

The Importance of Therapeutic Processes in School-Based Psychosocial Treatment of Homework Problems in Adolescents With ADHD

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Objective: To evaluate the importance of therapeutic processes in two brief school-based psychosocial treatments targeting homework problems in adolescents with attention-deficit/hyperactivity disorder (ADHD) as delivered by school mental health professionals. **Method:** A sample of 222 middle school students (72% male; $M_{\text{age}} = 12.00$ years, $SD = 1.02$) diagnosed with ADHD was randomized to receive either a contingency-management or a skills-based treatment for homework problems. Both treatments included 16 individual sessions (20-min each) and 2 parent/family meetings. Adolescents and school mental health professionals reported on the working alliance in the middle of the treatment; professionals rated adolescent involvement at each of the 16 sessions, parent involvement during both parent meetings, and parent commitment to carry out the established homework plan. Attendance at parent meetings was also recorded. **Results:** Therapeutic processes predicted objective, parent-reported, and teacher-reported academic outcomes. Parent engagement was particularly important for the contingency-based treatment, whereas working alliance and adolescent involvement were most important for the skills-based treatment. **Conclusions:** Therapeutic processes such as developing a strong working alliance and engaging parents and students are key elements of treatment delivery and receipt in school-based mental health programming and should be explicitly trained and monitored.

What is the public health significance of this article?

This study demonstrates that several therapeutic processes are important in treatments focused on reducing the homework problems of adolescents with ADHD. School-based treatment protocols should include explicit training and guidance for school mental health professionals surrounding building a strong alliance and fostering parent and adolescent engagement.

Keywords: school-based mental health, working alliance, adolescents, HOPS intervention, parent engagement

Attention-deficit/hyperactivity disorder (ADHD) is a highly prevalent neurodevelopmental disorder (Thomas, Sanders, Doust, Beller, & Glasziou, 2015) that is associated with significant academic impairment. In particular, many youth with ADHD struggle with aspects of homework completion, including recording assign-

ments accurately (e.g., Power, Werba, Watkins, Angelucci, & Eiraldi, 2006; Sibley et al., 2011), organizing and managing homework materials (e.g., DuPaul & Langberg, 2014), focusing on and completing assignments efficiently (Power et al., 2006), and consistently turning in homework assignments (e.g., Kent et al., 2011; Langberg et al., 2016a). These homework problems exert a significant negative impact on their long-term academic outcomes, above and beyond the influence of ADHD symptoms, intelligence, and service utilization (Langberg, Molina, et al., 2011). Accordingly, multiple psychosocial treatments have been developed to specifically address homework-related problems in youth with ADHD (e.g., Abikoff et al., 2013; Evans et al., 2016; Langberg, Epstein, Becker, Girio-Herrera, & Vaughn, 2012; Merrill et al., 2017; Pfiffner et al., 2007; Sibley, Olson, Morley, Campez, & Pelham, 2016).

Many evidence-based treatments for young children with ADHD involve working with parents and caregivers (e.g., behavioral parent training; Fabiano et al., 2009). Broadly speaking, these treatments focus on teaching parents how to structure the environment and to provide contingencies to encourage and reinforce desirable behaviors (e.g., compliance). However, when working in

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school settings, it can be challenging to engage parents in treatments (Hornby & Lafaele, 2011), particularly for adolescents (Eccles & Harold, 1996), and a high level of parental involvement is often not feasible (Stormshak et al., 2016). As such, some school-based treatments for students with ADHD involve working directly with students and training them to use skills that are critical for homework completion, such as setting short- and long-term goals, accurate homework recording, and organizational skills. In these skills-based treatments, parents are typically involved in a secondary role, to assist with generalization to the home setting and across time (e.g., Evans et al., 2016; Langberg et al., 2012), for example by helping parents to structure the homework completion environment and to provide rewards/consequences to reinforce positive homework behaviors.

A host of therapeutic process variables have been studied in the context of psychosocial treatments with parents and families in traditional outpatient clinic settings (Karver, Handelsman, Fields, & Bickman, 2006; McLeod, 2011; Shirk, Karver, & Brown, 2011). Two of the most commonly studied therapeutic process variables are the working alliance and client involvement/engagement with the treatment. Working alliance is defined as the bond between the client and the therapist and the ability of the therapist to work with the patient in a collaborative manner on therapeutic tasks and treatment goals (DiGiuseppe, Linscott, & Jilton, 1996; Elvins & Green, 2008). Working alliance is measured either on the basis of single reporters (e.g., parent, adolescent, clinician, observer; McLeod, 2011) or on the discrepancy between individuals (e.g., the difference between clinician and adolescent report; Baron, Morin, & Morin, 2011). In comparison, involvement research focuses on how actively involved the client is in session in terms of their responsiveness to the clinician and participation in therapeutic tasks (e.g., Chu & Kendall, 2004; Nock & Ferriter, 2005). In youth treatments with a substantial parent component (e.g., behavioral parent training), parent engagement is commonly measured using parent session attendance and completion of homework assignments or skills implementation between sessions (Baddar, Reid, & Webster-Stratton, 2003; Becker et al., 2015). In this study, we use the term adolescent involvement to refer to active participation in direct therapeutic activities and the term parent engagement to encompass a broader set of activities including parent involvement in session, parent attendance, and parent commitment to adhere to a homework plan.

Meta-analyses support the working alliance as a robust predictor of treatment outcomes for youth treatment (e.g., Shirk et al., 2011). Associations appear to be strongest when the working alliance is measured later in treatment rather than early in treatment or averaged across treatment (McLeod, 2011). Research on parent engagement has found limited support for greater attendance resulting in better treatment outcomes; however, some evidence supports in-session parent involvement and homework adherence between sessions as important predictors of treatment outcome (Clarke et al., 2015; Nix, Bierman, & McMahon, 2009). There is also some support for the importance of youth involvement in session for treatment outcomes (Chu & Kendall, 2004). Importantly, to date, these therapeutic processes have largely been studied separately (i.e., looking at the role of one or two variables in a study, even though they are moderately correlated dynamic processes; Karver et al., 2006). As such, it is unclear which of these therapeutic processes is most important for outcomes, information

that potentially would be important for clinician training and resource allocation. Additionally, information on homework completion and participation is often not present for youth treatment studies, making this an important therapeutic process to examine (Chacko et al., 2016). Further, the importance of these variables in school-based treatments and whether they differ for contingency management and skills-based treatments is unknown, despite clinical reasons to expect they may operate differently.

School-based skills training treatments focus on skills rehearsal and practice, and on applying these skills to achieve short- and long-term goals (Evans et al., 2016). In contrast, contingency management treatments rely on manipulating and structuring the environment to encourage certain target behaviors (e.g., a daily report card with points applied in the moment for raising hand). As such, the working alliance may be less important in contingency management-based treatments in comparison to skills treatments. Specifically, in skills-based treatments the working alliance may play a facilitative role. A child or adolescent who feels a strong connection with their clinician and is motivated by this relationship may be more likely to participate in the within session skill-building exercises and to engage in skill use outside of sessions without someone immediately rewarding use of the skill (Chu et al., 2004). The working alliance with a clinician may matter less if rewards are being immediately provided for the student engaging in target behaviors. Further, the impact of therapeutic processes may vary depending on whether they are assessed as specific to the adolescent or the parent (e.g., Robbins et al., 2006; Shelef, Diamond, Diamond, & Liddle, 2005). In contingency management treatments that rely on adults to structure the environment, parent engagement and motivation to implement the program would seem crucial. In contrast, in skills-based treatments, if an adolescent truly learns skills and is motivated to apply them because of the working alliance with the clinician and their own involvement in session, parent engagement may matter less. Finally, the impact of therapeutic process variables may also vary on the basis of setting and the type of clinician implementing the treatment (McLeod et al., 2016). Specifically, when involvement, engagement, and working alliance are studied in research-based treatments, therapists are often highly trained graduate students who are receiving intensive supervision (McHugh & Barlow, 2010; Weisz, Ugueto, Cheron, & Herren, 2013). In contrast, school mental health (SMH) professionals rarely receive extensive training in therapeutic processes (Lever, Lindsey, O'Brennan, & Weist, 2014) and, accordingly, there is likely to be greater variability in how they build rapport, engage, and motivate students and parents. This is especially likely to be the case when treatments are studied as delivered in real-world school context, where minimal or no supervision is typically provided.

To our knowledge only a few studies have evaluated the impact of the working alliance or involvement/engagement in school-based treatments for ADHD. In an open trial, Langberg, Becker, Epstein, Vaughn, and Girio-Herrera (2013) found that the alliance strongly predicted outcomes associated with a SMH professional-delivered homework and organizational skills treatment. However, the sample size was very small ($N = 23$) and student and parent engagement were not measured. A larger study ($N = 112$) that examined working alliance and youth attendance but not engagement or involvement, found that adolescent-rated working alliance was a significant predictor of outcomes in an after school program

for adolescents with ADHD targeting organization, note taking, and social skills (Langberg et al., 2016b). In another open trial ($N = 57$) of a school-based treatment, Villodas, McBurnett, Kaiser, Rooney, and Pfiffner (2014) found that parent report of their own home-based strategy and skills implementation was associated with social and behavioral outcomes. However, in a randomized controlled trial comparing a skills-focused child treatment with a classroom component to a parent-focused treatment, Rooney, Hinshaw, McBurnett, and Pfiffner (2016) reported that parent engagement (homework adherence between sessions) only predicted outcomes for the parent-focused treatment. These mixed findings support the notion that therapeutic processes may differ depending on the focus of the treatment (Rooney et al., 2016). These studies also highlight a broad limitation of the literature to date; evaluation of only a single therapeutic process in each study.

Present Study

Given these gaps in the literature, the present study sought to evaluate the role of several therapeutic processes in two 16 session homework treatments delivered individually (1:1 adolescent to provider) by SMH professionals in the school setting. Both treatments also included two parent/family meetings focused on promoting generalization. One treatment, Completing Homework by Improving Efficiency and Focus (CHIEF; Langberg et al., 2017), is a contingency management-based treatment focused on providing structure and rewards during homework completion time in order to increase on task behavior and the completion of homework goals. In contrast, the Homework, Organization, and Planning Skills (HOPS) treatment is a skills-based treatment that focuses on teaching organization and planning skills that are important for homework completion. Although primarily a skills training intervention, HOPS also utilizes principles of contingency management. Specifically, SMH professionals use a points system to reinforce skills implementation at school and encourage parents to implement a similar points system at home. As noted earlier, we hypothesized that the working alliance would be most important for the skills-based HOPS treatment whereas parent engagement variables (engagement in session, parent attendance, and commitment to carry out their plan at home) would be most significant for the contingency management-based CHIEF treatment. Importantly, in this study we evaluate several therapeutic processes simultaneously and their impact on both parent- and teacher-rated homework problems and on more objective outcomes such as the percentage of assignments turned in and grade point average (GPA).

Method

Participants

Participants were 222 middle school students (72.0% male; $M_{\text{age}} = 12.00$ years, $SD = 1.02$) with ADHD who were randomly assigned to receive the HOPS or CHIEF treatments (see Langberg et al., 2017 for more details). Seven middle schools were involved in the project and six SMH professionals who had recently graduated with a Masters' Degree in School Counseling (White women; age range = 25 – 27) delivered the treatments. SMH professionals were hired and paid through the research grant. Each SMH

professional delivered both HOPS and CHIEF, with an equal number of students within every school working with each SMH professional. Participants were ethnically diverse, with 56% identifying as White, 28% identifying as Black, 12% identifying as multiracial, and 4% identifying with another race or preferring not to report race; additionally, 9% of the sample identified as Hispanic/Latinx. Adolescents in the present sample came from families with a range of socioeconomic backgrounds: family income of <\$25,000 (14%), \$25,000–\$75,000 (39%), and >\$75,000 (47%), and parents with less than a high school degree (5% for mothers, 7% for fathers), high school degrees (27% for mothers, 28% for fathers), some college/associate's degree (20% for mothers, 14% for fathers), bachelor's degree (34% for mothers, 38% for fathers), and advanced degrees (14% for mothers, 13% for fathers).

Procedures

Participants were recruited as part of a randomized control trial evaluating school-based treatment programs for middle school students with ADHD. Study procedures were approved by the Virginia Commonwealth University Institutional Review Board; all caregivers provided signed consent and all adolescents provided assent. The principal investigator went to each school and explained that the treatments focused on homework problems for students with attention and behavior problems; school staff were given recruitment flyers describing the study (e.g., offering "homework treatments for students with attention and behavioral difficulties and/or with ADD/ADHD"). A phone screen was administered to interested parents/caregivers. To be scheduled for an evaluation, parents had to endorse their adolescent as displaying at least four of nine *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*; American Psychiatric Association, 2000) ADHD inattention symptoms. This threshold was chosen to reduce the number of families who participated in the full inclusion/exclusion evaluation who would ultimately not meet eligibility criteria.

Criteria for inclusion in the study required that adolescents (a) attended one of the participating schools; (b) met full *DSM-IV-TR* diagnostic criteria for ADHD based on the Parent Children's Interview for Psychiatric Syndromes (Weller, Weller, Fristad, Rooney, & Schecter, 2000) or combined with teacher ratings on the National Institute for Children's Health Quality Vanderbilt ADHD Rating Scale (Wolraich et al., 2003); (c) demonstrated an IQ of 80 or above as estimated using the Wechsler Intelligence Scale for Children (4th ed.; Wechsler, 2003); and (d) did not meet diagnostic criteria for a pervasive developmental disorder, bipolar disorder, or psychosis. Each participant's assessment data were reviewed by a licensed clinical psychologist to determine eligibility and diagnoses.

SMH professionals received the HOPS and CHIEF manuals and met with the principal investigator twice (1 hr each time) to review the manuals prior to implementing the interventions. SMH professionals did not receive any ongoing consultation or supervision during the trial. For both HOPS and CHIEF, the 16 sessions were delivered during the school day with students pulled from elective periods. Sessions for both HOPS and CHIEF were conducted with individual students (i.e., 1:1). The first 10 sessions occurred twice weekly and the final six sessions occurred once per week. As a result, the 16 sessions were completed over an 11-week period.

Attendance was high for both treatments: 93% of CHIEF participants attended all 16 sessions, and 92% of HOPS participants attended all 16 sessions (see Langberg et al., 2017 for details), with an average meeting length of 19.42 ($SD = 1.88$) min for CHIEF and 17.42 ($SD = 3.50$) min for HOPS. Overall, adherence to the HOPS (85.4%) and CHIEF (89.2%) treatments across sessions and professionals was high (see Langberg et al., 2017 for details). HOPS sessions focused on teaching organization, homework recording, and planning skill; CHIEF sessions were highly structured periods of homework completion where SMH professionals reinforced students for their behaviors (on-task and focus).

Both treatments also included two 1-hr sessions with the provider and each family. These meetings were held at the school, after school hours, and included the SMH professional, the student, and parent/caregiver(s). The first meeting took place early in the treatment and was designed to orient the parent to the program and to establish an initial plan for monitoring and rewarding skills use at home. Specifically, all families left the first session with a formal written monitoring and behavior rewarding plan. The second meeting took place near the completion of the treatment and focused on troubleshooting any difficulties parents had with implementing the plan in the prior weeks. For HOPS, the plans focused on monitoring and rewarding accurate homework recording and use of materials organization and planning skills. For CHIEF, the plan focused on monitoring and rewarding on-task behavior during homework completion time and setting and meeting work completion goals. On average, CHIEF parent meetings lasted 40.65 ($SD = 13.94$) min and HOPS parent meetings lasted 42.15 ($SD = 14.26$) min. Attendance at both parent sessions was fairly high, 83% for CHIEF and 87% for HOPS. Overall, SMH professional adherence for the parent meetings was, 77.9% for CHIEF and 92.5% for HOPS (see Langberg et al., 2017 for details).¹ For parent meetings, 72% of meetings were attended by mothers, 11% were attended by fathers, 11% were attended by both mothers and fathers, and 6% were attended by another caregiver (e.g., grandmother, grandfather, stepmom, aunt).

Process Measures

Working alliance. Adolescent–SMH professional working alliance was assessed by the Working Alliance Inventory–Short Revised (WAI; Hatcher & Gillaspie, 2006), a 12-item measure assessing three aspects of the working alliance: agreement on therapeutic tasks, agreement on therapeutic goals, and client–clinician bond. Each item was rated on a 7-point Likert scale ranging from 1 (*never*) to 7 (*always*). Scores on the WAI have been reported as reliable ($\alpha = .85-.92$) and to demonstrate convergent validity with other alliance instruments (Hatcher & Gillaspie, 2006). In the present study, internal consistency was .92 for SMH professionals and .90 for adolescents. Discrepancy scores, which were explored but not used in the present analyses, were calculated using the difference between clinician and adolescent report (i.e., clinician – adolescent).

Adolescent involvement. At the end of each session, SMH professionals rated how engaged the adolescent was on a 7-point Likert scale ranging from 1 (*not engaged, monotone, blank affect*) to 7 (*high engaged, animated, enthusiastic*). Although this specific measure has not been used before, a single item measure similar to the one in the present study has been previously published in other

ADHD treatment research (e.g., Sibley, Smith, Evans, Pelham, & Gnagy, 2012). As this measure had data at many time points, and there was significantly variability within each session and between individuals (e.g., some adolescents only earned 6 s and 7 s, whereas others never earned higher than a 5), we explored analyses both using an average across sessions and using a growth mixture model, which identified three subgroups among adolescent involvement data. As results were consistent using either approach, findings reported here used the average involvement across sessions, as this is a more parsimonious approach and is consistent with our measure of parent involvement.

Parent engagement variables. Three parent engagement variables were coded by SMH professionals during the parent meetings. The first variable, parent attendance, is a count variable of whether a participants' parent(s) attended zero, one, or two sessions. The second variable, parent involvement, is a SMH professional's subjective rating on a 7-point Likert scale of how engaged the parent was in the meeting with scores ranging from 1 (*not engaged, monotone, blank affect*) to 7 (*high engaged, animated, enthusiastic*). Involvement was monitored at the start and end of the meeting; an average of these two within-session ratings was used. As rates of involvement were stable across the two sessions, results were also averaged across sessions, when parents attended two sessions. Finally, commitment to the homework plan was the SMH professional's rating of how committed the parent seemed to carry out the monitoring and rewarding plan they had created. Commitment was rated on a 5-point Likert scale ranging from 1 (*not committed/likely to carry out homework plan*) to 5 (*highly committed/likely to carry out homework plan*). As previously mentioned, homework plans varied across the treatments. Data from the second parent meeting, which occurred around Session 15, was used for all participants unless they did not have a second meeting in which case data from the first parent meeting was used. The second parent meeting was chosen as this gave parents the opportunity to implement and revise their homework plan and a greater number of parents attended the second session.

Outcome Measures

All outcome measures completed by parents and teachers were collected at pre- and post-treatment time points.

Homework performance questionnaire (HPQ). Parents and teachers completed a version of the HPQ (Power, Dombrowski, Watkins, Mautone, & Eagle, 2007), which consists of 13 items on a 5-point scale, with corresponding percentages to indicate the amount of time a behavior occurs. Items were worded in the positive so that 90% to 100% of the time indicates that the adolescent does that behavior consistently well (e.g., student writes down homework assignments independently or manages homework time well). Scores on the HPQ have demonstrated convergent validity with other measures of homework problems (Power

¹ There was a significant difference in fidelity between the two treatment groups for the parent sessions. This difference was driven largely by two items: SMH professionals for CHIEF did not as consistently explain the theoretical rationale (1) for frequently monitoring on-task behavior and (2) for setting work completion goals as they did for consistently completing the skills checklists in HOPS.

et al., 2007, 2015). Internal consistency was $\alpha = .91$ and $.94$ for parents; $\alpha = .96$ and $.97$ for teachers.

Assignments turned in. Teachers reported the percentage of assignments (0% to 100%) students turned in on time. This item is similar to one used in the Classroom Performance Survey (Brady, Evans, Berlin, Bunford, & Kern, 2012), which has been used to track homework completion in multiple studies (e.g., Langberg et al., 2016a; Meyer, Kelley, & the Parent Monitoring of Homework Behavior and Study Skills, 2007). Scores on this item has demonstrated good clinical utility in distinguishing teacher identified academically impaired students from nonimpaired students and good convergent validity with other measures of academic impairment (Brady et al., 2012).

GPA. Grades for each participant were collected from the school 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 for the quarter closest to and preceding the respective assessment period (pre- and posttreatment) were included in the analyses. Two cohorts participated each school year, with equal numbers of students receiving the treatments in either the fall or winter/spring. For fall cohort participants, baseline GPA was Quarter 4 of the previous year and posttreatment GPA was the end of Quarter 2 of the treatment year. For winter/spring cohort participants, baseline GPA was Quarter 2 of the treatment year and posttreatment GPA was Quarter 4.

Covariates

Vanderbilt ADHD Diagnostic Parent Rating Scale (VADPRS; Wolraich et al., 2003). The VADPRS is a rating scale that includes all 18 ADHD *DSM-IV* symptoms. Parents rated how frequently each symptom occurs on a 4-point Likert scale ranging from 0 (*never*) to 3 (*very often*). The total ADHD score was used in the present study, which consists of the Inattention score (sum of the nine inattention items) and the Hyperactivity/Impulsivity score (sum of the nine hyperactive/impulsive items). The VADPRS has excellent psychometric properties (Wolraich et al., 2003) and internal consistency was $.90$ in the present study.

ADHD medication status. Participants' use of medication and other interventions for ADHD was documented at baseline and tracked across time by interviewing parents. Baseline data were used to create a dichotomous variable indicating whether the student was or was not currently on medication to include as a covariate in the analyses.

Family income. Parents reported the approximate household yearly income of the adolescent's primary residence.

Parent education. Parents reported the number of years of education the adolescent's mother and father completed.

Analytic Plan

Bivariate correlations between study variables were first examined separately for the HOPS and CHIEF treatment groups. Next, a series of multigroup regression analyses (Byrne, 2013) were conducted in Mplus Version 7 (Muthén and Muthén, 1998–2012) with treatment condition (HOPS vs. CHIEF) being used as the grouping variable. These analyses evaluated which therapeutic process variables predicted posttreatment outcomes, controlling

for baseline scores for outcome measures and relevant covariates (i.e., ADHD symptom severity, ADHD medication status, income, parent education), and if such relations varied between the two treatment groups. The present study focuses on posttreatment outcomes as significant improvement was seen in both treatments from pre- to posttreatment, and effects were stable from posttreatment to 6-month follow-up with limited variability to predict changes between these time points (Langberg et al., 2017). All seven therapeutic process variables were entered into a single path model. Models were trimmed by dropping the least significant path for each predictor one at a time, until a significant chi-square difference indicated that the model had been overtrimmed. Model fit statistics comparing the final trimmed model with paths free to vary across the two treatment groups (i.e., examining differential relations between process variables and outcomes across the two groups) versus fixed to be equal across groups was examined (i.e., assuming these relations to be the same for the two treatment groups); a nonsignificant chi-square statistic would indicate that the fixed model should be retained in favor of parsimony. Full information maximum likelihood was used to address missing data, which uses all observed information to estimate parameters. Both unstandardized and standardized coefficients are presented in figures; standardized coefficients can be used to gauge relative importance of paths and interpreted as *r*-values (Durlak, 2009) with values greater than $.10$ indicating a small effect, values greater than $.30$ indicating a medium effect, and values greater than $.50$ indicating a large effect (Cohen, 1988). As both independent reports of WAI and the discrepancy between these reports cannot be entered into a single path model due to multicollinearity, bivariate correlations were used to guide decisions regarding which method to use in the present analyses. To control for nesting effects, we used the sandwich variance estimator (Diggle, Heagerty, Liang, & Zeger, 2002), which produces corrected standard errors in the presence of nonindependent data due to nested data structures, in this case, students nested within SMH professionals and schools.

Results

Preliminary analyses

Intercorrelations between variables for each treatment are presented in Table 1. Therapeutic process variables demonstrated weak to moderate relations with one another (e.g., adolescent involvement with WAI) for both groups, indicating that variables were not multicollinear. ADHD symptoms and ADHD medication status were explored as relevant covariates; ADHD medication status was only related to percentage of assignments turned in at baseline and ADHD symptoms were only related to parent commitment to homework plan in bivariate correlations. Interestingly, parental commitment to homework plan was significantly correlated with baseline scores for outcome variables, such that adolescents who were doing better at baseline had parents who were more committed to carrying out the plan. It should be noted however, that these associations are relative, given the overall low academic performance at baseline for the sample (e.g., mean GPAs at 2.20 and 2.15 at baseline). Because it is impossible to rule out whether parents who were more committed to the homework plan differed in meaningful ways at baseline (e.g., were already imple-

Table 1
Intercorrelations Between Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. ADHD symptoms	—	.130	-.034	-.092	-.528***	.003	-.054	-.052	.022	-.043	.000	-.053	.055	-.027	.111	.122
2. Medication status	.252**	—	.077	.102	-.104	-.074	.185	.053	.200*	.098	.093	.034	-.132	-.026	-.007	.160
3. Baseline GPA	-.076	.089	—	.646***	.220*	.261*	.522***	.396***	.550***	.403***	.055	.060	.239*	.104	-.056	.121
4. Post GPA	-.038	.034	.734***	—	.201*	.398***	.374***	.583***	.353***	.597***	.185	.087	.188	.232*	.016	.320**
5. Baseline Parent HPQ	-.339***	-.013	.433***	.253**	—	.287**	.208*	.119	.193*	.214*	-.276*	.060	.063	.066	-.148	-.051
6. Post Parent HPQ	-.263*	.117	.439***	.472***	.415***	—	.196	.315**	.201*	.348**	.132	.134	.253*	.351***	.159	.412***
7. Baseline Teacher HPQ	-.023	.064	.654***	.586***	.389***	.341**	—	.382	.719***	.356***	-.004	-.171	.262**	.316**	.030	.276**
8. Post Teacher HPQ	.021	.063	.647***	.657***	.347***	.461***	.647***	—	.338**	.673***	.030	-.091	.172	.236*	-.009	.300**
9. Baseline % assignments	-.054	.007	.605***	.562***	.357***	.292**	.716***	.537***	—	.409***	.021	-.077	.279**	.189	.046	.109
10. Post % assignments	.042	.094	.590***	.583***	.358***	.394***	.501***	.785***	.617***	—	-.120	.114	.245*	.264**	.015	.206*
11. Adolescent involvement	.080	.096	-.060	-.018	-.060	-.018	.122	.272*	.094	.135	—	-.078	.081	.141	.351**	.409**
12. Parent attendance	.121	-.002	.025	.042	.102	.123	-.205*	-.182	-.163	-.043	-.183	—	.001	-.230*	.100	.013
13. Parent involvement	.152	-.037	.178	.252*	.178	.252*	.084	.288**	.016	.224*	.159	-.024	—	.522***	.094	.115
14. Parent commitment to plan	.205*	.023	.330**	.447***	.330***	.447***	.289**	.413***	.214*	.239*	.207*	-.242*	.561***	—	.165	.123
15. Adolescent-reported WAI	-.139	.123	.025	-.017	.025	-.017	.045	.058	-.007	-.104	-.066	-.068	-.001	-.082	—	.295**
16. Clinician-reported WAI	.102	.006	.117	.154	.117	.154	.114	.248*	.059	.086	.118	-.038	-.026	.116	.117	—
CHIEF <i>M (SD)</i>	29.76 (8.77)	.52 (.50)	2.20 (.92)	2.03 (1.03)	21.86 (12.19)	32.40 (12.99)	23.22 (13.87)	27.77 (14.37)	61.91 (26.98)	66.68 (25.96)	2.77 (.56)	1.46 (.66)	6.30 (1.01)	3.70 (1.43)	62.07 (9.55)	61.12 (7.44)
HOPS <i>M (SD)</i>	31.47 (10.71)	.57 (.50)	2.15 (.85)	2.15 (.88)	21.03 (10.38)	33.74 (11.97)	24.82 (11.72)	28.93 (12.68)	64.96 (24.49)	67.56 (24.29)	2.77 (.50)	1.57 (.60)	6.33 (1.02)	3.80 (1.42)	62.70 (11.50)	60.89 (9.34)

Note. Correlations for Completing Homework by Improving Efficiency and Focus (CHIEF) presented below the diagonal; correlations for Homework, Organization, and Planning Skills (HOPS) presented above the diagonal. Post = postintervention; % Assignments = percentage of homework assignments turned in; ADHD = attention/deficit-hyperactivity disorder; GPA = grade point average; HPQ = Homework Problems Questionnaire; WAI = Working alliance inventory.

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

menting some of the skills discussed), family income and parent education were also explored as potential covariates. Family income displayed significant but weak correlations with parent meeting attendance and commitment to the homework plan ($r_s = .14-.17$, $ps < .03$) and significant small to moderate correlations with the outcome variables ($r_s = .13-.29$, $ps < .06$). Parent education also displayed significant but small associations with parent meeting attendance ($r = .18-.21$, $ps < .01$) but was largely unrelated to outcome variables ($r = .07-.13$, $p > .06$), with the exception of teacher-reported HPQ, $r = .17$, $p = .03$. As such, both family income and parent education are included as covariates in the analyses.

Across treatments, SMH professional and adolescent report of the WAI exhibited weak correlations with each other ($r = .23$), suggesting discrepant views on the WAI, consistent with some prior literature (e.g., Hawley & Garland, 2008). Additionally, the discrepancy between SMH professional and adolescent report displayed weak correlations ($r_s = .05-.18$, $ps = .01-.42$) with outcome variables at baseline and posttreatment for both treatments, whereas the individual components displayed somewhat stronger correlations (see Table 1), particularly for SMH professional-

reported WAI. Thus, the individual reports of WAI were used in the present study.

Model fit statistics confirmed that allowing paths to be free across treatment groups resulted in significantly better fit than fixing these paths across groups, $\Delta\chi(20) = 34.56$, $p = .02$, suggesting that as hypothesized there are differences in the relations between therapeutic processes and treatment outcomes for CHIEF versus HOPS.

CHIEF

For CHIEF, four therapeutic processes emerged as predictors of treatment outcomes, adolescent involvement, SMH professional-reported WAI, parent involvement, and parent commitment to the homework plan (see Figure 1). Specifically, parent HPQ was significantly predicted by SMH professional-reported WAI and parent commitment to the homework plan, controlling for baseline parent HPQ, ADHD symptoms, ADHD medication status, family income, parent education, and other therapeutic processes. Teacher HPQ was significantly predicted by SMH professional-reported WAI and parent involvement, controlling for relevant baseline variables and other therapeutic processes.

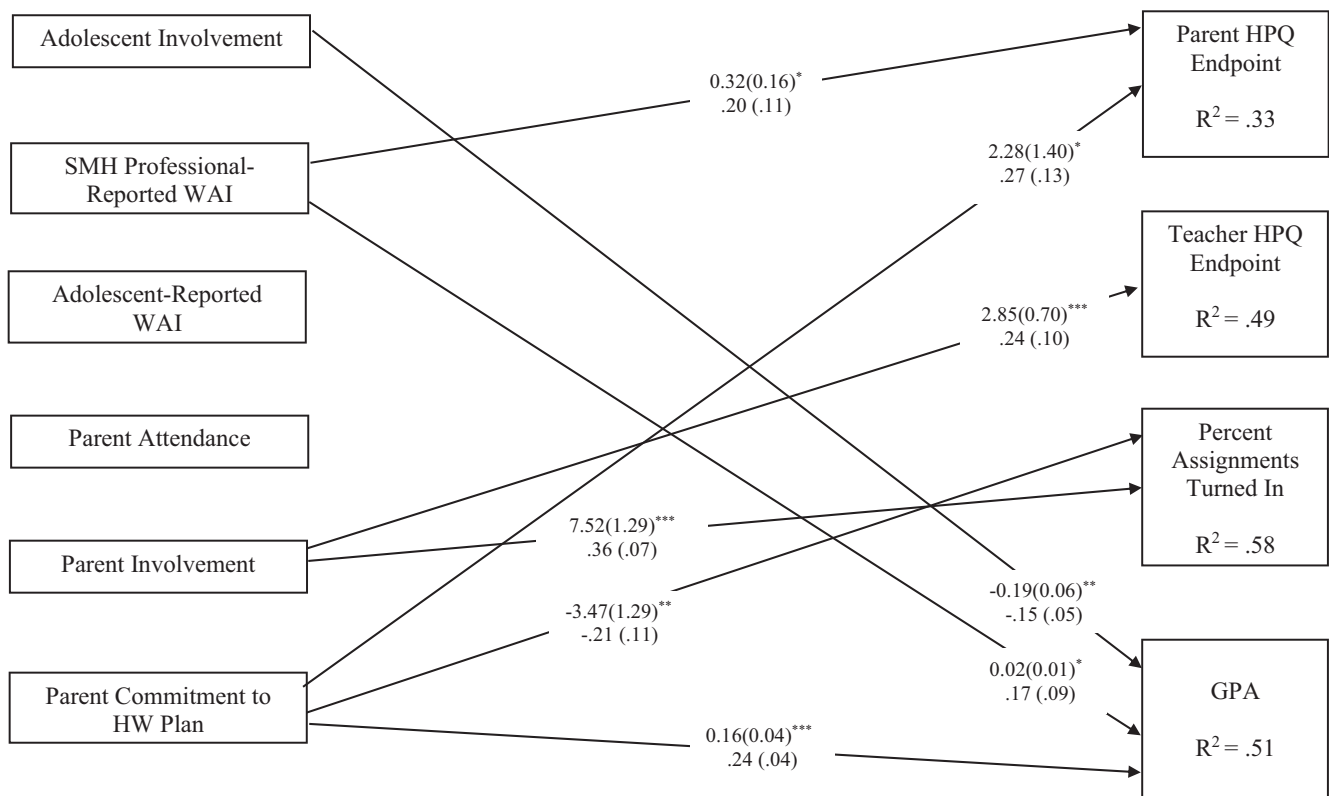


Figure 1. Path model for Completing Homework by Improving Efficiency and Focus (CHIEF) intervention. Covariances and nonsignificant paths are not shown for readability. Results are controlling for attention-deficit/hyperactivity disorder (ADHD) total symptoms and baseline Teacher Homework Performance Questionnaire (HPQ), percentage of assignments turned in, and grade point average, which are not shown for readability. ADHD symptoms were unrelated to outcomes ($ps > .10$); baseline measures were highly correlated with their endpoint scores ($ps < .001$). Unstandardized coefficients are reported on top; standardized coefficients are reported on bottom in the figure as a way to gauge relative importance of each significant path. R^2 represents a measure of effect size for each outcome using all predictors, including baseline scores and covariates. * $p < .05$. ** $p < .01$. *** $p < .001$.

The percentage of homework assignments turned in posttreatment was significantly predicted by parent involvement and parent commitment to the homework plan, controlling for relevant baseline variables and other therapeutic processes. However, the association with parent commitment to the homework plan was not in the expected direction: higher parent commitment to the homework plan predicted fewer assignments turned in posttreatment. Finally, GPA posttreatment was significantly predicted by adolescent involvement, parent commitment to the homework plan, and SMH professional-reported WAI, controlling for relevant baseline variables and other therapeutic processes. However, the adolescent involvement association was not in the expected direction, with adolescents who were more involved in-session having lower GPAs posttreatment.

HOPS

For HOPS, three therapeutic processes emerged as predictors of treatment outcome, adolescent involvement, and SMH professional- and adolescent-reported WAI (see Figure 2). Specifically, teacher HPQ posttreatment was significantly predicted by

SMH professional-reported WAI, controlling for relevant baseline variables and other therapeutic processes. The percentage of homework assignments turned in posttreatment was significantly predicted by adolescent involvement and SMH professional-reported WAI, controlling for all relevant baseline covariates and other therapeutic processes. However, adolescent involvement was not in the expected direction: More adolescent involvement in session predicted fewer assignments turned in posttreatment. Finally, GPA posttreatment was predicted by SMH professional-reported WAI and adolescent-reported WAI controlling for relevant baseline variables and other therapeutic processes. However, the association with adolescent-reported WAI was not in the expected direction, such that youth with stronger self-reported bonds with their SMH professional had lower GPAs posttreatment.

Discussion

The present study focused on the impact of several important therapeutic processes on outcomes associated with brief school-based treatment of homework problems for adolescents with ADHD. This study builds upon prior work by simultaneously

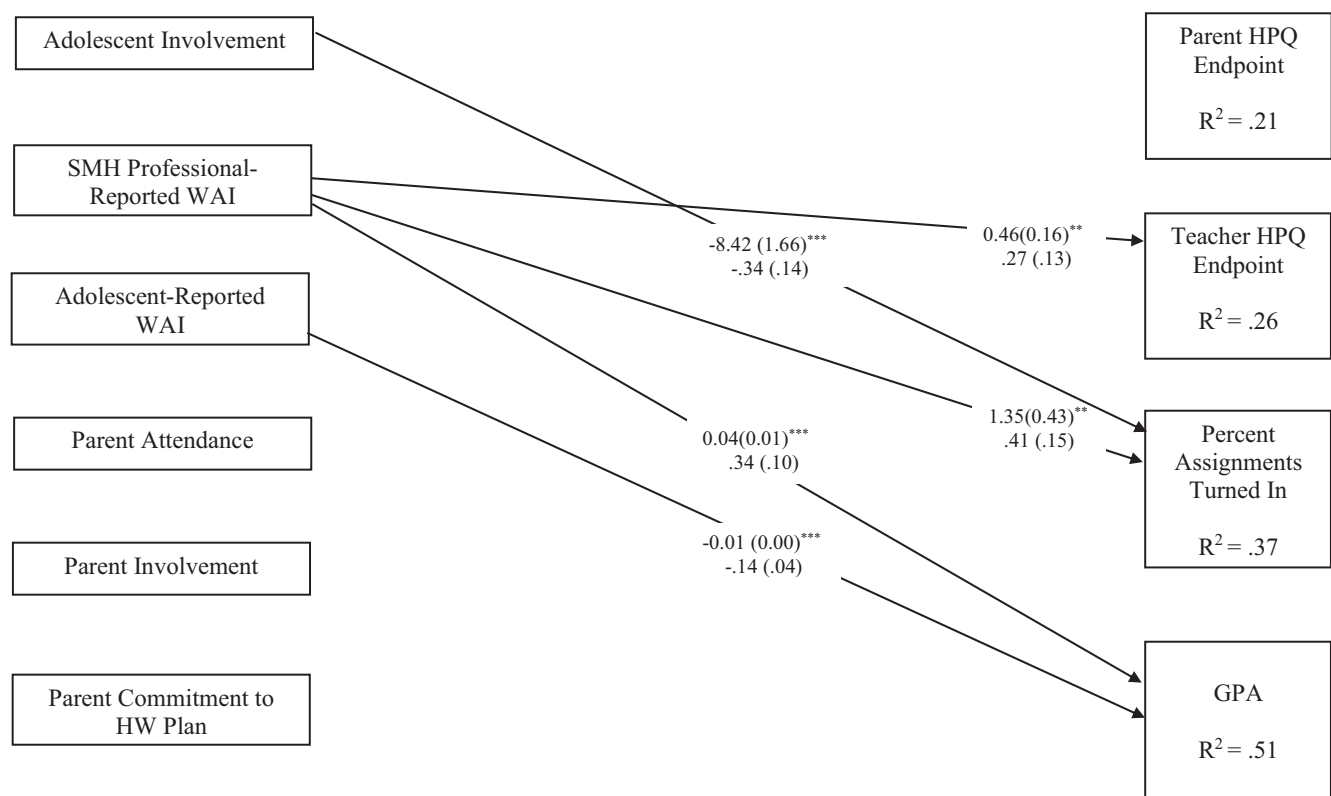


Figure 2. Path model for Homework, Organization, and Planning Skills (HOPS) intervention. Covariances and nonsignificant paths are not shown for readability. Results are controlling for attention-deficity/hyperactivity disorder (ADHD) total symptoms and baseline Teacher Homework Performance Questionnaire (HPQ), percentage of assignments turned in, and grade point average (GPA), which are not shown for readability. ADHD symptoms were unrelated to outcomes ($ps > .10$); baseline measures were highly correlated with their endpoint scores ($ps < .001$). Unstandardized coefficients are reported on top; standardized coefficients are reported on bottom in the figure as a way to gauge relative importance of each significant path. R^2 represents a measure of effect size for each outcome using all predictors, including baseline scores and covariates. ** $p < .01$. *** $p < .001$.

evaluating alliance and involvement/engagement variables and whether the impact of these processes differs across contingency management and skills-training treatments. Further, this study evaluated the impact of these therapeutic processes on parent- and teacher-report of outcomes as well as on more objective metrics of academic functioning. Working alliance, adolescent and parent involvement, and parent commitment to carry out a home-based monitoring and rewarding plan were each important predictors, with associations dependent upon the outcome of interest. Consistent with hypotheses, there were notable differences in which therapeutic processes were most important for contingency management versus skills-training approaches. These findings and clinical implications for SMH professional-delivered psychosocial treatments are discussed further below.

For CHIEF, parent involvement and parent commitment to the homework plan proved to be unique predictors of treatment outcomes, with these processes being the two strongest predictors of outcomes for CHIEF as indicated by their small to moderate effects ($r = .24-.36$). This finding was consistent with hypotheses as CHIEF is a contingency management treatment, and students were only reinforced for their behaviors (on-task and focus) in session with the SMH professional, unless their parents also monitored and rewarded those same behaviors at home. As such, and with most contingency management based treatments, adult involvement and engagement (in this case parents) is critical for behavior generalization. Accordingly, it is not surprising that the adolescent therapeutic process variables had less of an effect for the CHIEF treatment ($r_s = -.15-.20$). In contrast, for HOPS, where adolescents were instructed to practice and rehearse the skills they learned on a daily basis in-between sessions, adolescent involvement proved to be a unique predictor of outcomes. Indeed, for HOPS, adolescent involvement ($r = -.34$) and SMH professional-reported working alliance ($r_s = .24-.41$) proved to be the strongest predictors of treatment outcome. Consistent with prior research (Clarke et al., 2015; Nix et al., 2009), parent attendance was not a unique predictor of outcomes for either treatment. However, rates of attendance at parent meetings were high for both treatments, limiting variability. High attendance rates were attributed to the focus of the intervention (i.e., academic problems) and the feasibility of school-based mental health interventions with a small parent component; specifically, stakeholder input suggested that two sessions was reasonable for parents to attend, and parent meetings were held at school after work hours. Additionally, the sample was of a higher socioeconomic status than the national average, both as measured by family income and parent education, which may have made attendance easier for these parents.

A surprising finding was that two of the adolescent process variables, adolescent involvement and adolescent-reported working alliance, were associated with negative outcomes for both treatment groups. Specifically, having a strong adolescent-reported working alliance and having an adolescent who participated more during the in session activities was associated with turning in fewer homework assignments and having a lower GPA posttreatment. This was true even after taking into account ADHD symptoms and medication status, which helps rule out the possibility that the more involved adolescents were simply the most behaviorally severe. Given that the bivariate correlations for these associations were weak and nonsignificant ($r < -.12$) and that some prior research (Langberg et al., 2013, 2016b) has found adolescent-reported WAI to predict positive academic treatment outcomes, these findings should be interpreted with

caution. It will be important for future research to further evaluate these associations and to consider whether additional variables, such as intellectual ability or academic achievement, that could account for these associations.

In the present study, we found SMH professional-reported working alliance to be a stronger predictor of treatment outcomes in comparison to adolescent-reported working alliance for both treatments. In fact, the standardized coefficient for SMH professional-reported WAI was twice the magnitude of the standardized coefficient for adolescent-reported WAI. These findings are inconsistent with the limited prior research examining alliance in school-based treatment studies of adolescents with ADHD, which has found that adolescent and not SMH professional rated alliance is associated with outcomes (Langberg et al., 2013, 2016b). Interestingly, findings in the broader youth mental health treatment literature are also mixed and seemingly inconsistent. Specifically, some research suggests that both parent- and youth-reported WAI but not therapist-reported alliance predict treatment outcome (Hawley & Garland, 2008; Robbins et al., 2006), whereas other evidence suggests that parent-reported and observer ratings of alliance have stronger effects on outcomes than youth-report (Shelef et al., 2005). Still other evidence suggests that associations depend upon the outcome of interest (Hawley & Weisz, 2005). We can only speculate as to why our findings differ from other school-based ADHD research. One of the prior studies (Langberg et al., 2013) was also focused on the HOPS intervention but was an open trial and only included 23 adolescents. The other study (Langberg et al., 2016b) had a similar sample size, but the interventions were delivered in a group-based, afterschool program context, that lasted for an entire school year. Perhaps the adolescent's view of the alliance is important in the long-term, for sustained motivation to continue implementing skills. Overall, the present study and these differential findings support the assertion that associations vary by outcome (Hawley & Weisz, 2005), and highlight the importance of simultaneously evaluating multiple therapeutic processes and outcomes.

Although the variables that predicted outcomes varied across interventions, for both interventions, therapeutic processes were unique predictors of objective academic outcomes (assignment completion and GPA). This is an important finding because GPA is a notoriously difficult outcome to improve in treatment studies focused on adolescents with ADHD (e.g., Langberg et al., 2017; Evans et al., 2016; Sibley et al., 2013). In fact, for both interventions, the dependent variables with the largest proportion of variance explained were the two objective outcome measures. However, it is important to note that Mplus only provides R^2 values that estimate the proportion of variance explained for by the full model, including both the predictor variables, baseline score for the outcome measures (with baseline and posttreatment GPA being highly correlated) and covariates, so the large percentage of variance explained cannot be solely attributed to the therapeutic process measures.

Limitations

Findings from the present study should be interpreted within the context of several limitations. First, we did not have a measure of the parent-SMH professional working alliance, which has been found to be important in prior clinic-based research (e.g., Kazdin & McWhinney, 2017; Hawley & Weisz, 2005). It will be important for future research to discern whether the parent-clinician working alliance is important in school-based treatments. The

engagement variables included in the present study may provide some insight into this question, as parents with a strong working alliance with the clinician are typically more engaged (e.g., Karver et al., 2008). Second, several of the measures used in the present study were single item. It will be important for future research to look at involvement in a more in-depth manner and to tease apart aspects of involvement that might be particularly influential. Additionally, we did not observe student or parent behavior during sessions or retain physical copies of the parent monitoring and rewarding plans. As such, there are no objective or observational data to compare to SMH professional report. Third, the working alliance was assessed only once near the middle of treatment. There is some evidence that including multiple alliance measurements starting early in treatment may produce a more accurate estimate (Crits-Christoph, Gibbons, Hamilton, Ring-Kurtz, & Gallop, 2011). Relatedly, we examined working alliance and involvement separately, but they are likely related constructs that influence each other over time. Fourth, our measure of SMH professional-reported working alliance could be biased by the fact that SMH professionals were aware of how students were doing academically. As such, it is impossible to know if SMH professionals rated students who were performing better as having a stronger working alliance. Fifth, although fidelity between HOPS and CHIEF for the student portion of the treatment was high and nearly identical, fidelity for the parent portion was lower for CHIEF than HOPS, which may have influenced the findings. However, even with lower SMH professional treatment integrity for the CHIEF parent meetings, parent involvement and parent commitment to the homework plan still proved to be the strongest predictors of outcomes. Sixth, our homework adherence measure was based on SMH professionals' ratings of how likely they thought parents were to carry out to the agreed upon plan, and we did not have measures of actual adherence. Finally, this study included only six SMH professionals, all of whom were newly graduated and paid by the study, which could limit the generalizability of the findings. Specifically, professionals who are based in the school setting and employed by the district, as was the case with earlier studies of the HOPS intervention, are pulled in many different directions and may have less time to consistently meet and maintain a strong alliance.

Future Directions and Conclusions

The results of this study have important implications for SMH professional-delivered treatments. Most school-based treatment protocols/manuals focus largely on explaining how to deliver the core components of the treatment. However, it may be equally important for these manuals to provide guidance and examples of how to develop a strong bond with students and parents and how to best to engage them in treatment. SMH professionals rarely receive such training in therapeutic processes (Lever et al., 2014), and this may broadly limit the efficacy of school-based treatments. Additional work is needed to continue exploring whether the therapeutic processes that are most important vary as a function of treatment type (e.g., behavioral vs. cognitive) and by outcome. Findings from this study need to be replicated, but suggest that for skills-training treatments, protocols should emphasize developing a strong bond with the student and collaboratively establishing treatment goals. In contrast, for contingency management treat-

ments, SMH professionals may need to focus more on actively engaging parents or other adults in the treatment and overcoming barriers to ensuring that they consistently monitor behavior and provide contingencies.

In summary, this study highlights the importance of therapeutic process variables in school-based treatments delivered by SMH professionals. This study also documents the importance of simultaneously measuring several process variables and outcomes in treatment outcome research. Important next steps will be to develop SMH professional trainings focused on these core therapeutic skills, pulling on existing clinical psychology literature with some adaptation for treatment in school setting (e.g., there may be differences in appropriateness of self-disclosure). Future research would then explore whether providing these types of trainings can enhance the outcomes of existing school-based treatments for youth with ADHD.

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