adolescents' behavior using training interventions may take considerable time and coached practice. As we described previously (Evans et al., 2009), achieving mastery in response to these interventions can take many weeks. The CHP-M condition appears to have not provided an adequate amount of instruction and practice. In addition, although not fully integrated into the school day, CHP-AS staff did speak frequently with teachers and worked to coordinate interventions with school activities and facilitate generalization. Traditional clinical models of eight to 12 weeks of individual sessions may not be adequate for addressing the school-related needs of adolescents with ADHD because of the relatively small dosage and complete lack of integration with school.

Methodology Implications

The results of this study also raise important questions regarding measurement and samples. In addition to the issues related to the measurement of social functioning described above, some have expressed concerns about the potential bias of the sources of ratings used as outcomes (Sonuga-Barke et al., 2013). In this study, those concerns may be minimized because there were two active treatment conditions and parents expected no greater benefit for one over the other, yet there were significant benefits to the CHP-AS over the CHP-M. Furthermore, unlike behavioral parent training interventions, parents had very little involvement with treatment in either condition. As a result, the potential for parent bias is likely to have been less than some other studies.

As discussed, we had reservations about being able to detect a response to treatment using teacher ratings. We believe that for many of the reasons we described there were no significant ITT effects. One method for considering teacher ratings has been to use ratings from the teacher who knows the student best; however, this is quite arbitrary and does nothing to assure that the ratings reflect student behavior across classrooms and other settings at the school. Gathering ratings from every teacher creates other problems, such as how to analyze them because they are unlikely to agree with each other (Evans, Allen et al., 2005). A mean score across teachers (as we used here) may not actually represent performance in any given classroom or other less structured settings (e.g., hallway transitions, cafeteria). The results of this study raise doubts about the value of our current teacher ratings as we found significant effects for grades, but not teachers' reports of any of the behaviors that contribute to grades (an effect also reported in Evans et al., 2007). It seems unlikely that the improvements in organization of materials and assignments and homework completion as reported by parents were not somehow related to improvements in grades, but teacher reports did not indicate that. In previous research, we found that proximal outcome data of materials organization were associated with improvements in grades (Evans et al., 2009). We believe that new measures of behavior at secondary schools are needed that are sensitive to differences between students and within students over time.

Limitations

Many of the limitations in the study are inherent in conducting research in middle school settings (see Fabiano, Chafouleas, Weist, Sumi, & Humphrey, 2014 for discussion) and when conducting trials over a 2-year period of time (baseline to follow-up). Missing data, gaps in the provision of services because of school vacations and weather, and obstacles related to measurement in school settings were challenges and limit our confidence in the conclusions. The limited number of participants with significant social impairment (discussed earlier) compromised our ability to adequately evaluate the ISG component of CHP. Moderator analyses may shed light on this limitation. Another limitation discussed earlier in the document pertains to the utility of teacher ratings. Many adolescents behave differently in different classroom settings so teacher disagreement may, to some extent, reflect reality. Nevertheless, school functioning is often treated as a unitary construct within domain (mean values of teacher ratings across teachers), but more information may be available about the effectiveness of the treatment if classrooms are treated as unique settings. Of course, this leads to other problems when studies are conducted across semesters and years as the teachers and classes change for each student. Finally, including reports of participant

satisfaction could have improved our understanding of the acceptability of the program.

Future Directions

The results of this study indicate that when provided by research staff, the larger dosage and comprehensive set of CHP interventions that are in the CHP-AS program lead to significant benefits compared with the subset of interventions provided by teachers in the CHP-M and CC. In contrast, the attrition in the AS model of the program was substantially larger than that in the CHP-M or CC (Mantel-Cox $\chi^2[2] = 39.29, p < .001$). Staying after school 2 days per week for an entire school year is not desirable to many students. In addition, other activities and transportation problems can interfere with staying after school. It may be that the most acceptable and effective version of CHP is one that is provided during the school day, but consists of approximately 5 hr of intervention per week. Many middle schools provide supervised study halls for one period per day for students with ADHD. We have conducted 2 year-long pilot feasibility studies in public middle schools replacing the study halls with CHP. Trained school staff provided the interventions. So although the results of this study may represent optimal implementation and benefits of the AS program, increased benefits from the interventions may result from the services being offered during the school day. We believe that future development and research on this integrated model of care is warranted.

The interventions in both treatment conditions were one size fits all, and we likely implemented unnecessary intervention components for some participants. One way to streamline these interventions and to make it more likely that they will be widely disseminated and adopted would be to use an adaptive approach driven by assessment (e.g., Stormshak, Connell, & Dishion, 2009). An important next step could be to develop an assessment system that guides a set of modular and adaptive treatments. In addition, a component analyses could help identify the most effective interventions in the program.

In addition to this work conducted in middle schools, considerable treatment development and evaluation work for students with ADHD is needed at the high school level (DuPaul et al., 2012). The first trial was only recently reported (Evans, Schultz, & DeMars, 2014) and involved an evaluation of a modified version of the CHP for the high school setting. A large randomized trial of this program is currently underway. The study in the high school setting indicated that dose was an important variable in the prediction of treatment response. Examination of dosage effects in this study is a next step in this line of research.

Conclusions

In summary, the results of this large randomized trial with 326 young adolescents with ADHD demonstrate that participation in the CHP-AS intervention is associated with moderate effect size improvements in parent-rated organization and time-management skills, homework problems, and ADHD symptoms of inattention, and with small improvements in overall academic functioning and GPA. Importantly, these improvements were in comparison to a CC condition and also to another active treatment condition (CHP-M). Perhaps the most important finding from this study is that gains were sustained into the next school year and even increased in magnitude for several of the measures. The persistence of improvements over time supports the use of training interventions that teach skills and facilitate generalization and do not rely on parents and teachers to manipulate contingencies in the classroom and home.

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A special issue of *Psychological Services* on "Military Sexual Trauma" releases in November, 2015. MST is a term used by the United States Department of Veterans Affairs (DVA) to refer to rape, sexual assault and sexual harassment that occurs during military service. The issue, guest edited by Michi Fu and Tracy Sbrocco, features 13 articles that include sexual trauma in male and female service members, sexual intimate partner violence, utilization of healthcare, and a training program to treat MST. The issue examines MST among non-traditional populations as well as treatment recommendations. An anonymous piece offers a first-hand experience of MST. The table of contents is available at http://psycnet.apa.org/journals/ser/12/4.