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Maintaining Behavioral Gains After Leaving an Intensive Behavior Program

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ABSTRACT OF THE THESIS

Maintaining Behavioral Gains After Leaving an Intensive Behavior Program

by

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Behavioral parent training (BPT), behavioral classroom management, behavioral peer interventions, and multicomponent behavioral treatment interventions are effective psychosocial treatments for children with Attention-Deficit/Hyperactivity Disorder (ADHD). However, research is limited on the effectiveness of these interventions over time. The purpose of this study was to determine if a school-based behavioral health program, rooted in interventions with a strong empirical foundation, is effective in improving both short-term and long-term outcomes for students with ADHD. In addition, predictors of successful treatment outcomes were examined. Participants included 63 students who had transitioned out of the program within the past 13 to 42 months. Follow-up phone calls with parents were conducted; a parent-report questionnaire and measure of ADHD symptomatology were administered. Results indicated that students' ADHD symptomatology improved throughout the program and gains were maintained 1 to 3.5 years later. Further, results suggested that gender and race were predictive of

improvements in symptomatology during the follow-up period. Additionally, parents found the intervention program to be socially valid. Suggestions for researchers and implications for practitioners are also discussed.

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Maintaining Behavioral Gains After Leaving an Intensive Behavior Program

Attention-Deficit/Hyperactivity Disorder (ADHD) is a disorder characterized by persistent inattention, hyperactivity, and impulsivity. Pervasive symptoms of inattention, disorganization, off-task behavior, and excessive motor activity such as fidgeting, being out of seat, and talking impact the daily functioning of children with ADHD. The *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-V*; American Psychiatric Association, 2013) defines three presentations of ADHD: predominately inattentive, predominately hyperactive/impulsive, and combined. According to the National Center for Health Statistics (2017), approximately 10.4% of children between the ages of five and seventeen have a diagnosis of ADHD.

Research suggests that individuals with ADHD are at a greater risk for experiencing negative academic and social outcomes, including academic underachievement, failing grades, grade retention, suspensions, expulsions, school dropout, and peer rejection (Barkley, Fischer, Edelbrock, & Smallish, 1990; Barkley, Fischer, Smallish, & Fletcher, 2006; DuPaul, Morgan, Farkas, Hillemeier, & Maczuga, 2016; McQuade & Hoza, 2015). Families of children with ADHD also tend to experience greater family conflict and stress (Johnston & Chronis-Tuscano, 2015). With the large number of children with ADHD and high risk for negative outcomes, understanding how to better address the needs of these individuals is of great importance.

Evidence-Based Psychosocial Interventions

Behavioral treatments and psychostimulant medication are considered to be the most effective interventions for children with ADHD (Barkley, 2014). Because

medication is not a treatment that can be prescribed in a school setting, understanding the effectiveness of behavioral treatments is of utmost importance. Previous research has demonstrated that behavioral parent training (BPT), behavioral classroom management, behavioral peer interventions, and multicomponent behavioral treatment interventions are evidence-based psychosocial interventions that are effective for children with ADHD and can be implemented in a school setting (DuPaul, Eckert, & Vilardo, 2012; Evans, Owens, & Bunford, 2014; Evans, Owens, Wymbs, & Ray, 2018; Pelham & Fabiano, 2008).

Behavioral parent training. Behavioral parent training (BPT) involves teaching parents to use behavior management strategies that can be implemented at home to decrease behavior problems (Long, Edwards, & Bellando, 2017; Reyno & McGrath, 2006). In most BPT programs, parents attend between 8 and 16 weekly group sessions that cover topics such as (a) general information about ADHD and behavior management, (b) implementing a daily report card (DRC) to create consistency between school and home settings, (c) reinforcing appropriate behavior and ignoring inappropriate behavior, (d) giving commands and reprimands, (e) establishing behavior contingencies, (f) using time outs, (g) using reward systems at home, such as a token economy, (h) using behavior management in other settings, (i) engaging in problem solving, and (j) maintaining skills (Chronis, Chako, Fabiano, Wymbs, & Pelham, 2004; Long et al., 2017; Pelham & Fabiano, 2008).

Research suggests that BPT is effective at improving symptomatology, disruptive behavior, impairment, and social skills in children with ADHD, oppositional defiant disorder (ODD), conduct disorder (CD), and in children demonstrating severe problem

behaviors (Chronis et al., 2004; Evans et al., 2018; Evans et al., 2014; Long et al., 2017; Reyno & McGrath, 2006). BPT has also proven to be effective at improving parenting skills and family cohesion, as well as decreasing parental stress and family conflict (Chronis et al., 2004; Evans et al., 2018; Evans et al., 2014; Reyno & McGrath, 2006). To demonstrate this, Lee, Niew, Yang, Chen, and Lin (2012) examined 40 studies between 1970 and 2011 that focused on outcomes of BPT for children with ADHD. Effect sizes for child behavior (*M* ES = .32), parent behavior (*M* ES = .33), and parental perception of parenting (*M* ES = .53) were in the moderate range, suggesting that BPT is an effective treatment for this population.

Behavioral classroom management. Another evidence-based intervention for children with ADHD is behavioral classroom management (Evans et al., 2018; Evans et al., 2014; Fabiano et al., 2009). Behavioral classroom management involves utilizing contingency management procedures, which consist of (a) identifying and operationally defining a target behavior, (b) setting specific behavioral goals, and (c) providing reinforcement contingent on whether the child meets the proposed goals (DuPaul & Stoner, 2015; Kazdin, 2001). Common classroom-based contingency management procedures include token economies, point systems, praise, and direct attention (Pelham & Fabiano, 2008). Home-based contingency management procedures, such as the implementation of a daily report card (DRC), are also commonly used (Evans et al., 2014).

Research suggests that behavioral classroom management techniques are associated with improvements in classroom behavior, academic engagement, and goal

attainment for students with ADHD (DuPaul et al., 2012; Evans et al., 2014). Further, DRCs have demonstrated effectiveness at increasing communication between home and school (DuPaul & Stoner, 2015). In a meta-analysis conducted by DuPaul and colleagues (2012), 60 studies conducted between 1996 and 2010 involving school-based interventions for students with ADHD were examined. Twenty-six of these studies implemented a contingency management intervention; the mean effect on student behavior was in the moderate to large range (within-subjects design *M* ES = 0.87; single-subject design *M* ES = 2.40).

Behavioral peer interventions. Children with ADHD often struggle with peer interactions and peer relationships (Pelham & Fabiano, 2008). Behavioral peer interventions target social impairments and aim to teach children essential social skills. Social skills training programs focus on teaching children skills such as cooperation, problem solving, anger management, communication, friendship development, group entry, and conversational skills (Antshel & Remer, 2003). Research suggests that behavioral peer interventions, whether implemented in a traditional setting or a recreational setting, are effective at improving the social functioning of children with ADHD (Evans et al., 2014).

Multicomponent treatment interventions. Previous research has demonstrated the effectiveness of BPT, behavioral classroom management, behavioral peer interventions, and medication for improving outcomes for children with ADHD. In order to further investigate the efficacy of these interventions, a multimodal psychosocial treatment package was developed through the Multimodal Treatment of ADHD (MTA)

study. This set the stage for future research on multimodal treatments and combined behavioral treatments for children with ADHD.

The MTA Cooperative Group (1999a) conducted a 14-month national randomized control trial to compare the effectiveness of the following treatments: community care, medication management, behavioral treatment, and a combined treatment package. The multicomponent behavioral treatment consisted of BPT, teacher consultation sessions, the implementation of a DRC and token reinforcement, and an 8 week summer treatment program (STP) focused on teaching social skills. In the combined treatment, participants received medication management and the behavioral treatment. Though medication management was more effective than the behavioral treatment at reducing ADHD symptomatology, the two treatments were equally effective at decreasing ODD and internalizing symptoms as well as improving social skills and parent-child relations. Further, results indicated that the combination treatment and medication management were equally effective in all domains; however, those receiving the combination treatment required a lower dosage of medication. Overall, findings suggested that adding a multicomponent behavioral treatment intervention addressing academic, behavioral, and social concerns to a medication treatment and implementing it across settings leads to improved outcomes for children with ADHD (MTA Cooperative Group, 1999a).

In a more recent study, Owens and colleagues (2005) implemented a similar multicomponent behavioral treatment for elementary school age children with ADHD. The treatment consisted of weekly parenting sessions, biweekly teacher consultation, and the implementation of a DRC for one school year. Per parent report, children in the

treatment group demonstrated significant improvements in ODD symptoms, aggression, and peer relations compared to the control group. According to teacher report, the treatment group demonstrated significant improvements in inattention symptoms, impairment, academic functioning, and student-teacher relations compared to the control group.

Further, Fabiano and colleagues (2009) conducted a meta-analysis examining 174 behavioral treatment studies for children with ADHD conducted from 1976 to 2008. All studies included behavioral treatments such as BPT, behavior modification, and behavioral peer interventions. Across studies, the overall mean effect on ADHD symptomatology and impairment was in the moderate to large range (between-subjects design *M* ES = 0.83; within-subjects design *M* ES = 2.64; pre-post design M ES = .70; single-subject design *M* ES = 3.78), thus demonstrating the effectiveness of the treatment.

Maintenance Effects

Though many studies have demonstrated the effectiveness of these interventions for children with ADHD, there is a lack of research demonstrating that effects are maintained over time. For example, DuPaul and colleagues (2012) examined 60 school-based intervention studies for students with ADHD that were conducted between 1996 and 2010 and found that only 20% conducted follow-up assessments.

Short-term maintenance effects. Of the studies that have analyzed maintenance effects for children with ADHD, majority conducted follow-up assessments fewer than six months later. Some studies found that post-treatment gains maintained between one and six months after intervention completion (Mikami, Lerner, Griggs, McGrath, &

Calhoun, 2010; Pfiffner et al., 2007; van den Hoofdakker et al., 2007). Many studies, however, found variable maintenance effects at follow-up.

Supporting this noted concern are findings from a 2015 study conducted by Abikoff and colleagues. In this study, the post-treatment effects indicated that the New Forest Parenting Package (NFPP) in-home BPT program and the Helping the Noncompliant Child (HNC) clinic-based BPT program were equally effective at decreasing ADHD symptoms, ODD symptoms, and defiance as well as improving parenting skills (Abikoff et al., 2015). However, the seven-month follow-up assessment indicated that although the HNC group experienced a maintenance of treatment gains, the NFPP group experienced an increase in overall ADHD symptoms, hyperactivity, and impulsivity. The data suggest that though the two interventions produced similar treatment effects post-intervention, the HNC program may be more effective long-term in regard to decreasing ADHD symptomatology.

In another study, Sibley and colleagues (2016) investigated the effectiveness of the BPT program Supporting Teens' Academic Needs Daily (STAND) for adolescents with ADHD. Gains in organization, time management, and planning at home, ADHD symptoms at home, and parenting stress maintained at the six-month follow-up. However, disruptive behavior at home, homework recording, parent use of behavior contingencies, and parent-child contracting were significantly worse than at post-treatment.

Further, Power and colleagues (2012) found that a multicomponent behavioral intervention, Family-School Success (FSS), was more effective than the BPT program,

Coping with ADHD through Relationships and Education (CARE), for elementary age children with ADHD and academic impairments. FSS included parent education, conjoint behavioral consultation, the implementation of a DRC, and behavioral homework interventions, while CARE focused solely on parent education and support. Post-treatment data suggested that FSS was more effective at improving homework avoidance and inattention, parent negative discipline, and parent involvement in education. There were no significant post-treatment differences between treatment groups in productivity and rule adherence, ADHD symptoms, positive parenting, and the parent-teacher relationship. At the 3 month follow-up, however, the FSS group reported having better parent-teacher relationships than the CARE group. Additionally, there were no longer significant differences between groups in regard to parent involvement in education or homework avoidance and inattention after three months.

Similarly, Abikoff and colleagues (2013) compared the effectiveness of a multicomponent behavioral treatment program, Parents and Teachers Helping Kids Organize (PATHKO), to a traditional organizational skills training (OST) program on the organization and time management skills of elementary age students with ADHD. While traditional OST views a child's difficulties as a skills deficit and aims to teach children organizational skills, PATHKO views their difficulties as a performance deficit and focuses on training parents and teachers to establish reward contingency plans. At post-intervention, both treatments groups demonstrated significantly greater improvements in organization, academic functioning, homework behaviors, and family relations compared to the control group. Further, significant differences between treatment groups were only

found in regard to organization, with the OST group demonstrating greater improvements than the PATHKO group. Follow-up assessments indicated that gains maintained in both groups one-month after treatment. However, follow-up assessments four months after treatment indicated that while the OST group's gains continued to maintain, participants in the PATHKO group experienced a significant increase in homework problems.

Together, results from these studies further emphasize the importance of conducting follow-up studies. To measure intervention effectiveness, researchers need to understand whether outcomes change between post-intervention and follow-up. An overall limitation of the literature on maintenance effects is the lack of studies investigating long-term treatment outcomes. In an analysis of 60 studies on school-based interventions for children with ADHD, DuPaul and colleagues (2012) found that of the studies that conducted follow-up assessments, ten followed-up 1-4 weeks later, eight 5-8 weeks later, and two 9-12 weeks later. It is important to note that there were no studies included in this meta-analysis that conducted follow-up assessments more than 12 weeks after treatment (DuPaul et al., 2012). Sibley and colleagues (2018) explained that in order to fully understand the impact of psychosocial treatments, future studies need to conduct follow-up assessments at least one year after treatment completion. Because ADHD is a chronic disorder and symptoms often persist into adulthood, it is especially important to investigate long-term intervention outcomes for this population (Subcommittee on Attention-Deficit/Hyperactivity Disorder, Steering Committee on Quality Improvement and Management, 2011).

Long-term maintenance effects. Several follow-up studies have looked at whether treatment gains maintained in the sample of children from the MTA study. Initial results suggested that the medication management and combination intervention groups continued to have lower levels of ADHD and ODD symptoms at the 10-month follow-up compared to the behavioral intervention and control groups (MTA Cooperative Group, 2004a). Interestingly, however, the medication management and combined intervention groups experienced increases in ADHD and ODD symptoms during the 10 months, whereas gains maintained in the behavioral intervention and control groups. Further analyses suggested that continued use of medication mediated the changes in symptomatology for the medication management and combined intervention groups, suggesting that ceasing medication is associated with increased symptomatology (MTA Cooperative Group, 2004b). A follow-up assessment conducted 22 months after treatment completion indicated that the four treatment groups did not demonstrate significant differences in ADHD or ODD symptomatology, social skills, or functional impairment (Jensen et al., 2007). Similarly, there were no significant differences between treatment groups five to seven years after treatment completion. ADHD symptom trajectory, however, predicted long-term outcomes (Molina et al., 2009). Though there were no long-term differences between treatment groups, these studies demonstrate that relative to baseline, children receiving treatment do experience an overall maintenance of improved functioning (Jensen et al., 2007; Molina et al., 2009).

Aside from the MTA follow-up studies, few psychosocial intervention studies have investigated maintenance effects more than one year after treatment. One such

study, conducted by Webster-Stratton, Reid, and Beauchaine (2013), investigated the long-term effectiveness of the Incredible Years BPT and social skills program for preschoolers with ADHD. Follow-up data indicated that gains made in aggression, hyperactivity, emotion regulation, social competence maintained one year after treatment completion. Similarly, DuPaul and colleagues (2013) analyzed the maintenance of treatment effects of a multicomponent behavioral intervention program and a parent education program for preschoolers at-risk for ADHD. Data suggested that improvements in aggressive behavior, teacher-rated delinquent behavior, ADHD symptoms, ODD symptoms, conduct problems, social skills, and DIBELS scores maintained 6 months and 12 months after treatment completion for both groups.

Predictors of Treatment Response

In recent years, more research has been conducted to investigate variables that predict treatment response for children with ADHD. However, one challenge within the literature is that there are highly variable results between studies regarding the predictive power of variables such as age, gender, race/ethnicity, socioeconomic status (SES), and treatment duration. Understanding whether these variables predict treatment success is especially important when planning and implementing interventions for this population.

Age at admission. Research on age as a predictor of treatment success is scarce and results on the predictive value of age tend to vary. A few studies found that age at treatment initiation did not predict differential treatment outcomes for children with ADHD (Arnold, Hodgkins, Caci, Kahle, & Young, 2015; Langberg, Becker, Epstein, Vaughn, & Girio-Herrera, 2013; Owens, Hinshaw, McBurnett, & Pfiffner, 2016). Other

studies, however, found that age at the start of treatment impacted treatment response. One such study, conducted by Rittner, Nochajski, Crofford, and Chen (2015), found that age at program admission predicted successful treatment discharge for middle school and high school students with severe emotional behavioral disorders (EBD). Results indicated that students who entered the program in seventh, eighth, or ninth grade were significantly less likely to return to a regular classroom setting or graduate from high school. In another study, van den Hoofdakker and colleagues (2010) found that age significantly moderated the relationship between treatment group and treatment response, with older children experiencing a greater decrease in behavior problems as a result of BPT.

Gender. According to the National Center for Health Statistics (2017), there are significantly more males (14.2%) with an ADHD diagnosis than females (6.4%). Research also suggests that there are gender differences in regard to symptom severity. Typically, males with ADHD tend to have more severe inattention, hyperactivity, and externalizing behaviors, while females with ADHD tend to have greater intellectual impairments and more severe internalizing behaviors (Arnett, Pennington, Willcutt, DeFries, & Olson, 2015; Gaub & Carlson, 1997; Gershon, 2002; Levy, Hay, Bennett, & Mcstephen, 2005). Despite this, research suggests that gender does not predict treatment response or treatment outcomes (Langberg et al., 2013; Mikami et al., 2010; MTA Cooperative Group, 1999b; Owens, Hinshaw, & Arnold, 2003; Owens et al., 2016; Rittner et al., 2015).

Race/ethnicity. It is unclear whether race or ethnicity predict treatment outcomes. Some research suggests that minority status and ethnicity are not significant predictors of treatment success (Jones et al., 2010; Langberg et al., 2013). However, several studies have found differential treatment outcomes between African American or Latino children and Caucasian children. Using data from the MTA study, Arnold and colleagues (2003) found that Caucasian children had greater improvements in ADHD and ODD symptoms compared to African American children. However, after controlling for SES, only differences in ODD symptom improvement were significant. Compared to Caucasian children, African American children responded better to combination treatments and experienced greater decreases in ODD symptoms as a result of behavioral therapy rather than community care (Arnold et al., 2003; Hinshaw, 2007; MTA Cooperative Group, 1999b). In another study, Rittner and colleagues (2015) found that compared to other races, African American children were less likely to transition into a less restrictive setting or graduate high school after being discharged from a day treatment program.

Using the MTA data, Arnold and colleagues (2003) also looked at the treatment outcomes of Latino children. Results indicated that Caucasian children had greater improvements in ODD symptoms compared to Latino children. Caucasian children also had greater improvements in ADHD symptoms compared to Latino children; however, this was not significant after controlling for SES. Additionally, results suggested that Latino children experienced greater decreases in ODD symptoms in the combination treatment compared to the medication management treatment.

Socioeconomic status. Though the effects of socioeconomic status (SES) have been analyzed in multiple studies, there are discrepancies between results. It is possible that the discrepant results stem from the use of several different methods of assessing SES, including the Hollingshead Index, income, parental occupation, parental education, marital status, receipt of public assistance, and free and reduced lunch.

Hollingshead Index. The Hollingshead Index is one of the most widely used measures of SES in research (Adams & Weakliem, 2011). The Hollingshead Four Factor Index uses parental education, occupation, marital status, and sex to create an overall measure of SES. An overall SES score is calculated by adding the weighted occupation and education scores of the head of household, which is dependent on the marital status score (Hollingshead, 1975). However, some researchers suggest that the Hollingshead Index is outdated and may not be the most accurate representation of SES (Entwisle & Astone, 1994; Rieppi et al., 2002).

Several studies using the Hollingshead Index as a measure of SES have found SES to be a significant predictor of post-treatment outcomes. MacKenzie, Fite, and Bates (2004), for example, conducted a study to investigate the effects of a BPT program on the behavior of children with externalizing behavior problems. Low SES families tended to report greater behavioral improvements, suggesting that the Hollingshead Two Factor Index is a significant predictor of treatment outcomes. Further, Rieppi and colleagues (2002) found the Hollingshead Four Factor Index was a significant moderator of the relationship between treatment group and treatment outcome in the MTA study. Results indicated that participants identified as low SES experienced a greater decrease in ODD

symptoms as a result of the combination treatment. Families identified as high SES, however, responded similarly to all four treatment conditions in terms of improved ODD symptomatology.

Income. SES is not often measured solely based on family income. One such study, however, found that income did not predict post-treatment outcomes in the MTA study (Rieppi et al., 2002).

Parental occupation. Using data from the MTA study, Rieppi and colleagues (2002) found that parental occupation moderated the relationship between treatment response and treatment group. Data suggested that children of parents with lower occupation status, based on the Hollingshead occupation ratings, demonstrated a greater decrease in ODD symptoms as a result of the combination treatment. Children of parents with a higher occupation status, on the other hand, responded similarly to medication management and the combination treatment. Similar results were obtained when SES was measured by Nakao and Treas' (1989) occupation ratings (Rieppi et al., 2002).

Parental education. Several studies suggest that parental education does not predict treatment response, treatment completion, or ADHD symptom persistence (Lavigne et al., 2010; Law et al., 2014; Owens et al., 2003; Roy et al., 2016; Roy et al., 2017). One study, however, found that parental education moderated treatment response in the MTA study (Rieppi et al., 2002). Results indicated that children of parents with a higher education level experienced a greater decrease in ADHD symptoms with the combination treatment compared to the other three treatments. On the other hand, children of parents with less education experienced similar improvements in ADHD

symptomatology with the combination treatment and medication management. This finding suggests that compared to parents with higher levels of education, less educated parents may not experience the added benefit of BPT in the combination treatment (Arnold et al., 2003; Rieppi et al., 2002).

Marital status. Research suggests that marital status does not predict treatment response, treatment completion, or ADHD symptom persistence (Biederman et al., 2011; Lavigne et al., 2010; MacKenzie et al., 2004; Rieppi et al., 2002; Roy et al., 2016). One study, however, found marital status to be a significant predictor of successful treatment discharge, in that children with married parents were more likely to have successful treatment outcomes (Rittner et al., 2015).

Other classifications. Other methods used to measure SES include the receipt of public assistance and qualifying for free and reduced lunch. The MTA Cooperative Group (1999b), for example, found that the receipt of public assistance moderated the relationship between treatment group and treatment outcome. Families receiving public assistance experienced greater benefit from the combined treatment in regard to improved teacher-rated social skills. Additionally, families receiving public assistance experienced a decrease in parent-child closeness as a result of the medication management condition. To the contrary, Owens and colleagues (2003) found that the receipt of public assistance does not significantly moderate the relationship between treatment group and treatment outcome in the MTA sample. Rittner and colleagues (2015) also found that SES did not predict successful treatment outcomes, as assessed by qualifying for free and reduced lunch.

The predictive value of SES is still not conclusively understood, therefore future studies should further investigate this relationship. Future research should continue to look at income, occupation, parental education, and marital status both as a composite and as individual variables (Bradley & Corwyn, 2002).

Treatment duration. In regard to psychosocial interventions, few studies have looked into whether treatment duration impacts treatment outcomes for children with ADHD. In one study, Rittner and colleagues (2015) looked at whether the number of days in the treatment program predicted successful treatment outcomes for children with EBD. Results indicated that the more time spent in the program, the more likely discharge was successful. Treatment duration ranged from six days to ten years, with children spending an average of two and a half years in the program. Arnold and colleagues (2015) also found that treatments with longer durations, more than two years, were slightly more effective than treatment durations of less than two years. A meta-analysis conducted by Van der Oord, Prins, Oosterlaan, and Emmelkamp (2008), however, found that there was no correlation between treatment duration and effect size. More research needs to be done in this area to better understand the optimal treatment duration for psychosocial interventions.

Predictors of treatment response at follow-up. Despite the myriad of studies that have assessed predictors of treatment outcomes for children with ADHD, fewer studies have analyzed variables that predict follow-up outcomes. It is important to identify variables that impact treatment success at follow-up in addition to post-treatment. Assessing predictors at multiple time points provides insight into potential risk factors

that may impede treatment at different points. This information can provide guidance for future treatment planning.

In one such study, Webster-Stratton and Hammond (1990) examined the effects of a BPT program on the deviant behaviors of children with conduct problems and the negative parenting behaviors of the children's parents. Predictor variables were analyzed at both post-treatment and a one-year follow-up. Results indicated that parental depression predicted parents' post-treatment perception of their child's behavior, whereas negative life experiences predicted their perception at follow-up. There were no significant predictors of teachers' perceptions of child behavior at post-treatment, however marital status was predictive at follow-up. Significant predictors of child behavior at post-treatment included marital status and marital satisfaction; the only significant predictor of child behavior at follow-up was marital status. Lastly, marital status and SES, as measured by the Hollingshead Two Factor Index, predicted parent negative behavior at both post-treatment and follow-up.

A few studies have investigated predictors of follow-up outcomes in the MTA sample. Results from the initial study suggested that receipt of public assistance impacted treatment outcomes at post-treatment for the MTA sample (MTA Cooperative Group, 1999b). Jensen and colleagues (2007), however, found that symptom severity, gender, comorbidity, receipt of public assistance, and parental ADHD did not predict follow-up gains 22 months after treatment completion. Recent studies suggest that household income does not predict the persistence of ADHD symptoms in adulthood, but it does

predict adult outcomes such as the receipt of public assistance, income, and social justice involvement (Roy et al., 2016; Roy et al., 2017).

Overall, results from these studies suggest that variables that predict post-treatment outcomes may be different than variables that predict follow-up outcomes. In order to further understand the effects of predictor variables on treatment outcomes, researchers need to investigate their impact on the maintenance of treatment gains.

Purpose of the Present Study

One limitation in the psychosocial intervention literature is that there is a lack of follow-up studies that investigate treatment outcomes more than one-year after post-treatment. A second limitation is that there are mixed results between studies that investigate predictors of treatment outcomes. A third limitation is that there are a small number of studies that look at predictors of treatment response at follow-up. The present study addresses the limitations of prior research in two primary ways. First, this study will analyze treatment outcomes greater than one-year post-treatment in an effort to further understand the long-term effects of an evidence-based psychosocial intervention program. Second, this study will add to the literature on predictor variables by assessing variables at both post-treatment and follow-up.

The purpose of the current study is to (a) evaluate the effectiveness of an evidence-based program for students with severe ADHD, (b) evaluate student outcomes after they transition back to a typical school setting, and (c) identify variables that influence positive treatment outcomes.

Research Question 1: Is this school-based behavioral health program effective at improving ADHD symptomatology and student functioning from the time of program entry to program exit?

Research Question 2: Do gains made in symptomatology maintain one to three and a half years after program completion?

Research Question 3: Do age at program entry, gender, race/ethnicity, SES, or treatment duration predict treatment gains at post-treatment?

Research Question 4: Do age at program entry, gender, race/ethnicity, SES, treatment duration, or time elapsed since treatment predict the maintenance of treatment gains at follow-up?

Research Question 5: To what extent do parents find this program socially significant for meeting their child's needs?

Method

Participants

Participants were selected from a school-based behavioral health program. Inclusion in this program is based on the demonstration of (a) behavioral challenges that impair the student in his/her educational placement, (b) impaired social competencies in his/her current setting, (c) an inability to function in the classroom without assistance, (d) a need for a controlled environment, (e) impaired family functioning as a result of the student's difficulties, and (f) when placement in a less restricted environment is not feasible. Participants (n = 63) in this study were families whose children had transitioned out of the program within the past 13 to 42 months. An attempt was made to contact all

95 of these families; inclusion in the study was based on parental response and willingness to participate in the study. Families were re-contacted after an average of 28.76 months (*range*: 13-42 months) since the child transitioned out of the program.

All students in this sample (54 boys and 9 girls) had diagnosis of ADHD or a related neurodevelopmental or behavioral disorder, as determined by the diagnoses of record. In regard to ethnicity, children were 76.19% non-Hispanic/Latino/Spanish and 15.87% Hispanic/Latino/Spanish. Further, children identified as 74.60% White, 7.94% Asian, 1.59% Black/African American, 1.59% Native Hawaiian/Pacific Islander, and 6.35% other (see Table 1).

Each school year a local mental healthcare agency provides funding for students who are significantly economically disadvantaged. The agency provides tuition funds for families who demonstrate financial need based on low income and qualifying for free and reduced lunch. This sample consisted of 16 low-income families (25.4%) whose tuition was paid for by this agency and 47 middle to high SES families (74.6%) who were responsible for paying tuition on their own (see Table 1). The significant differences between funding sources suggest that our sample contains two vastly distinct SES groups.

Setting

The program that the children participated in is a school-based behavioral health program designed to support students with ADHD and other related disorders who previously demonstrated significant difficulties succeeding in a traditional classroom environment. It is a quasi-private school that serves students in first grade through eighth grade. Children attend the program five days per week from 8:30 am to 2:30 pm. In an

effort to bridge the gap between research and practice, this program is rooted in evidence based intervention strategies.

Table 1.

Demographic Characteristics of Children

Characteristics	Children (n = 63)
Child's Sex	
Male	54 (85.71%)
Female	9 (14.29%)
Child's Ethnicity	
Non-Hispanic/Latino/Spanish	48 (76.19%)
Hispanic/Latino/Spanish	10 (15.87%)
Child's Race	
White	47 (74.60%)
Black/African American	1 (1.59%)
Asian	5 (7.94%)
Native Hawaiian/Pacific Islander	1 (1.59%)
Other	4 (6.35)
Age at Entry (years)	9.20 (1.86)
Age at Entry categories (years)	
5-7	16 (25.40%)
8-10	34 (53.97%)
11-13	13 (20.63)
Diagnosis	
ADHD	31 (49.21%)
ASD	11 (17.46%)
ADHD + ASD	16 (25.40%)
Other	2 (3.17%)
No diagnosis of record	3 (4.76%)
SES	
Self-pay	47 (74.6%)
Agency funded	16 (25.4%)
Duration of Treatment	26.60 (18.25)

Note. Continuous variables are expressed as *M* (*SD*).

Behavioral parent training. Parents were required to attend weekly 90-minute parent training meetings for eight consecutive weeks. The BPT sessions were led by the Therapeutic Services Team, which included the Executive Director of the program and a clinical psychologist, and consisted of eight parents per treatment session. The training

focused on teaching parents effective behavioral strategies that they could use at home to increase adaptive behavior and decrease problem behavior (see Table 2).

Table 2.

Behavioral Parent Training Session Topics

Session	**Topic**
1	Praise & Positive Reinforcement
2	Establishing the Rules & Conducting ABC Analyses
3	Developing a Home Program Token Economy & Giving Effective Directions
4	Implementing a Home Program
5	Nonphysical Discipline & Problem Solving
6	Identifying Special Challenges
7	Self-Awareness & Parent Relationships
8	Planning Ahead

Behavioral classroom management. The program incorporates a variety of behavioral classroom management techniques, including a token economy point system, a daily report card, and a level system.

Token economy. The program utilized a point system that gave students the opportunity to earn a token every thirty minutes. In half hour intervals, points were rewarded to students who demonstrated appropriate adaptive behaviors such as following directions, staying on task, getting along with others, and following school rules. These adaptive behaviors are operationally defined in *Appendix A.* At the end of each interval, students received a green token if they received 90% or more of the available points, an orange token if they received 80-89% of the available points, and a purple token if they received less than 80% of the available points. At the end of each day, the percentage of points that they received throughout the day was used to determine the type of reinforcement activity they got to participate in for the last thirty minutes of the day.

There was also a weekly reinforcement activity that students could participate in for the last 90 minutes of school on Fridays if they achieved 90% of the available points for the week.

Daily report card. Daily report cards (DRC) were sent home every day to inform parents of their child's progress throughout the day (see *Appendix B*). Parents were encouraged to provide reinforcement at home if their child finished the day in either "green" or "orange" in regard to their percentage of points for the day. Further, it was recommended that parents problem solve the challenges their child faced during the day, rather than punishing them for receiving "purple".

Level system. A level system was used to encourage the continual demonstration of appropriate behavior. Within each classroom, there were 10 levels with each level corresponding to a different set of privileges and responsibilities (see *Appendix C*). In order to move up a level, a student had to meet his/her individually set goal of total possible weekly points. If a student did not meet his/her weekly goal, he/she moved down one level.

Social skills training. Students received cognitive-behavioral social skills training for 50-minutes daily. This training focused on self-regulation, anger management, cooperation, relational skills, and social reciprocity. The social skills curriculum was modeled after research-based social skills and friendship making programs (Michelson, Sugai, Wood, & Kazdin, 1983; Oden & Asher, 1977). A list of the skills taught in the social skills program are detailed in *Appendix D*.

Measures

SWAN. The Strengths and Weakness of ADHD-symptoms and Normal-behavior (SWAN) scale consists of 18-items derived from the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association, 1994) criteria for ADHD. Utilizing a 7-point scale ranging from 1 to 7, parents are asked to rate their child's inattentive and hyperactive-impulsive symptoms compared to peers of their child's age. Scores of 1 ("far below average"), 2 ("below average") and 3 ("slightly below average") suggest that the child's ADHD symptoms are more severe than similar age peers, whereas scores of 5 ("slightly above average"), 6 ("above average"), and 7 ("far above average") suggest that the child displays less symptoms of ADHD compared to similar age peers. A score of a 4 on this scale signifies "average" symptomatology compared to similar age peers. The SWAN yields three subscales: Inattention, Hyperactivity, and Total Symptoms (Swanson et al., 2012). For Total Symptoms, the internal consistency (Cronbach's alpha) of the measure is .95 and the test-rest reliability is .76. Further, there is a significant correlation between the SWAN Total Symptoms score and the Strengths and Difficulties Questionnaire (SDQ) Hyperactivity/Inattention subscale score ($r = .54$, $p < .01$) (Lakes, Swanson, and Riggs, 2012). In the present study, the parent version of the SWAN rating scale was completed at admission, post-treatment, and follow-up. A copy of the SWAN rating scale can be found in *Appendix E*.

Parent-report questionnaire. A questionnaire was created for the follow-up phone interviews (see *Appendix F*). The questionnaire inquired about the students' current educational placement, Individualized Education Plan (IEP) or 504 plan, and

current therapeutic or behavioral services. To measure social validity, three questions about parent satisfaction with the program were also included in the questionnaire.

Procedure

All study procedures are qualify as program evaluation and therefore fall under the program's current Institutional Review Board (IRB) approval. Demographic information, pre-admission SWAN data, and post-treatment SWAN data were collected from the students' program files. Intake files were examined to obtain data regarding diagnosis of record, sex, race/ethnicity, age and grade at program entry, and source of funding. Transition files were examined to determine each child's duration of treatment and the time elapsed since transition. While in the program, the SWAN was administered quarterly to all students; previous SWAN data was examined in order to obtain SWAN scores from program admission and program exit.

Between September 2018 and January 2019, follow-up phone calls were conducted by two graduate student researchers. In order to maintain standardization, the two researchers used a script to guide the phone calls (see *Appendix G*). Training consisted of the graduate student researchers practicing the administration of the questionnaire and the SWAN for a total of two hours before contacting parents.

The procedure for contacting families is as follows. Researchers first attempted to call the mother's cell phone number, if she did not answer a voicemail was left. Second, the researchers attempted to call the father's cell phone number. If he did not answer, then a third attempt was made by calling the home phone number. This process was

repeated once a week for three weeks or until the family was reached. Once contacted, the researcher-created questionnaire was administered, followed by the SWAN.

Statistical Analyses

Analyses were conducted using SAS version 9.4. To address research questions 1 and 2, two paired samples *t*-tests were conducted. The SWAN scores were the dependent variables and the different time points were the independent variables. A paired samples *t*-test determines whether there are mean differences in the dependent variable, in this case the SWAN scores, between two different points in time (Field & Miles, 2010). To identify whether the program was effective at improving ADHD symptomatology, the SWAN scores from program admission and program exit were compared. To identify whether symptom improvement maintained over time, the SWAN scores from program exit and the follow-up assessment were compared.

Frequency data from the questionnaire were also analyzed. To address research question 1, response frequencies relating to the child's current educational placement, use of an IEP or 504 plan, and current therapeutic or behavioral services were analyzed. Response frequencies regarding parent satisfaction and parent perception of the program's academic and social components were analyzed to address research question 5.

To address research questions 3 and 4, one-way analyses of variance (ANOVA) were conducted to identify whether age, gender, ethnicity, race, SES, treatment duration, or length of time since program exit predicted treatment outcomes at post-treatment or at follow-up. An ANOVA determines whether the means differ between groups (Field & Miles, 2010). Gains in SWAN scores were used as the dependent variable and the various

predictor variables were included as the independent variables. Categorical independent variables include gender (female vs. male), ethnicity (Hispanic/Latino/Spanish vs. non-Hispanic/Latino/Spanish), race (non-White vs. White), and SES (agency funded vs. self-pay). Continuous independent variables include treatment duration and length of time since program exit. Age was examined as both a categorical (5-7 years vs. 8-10 years vs. 11-13 years) and continuous variable. In these analyses, predictor variables were analyzed one at a time.

Prior to conducting the ANOVA analyses, the four assumptions of parametric tests were tested. First, histograms were examined to determine if the dependent variable was approximately normally distributed. Normal probability plots were also examined to assess whether the values deviated from normality. The data suggested that the assumption of normality was met. Second, Levene's Test for Equality of Error Variances was used to test whether there was equal variability throughout the data. Because the Levene's tests were not significant, the homogeneity of variance assumption was met. The third assumption states that there should not be a relationship between observations in each group. Because the data in each condition are independent of each other, the independence of observations assumption is met. The final assumption states that the dependent variable should be measured at the interval level. Though the SWAN appears to be an interval variable, it is considered an ordinal variable because the difference between values on the scale is subjective and based on parent perception. The final assumption was not met, however this is fairly common (Field & Miles, 2010). These

statistical assumptions set the foundation for producing reliable results and drawing valid conclusions.

Results

Research Question 1

Research question 1 asked: Is this school-based behavioral program effective at improving ADHD symptomatology and student functioning from the time of program entry to program exit? SWAN scores from pretreatment and post-treatment were analyzed to determine this. Results suggested that parents rated students as having more severe inattentive symptoms at pretreatment (M = 2.85, SD = 0.96) than at post-treatment (M = 3.48, SD = 1.03); $t(58) = 4.76$, $p < .001$. Similarly, parents rated students as having more severe hyperactive/impulsive symptoms at pretreatment (M = 3.03, SD = 1.10) than at post-treatment (M = 3.64, SD = 0.99); $t(58) = 4.93$, $p < .001$. Taken together, students were rated as having more severe total ADHD symptoms at pretreatment (M = 2.94, SD = 0.96) than at post-treatment (M = 3.56, SD = 0.92), suggesting that students made significant overall gains in regard to reducing symptom severity throughout the program; $t(58) = 5.22$, $p < .001$ (see Table 3; see Figure 1).

Table 3.

Parent Report of ADHD Symptoms at Pretreatment and Post-treatment

	Pre	**Post**	***t***
	***M* (*SD*)**	***M* (*SD*)**	
Inattention	2.85 (0.96)	3.48 (1.03)	4.76***
Hyperactivity/Impulsivity	3.03 (1.10)	3.64 (0.99)	4.93***
Total Symptoms	2.94 (0.96)	3.56 (0.92)	5.22***

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

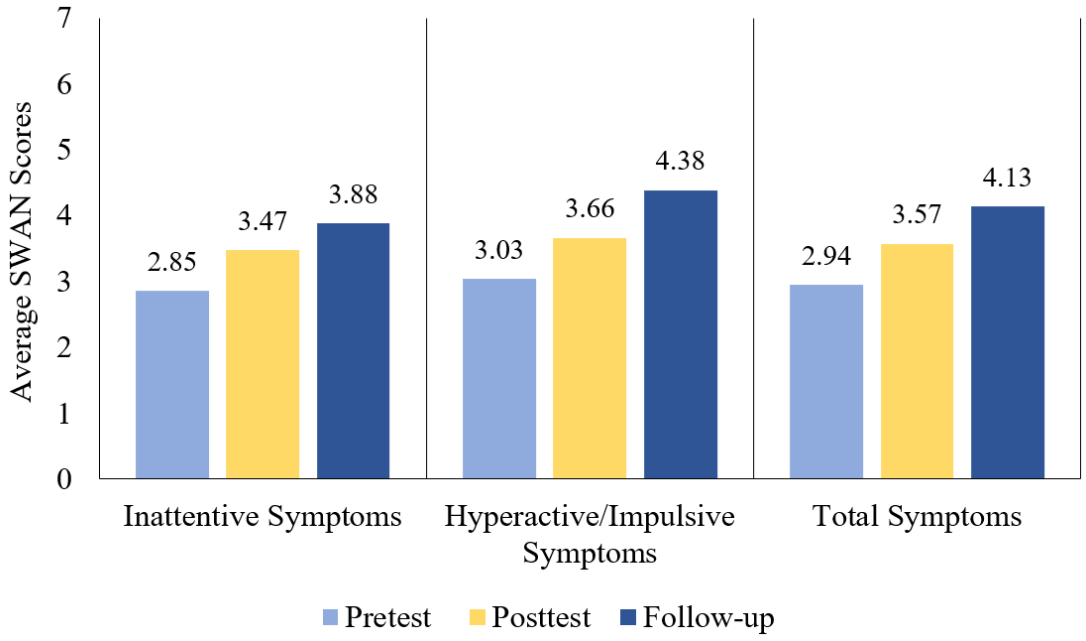

Figure 1. Parent-report of ADHD symptoms

To further understand students' current functioning, additional data were collected on students' current educational placement and supports. After transitioning out of the program, 68.3% of students were placed in a public school general education setting, 15.9% were placed in a private school general education setting, 7.9% were placed in a public school special education setting, 4.8% were placed in a private school special education setting, and 1.6% were home schooled. Results indicated that 74.6% of students received educational supports and services post-transition. Of those students, 14.3% received a 504 plan and 60.3% qualified for an IEP after transitioning. Regarding IEP eligibility category, the majority qualified for services under other health impairment (OHI; 40.5%) or autism spectrum disorder (ASD; 35.1%). Further, 25.4% of students returned to school without any educational support or services.

Research Question 2

Research question 2 asked: Do gains made in symptomatology maintain one to three and a half years after program completion? SWAN scores from post-treatment to follow-up were analyzed to determine whether treatment effects maintained over time. The data suggested that parents rated students as having more severe inattentive symptoms at post-treatment (M = 3.47, SD = 1.03) than at follow-up (M = 3.88, SD = 1.13); $t(62) = 2.70$, $p < .01$. Similarly, parents rated students as having more severe hyperactive/impulsive symptoms at post-treatment (M = 3.66, SD = 0.98) than at follow-up (M = 4.38, SD = 1.26); $t(62) = 4.47$, $p < .001$. Taken together, students were rated as having more severe total ADHD symptoms at post-treatment (M = 3.57, SD = 0.91) than at follow-up (M = 4.13, SD = 1.07), suggesting that students continued to make significant improvements in regard to reducing symptom severity after transitioning out of the program; $t(62) = 4.03$, $p < .001$ (see Table 4; see Figure 1).

Table 4.

Parent Report of ADHD Symptoms at Post-treatment and Follow-up

	Post	**Follow-up**	***t***
	***M* (*SD*)**	***M* (*SD*)**	
Inattention	3.47 (1.03)	3.88 (1.13)	2.70**
Hyperactivity/Impulsivity	3.66 (0.98)	4.38 (1.26)	4.47***
Total Symptoms	3.57 (0.91)	4.13 (1.07)	4.03***

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

Research Question 3

Research question 3 asked: Do age at program entry, gender, race/ethnicity, SES, or treatment duration predict treatment gains at post-treatment? Results suggested that there were no significant predictors of students' post-treatment gains (see Table 5).

Table 5.

Predictors of Post-Treatment Gains

	df	***MS***	***F***	***p***
Age	1	0.418	0.50	.484
Gender	1	0.032	0.04	.848
Ethnicity	1	0.244	0.27	.606
Race	1	0.501	0.55	.461
SES	1	0.138	0.16	.688
Treatment Duration	1	1.439	1.74	.192

Note. $^{**}p < .01$, $^{*}p < .05$

Research Question 4

Research question 4 asked: Do age at program entry, gender, race/ethnicity, SES, treatment duration, or time elapsed since treatment predict the maintenance of treatment gains at follow-up? (see Table 6).

Table 6.

Predictors of Follow-up Gains

	df	***MS***	***F***	***p***
Age	1	2.887	2.38	.128
Age (groups)	2	1.783	1.46	.240
Gender	1	5.372	4.59	.036*
Ethnicity	1	0.015	0.02	.903
Race	1	8.479	7.58	.008**
SES	1	0.001	0.00	.983
Treatment Duration	1	0.839	0.67	.415
Time Since Treatment	1	0.636	0.51	.478

Note. $^{**}p < .01$, $^{*}p < .05$

Age. Two analyses were conducted to investigate the potential impact of age on treatment outcome. First, age at program entry was examined as a continuous variable. The data suggested that age was not an independent predictor of follow-up gains; $F(1, 61) = 2.38$, $p = .128$. For the second analysis, age was coded into a categorical variable

with three age groups: younger (5-7 years), middle (8-10 years), and older (11-13 years). Results indicated that younger (M = 0.30, SD = 1.14), middle (M = 0.53, SD = 1.21), and older students (M = 0.99, SD = 0.67) students made similar gains between post-treatment and follow-up; $F(2, 60) = 1.46$, $p = .240$.

Gender. Results indicated that female students (M = 1.28, SD = 0.86) made significantly greater gains after program completion than male students (M = 0.45, SD = 1.11); $F(1, 61) = 4.59$, $p < .05$ (see Figure 2).

Ethnicity. Results suggested that there were no significant differences between Hispanic/Latino/Spanish (M = .56, SD = 1.00) and non-Hispanic/Latino/Spanish (M = 0.60, SD = 1.01) students' follow-up gains; $F(1, 56) = 0.02$, $p = .903$.

Race. The data indicated that White students (M = 0.70, SD = 1.02) made significantly greater gains after program completion than non-White students (M = -0.28, SD = 1.22); $F(1, 56) = 7.58$, $p < .05$ (see Figure 2).

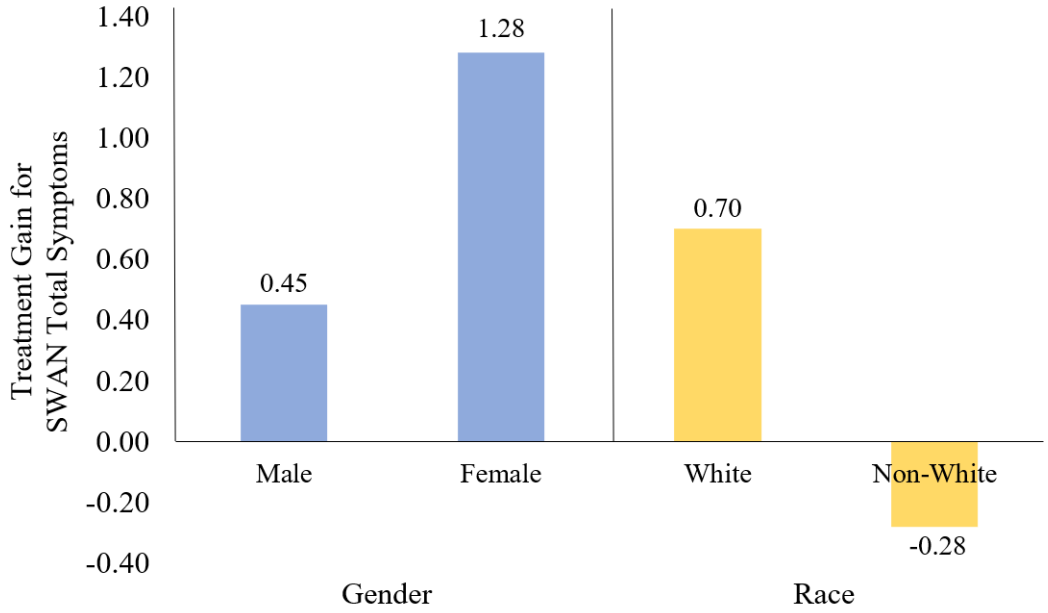

Figure 2. Significant predictors of follow-up gains

SES. Results suggested that there were no significant differences between self-pay (M = .57, SD = 1.01) and agency-funded (M = 0.56, SD = 1.41) students' follow-up gains; $F(1, 61) = 0.00$, $p = .983$.

Treatment duration. The data indicated that treatment duration was not an independent predictor of gains made between post-treatment and follow-up, suggesting that long-term gains are not impacted by how long a student participated in the program; $F(1, 61) = 0.67$, $p = .415$.

Time since treatment. The data indicated that time elapsed since treatment was not an independent predictor of follow-up treatment gains, suggesting that gains maintained regardless of how long it had been since students transitioned out of the program (M = 28.76, SD = 10.66); $F(1, 61) = 0.51$, $p = .478$.

Research Question 5

Research question 5 asked: To what extent do parents find this program socially significant for meeting their child's needs? Parent satisfaction was assessed by asking parents whether they believe the program was the right placement for their child. Majority of parents reported that the program was the right placement for their child, with 65.1% of parents reporting "strongly agree" and 28.6% reporting "agree". A small number of parents, however, reported that it was not the right placement, with 3.2% reporting "disagree" and 3.2% of parents reporting "strongly disagree".

Parents were asked to report the extent to which they believed the program helped their child academically and socially. Regarding the program's impact on academic improvement, 19% of parents reported "not at all", 36.5% reported "somewhat", 23.8%

reported “mostly”, and 20.6% reported “very much”. Further, 6.3% of parents reported “not at all”, 20.6% reported “somewhat”, 20.6% reported “mostly”, and 52.4% reported “very much” in regard to the program’s impact on their child’s social improvements.

Discussion

The purpose of the present study was to (a) evaluate the effectiveness of an evidence-based program for students with severe ADHD, (b) evaluate student outcomes after they transition back to a typical school setting, and (c) identify variables that influence positive treatment outcomes. This study aimed to fill a gap in the literature by evaluating the long-term effects of a multicomponent evidence-based intervention program that has previously demonstrated short-term effectiveness. Further, this study aimed to clarify contradictions in the literature in regard to predictors of treatment success.

Program Effectiveness

The first research question explored the effectiveness of a behavioral treatment program at improving ADHD symptomatology and student functioning. The results from the present study support previous findings that multicomponent psychosocial intervention programs are effective at improving outcomes for children with ADHD. Research suggests that BPT, behavioral classroom management, and behavioral peer interventions are effective interventions for children with ADHD (DuPaul et al., 2012; Evans et al., 2014; Evans et al., 2018; Pelham & Fabiano, 2008). Supporting the literature, the present study demonstrated that a behavioral program rooted in evidence-based intervention strategies, including BPT, behavioral classroom management (e.g.

token economy, DRC, level system), and social skills training is associated with improvements in parent-reported ADHD symptomatology.

Further, results indicated that majority of students were placed in a general education setting after transitioning out of the program. This finding suggests that multicomponent evidence-based psychosocial intervention programs may be associated with positive educational outcomes. The Individuals with Disabilities Act (IDEA) requires that students with disabilities be educated with peers without disabilities to the greatest extent possible. Though the behavioral treatment program evaluated in the present study is considered to be a more restrictive placement, the program focused on teaching students who could not otherwise function in the typical classroom setting the appropriate skills to access the least restrictive environment (LRE). Further, the program was involved in facilitating students' transition back to a traditional school setting. When students transitioned out of the program, the program team held a transition planning meeting with the family to discuss the transition process and to provide the family with an individualized behavior plan for the student's new school. Future research should further explore the relationship between psychosocial interventions and educational outcomes.

Maintenance of Treatment Gains

The second research question explored whether improvements in ADHD symptomatology maintained over time. Results from the present study suggested that gains made in ADHD symptomatology maintained one to three and a half years later.

Interestingly, gains not only maintained, but students continued to improve during the follow-up period.

Aligning with the research on the trajectory of symptom severity for children with ADHD, students experienced slightly greater improvements in hyperactive/impulsive symptoms than inattentive symptoms during the follow-up period. Research suggests that inattention is the more pervasive symptom across the lifespan and is more difficult to treat with psychosocial interventions (Biederman, Mick, & Faraone, 2000; Larsson, Dilshad, Lichtenstein, & Barker, 2011). Psychosocial interventions, however, have demonstrated significant effectiveness at reducing hyperactive/impulsive symptoms with some research suggesting that those effects maintain over time (MTA Cooperative Group, 1999a; MTA Cooperative Group, 2004a; MTA Cooperative Group, 2004b; Webster-Stratton et al., 2013).

In all, these results add to the current research on the effectiveness of psychosocial interventions. Prior research has not extensively looked at long-term treatment outcomes; the present study aimed to fill this gap by investigating treatment outcomes up to three and a half years after treatment completion. The present study's findings indicate that students continue to demonstrate improvements in inattention and hyperactivity/impulsivity symptoms after leaving the program.

Predictors of Treatment Gains

The third and fourth research questions examined the impact of age, gender, race/ethnicity, SES, treatment duration, and the time elapsed since treatment on treatment

outcomes. Results from the present study indicated that gender and race were the only variables that predicted long-term treatment outcomes.

Previous research has suggested that gender does not predict post-treatment outcomes (Langberg et al., 2013; Mikami et al., 2010; MTA Cooperative Group, 1999b; Owens et al., 2003; Owens et al., 2016; Rittner et al., 2015). Supporting the literature, the present study found that gender did not predict improvements at post-treatment. However, results from the present study suggest that gender is predictive of follow-up gains. Interestingly, female students made greater symptom improvements during the follow-up period than male students. Research suggests that inattentive and hyperactive symptoms are more severe in males; it is possible that the program was more effective for females because their symptoms were less severe (Gaub & Carlson, 1997; Gershon, 2002; Levy et al., 2005). Future research should control for symptom severity in order to further understand the relationship between gender and the maintenance of treatment gains.

Similarly, the present study demonstrated that race predicts the maintenance of treatment gains, but not post-treatment outcomes. During the follow-up period White students continued to demonstrate improvements in ADHD symptomatology, however, non-White students' symptoms worsened during this time. Research suggests that minority children have more barriers to obtaining services compared to Caucasian children; it is possible that diminished access to services may have played a role in these students' success after leaving the program (Eiraldi, Mazzuca, Clarke, & Power, 2006; Stevens, Harman, & Kelleher, 2005). One variable that may impact access to services is

educational setting. However, the non-White students in this sample were spread fairly evenly between public school (54.5%) and private school (45.5%). Another variable of interest is SES, as some research suggests that race is no longer a significant predictor of success when SES is controlled for (Arnold et al., 2003). Further analyses that control for SES should be conducted in order to clarify this relationship.

Taken together, these findings suggest that post-treatment outcomes and follow-up outcomes may be impacted by different variables. Specifically, male and minority students experienced similar gains to female and White students during the program, but differences arose once they were no longer receiving intervention. It is possible that these students require more support during the transition back to a typical school setting in order to maintain gains. Given these findings, future research should focus on identifying ways to improve long-term treatment outcomes for male students and non-White students with ADHD.

Social Validity

The final research question examined parent perceptions of the program's ability to meet their child's needs. As a whole, the program demonstrated high acceptability as parents were highly satisfied with the program and felt that it was a good placement for their child. Specifically looking at the social skills component of the program, parents reported being satisfied. Majority of parents reported being dissatisfied with the academic aspects of the program, however, with many reporting that the academic curriculum was not rigorous enough and that not enough time and attention was dedicated to academics. It is important to note that the focus of the program is primarily behavioral; academics

were not a core component of intervention. Overall, results suggested that parents found the intervention program socially valid.

Non-significant Effects

Interestingly, the present study found that no variables predicted symptom improvements from program entry to program exit. Further, age, ethnicity, SES, treatment duration, and time elapsed since treatment were not associated with symptom improvements during the follow-up period. The following discussion of non-significant results aims to further clarify the impact of predictor variables for this population of students.

First, the present study indicated that age was not predictive of treatment outcomes. This suggests that students similarly benefitted from the intervention program regardless of what age they entered the program. Several other studies found similar results (Arnold et al., 2015; Langberg et al., 2013; Owens et al., 2016). Though the literature often emphasizes the importance of intervening early in order to improve child outcomes, this finding suggests that it may not be too late to intervene for older children; they too can benefit from intensive intervention.

Given the extreme dichotomy between low income and high income families in this sample, it was interesting to find that SES was not a significant predictor of treatment success. One possible reason for this is that the present study only looked at income, as defined by whether students were self-pay or agency-funded. As suggested by Bradley and Corwyn (2002), future research should look at a broader range of SES variables including income, occupation, parental education, and marital status.

Surprisingly, treatment duration was not a significant predictor of treatment success. Some research suggests that longer treatment durations tend to be more effective for this population (Arnold et al., 2015; Rittner et al., 2015). It is possible that this effect was not significant in the present study because students were encouraged to remain in this program until they demonstrated the ability to function well in a traditional school setting. As a result, most students did not leave the program until they were ready to do so.

Limitations

One limitation of the present study is that it relied on a parent report measure of ADHD symptomatology as the primary outcome measure. One consideration is that rater bias and expectancy is associated with parent-report measures. A second consideration is that the present study only directly measured one outcome. Future studies should utilize additional measurement methods (e.g., direct observation of child behavior), additional informant sources (e.g., teacher, child), and should look at more than one aspect of child functioning (e.g., social skills, behavior problems). Including additional measures may increase the validity of these findings.

A second limitation is that the present study did not include a control group to compare the treatment group to. As a result, it is unclear whether long-term improvements are the direct result of treatment or are due to maturation effects. Because the present study served primarily as a follow-up on students who had transitioned out of the program, only data on these students were available. To increase methodological rigor

and demonstrate experimental control, future studies should employ a randomized controlled trial or a quasi-experimental design (What Works Clearinghouse, 2008).

As with any follow-up study, another limitation is the number of participants lost to follow-up. The attrition rate of the present study was 33.7%, which exceeds the 20% attrition rate guideline set by What Works Clearinghouse (What Works Clearinghouse, 2014). The primary reason for attrition in this study is the inability to contact parents; some parents did not answer the phone or call back, others changed their phone numbers. A small number of parents answered the phone but expressed that they did not want to participate. As a result of attrition, the generalizability of these findings are limited. It is unknown the extent to which student outcomes are associated with the parent's tendency to respond. It is possible that parents who were unsatisfied with the treatment program were less willing to participate.

Lastly, feasibility of implementation is limitation to consider. The present study examined the effectiveness of a multicomponent evidence-based intervention program implemented in a quasi-private school. This school was created with the primary goal of implementing this evidence-based program. Given the time and available resources in a traditional school setting, it may be more difficult to implement a comprehensive multi-component program in that setting.

Implications for Practitioners

In summary, these findings are encouraging and provide evidence that a school-based behavioral health program rooted in evidence-based psychosocial interventions is associated with improvements in both short term and long term outcomes for students

with ADHD. The present study demonstrated that ADHD symptoms improved throughout the program and continued to improve years after students transitioned out of the program. These findings have substantial implications for practitioners working with students with ADHD. Based on these findings and prior research, it is recommended that practitioners consider implementing interventions such as behavioral parent training, behavioral classroom management, and social skills training with this population of students. Additionally, the present study found that male students and minority students are less successful after leaving an intensive intervention program. This finding suggests that these students may require additional supports after intervention has concluded. Behavior programs may want to incorporate booster sessions in order to further support these students during transition and facilitate the maintenance of treatment gains. Taken together, results from the present study can inform and guide treatment planning for students with ADHD and other related disorders.

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Appendix A

Operational Definitions of Adaptive Behaviors

- **Following Directions:** The child earns points each period of 30 minutes for every occasion in which he/she follows directions given by the teacher or behavior specialist and the direction is initiated within 5 seconds.
- **Staying on Task:** The child earns points each period of 30 minutes for every occasion in which child completes all of the required work as specified by the teachers. During the times when no measurable quantity of work is required, the child receives points for each period in which the child is attending to the activity of focus.
- **Getting Along:** The child earns points for each period during which there are no incidences (verbal or nonverbal) of provocation, cursing, rudeness, teasing, lying, or aggression directed at peers or adults.
- **Following School Rules:** The child earns points for each period during which he/she follows the posted rules or rules specific to a particular activity. The latter must be made prior to an activity and may vary from activity-to-activity.

Appendix B

DAILY REPORT CARD

NAME: _____ LEVEL: _____ WEEK: _____

Monday's Homework

1. Read 10 min. aloud and 20 min. silently x_____ (initials)

Daily Color ◯ **Parent Signature _____**

Tuesday's Homework

1. Read 10 min. aloud and 20 min. silently x_____ (initials)

Daily Color ◯ **Parent Signature _____**

Wednesday's Homework

1. Read 10 min. aloud and 20 min. silently x_____ (initials)

Daily Color ◯ **Parent Signature _____**

Thursday's Homework

1. Read 10 min. aloud and 20 min. silently x_____ (initials)

Daily Color ◯ **Parent Signature _____**

Friday's Homework

No Homework!!

Daily Color ◯ **Funday Friday Color** ◯ **Parent Signature _____**

Appendix C

Level System

Level 1

- Can bring books from home
- Can play on the blacktop

Level 2

- Can play on the handball court and in the fort
- Can take the pet care quiz to cash out with school pets
- Level 1 privileges

Level 3

- Can play on the fields
- Level 3 sharing
- Level 1-2 privileges

Level 4

- Can help with colors and stamp reinforcement
- Level 1-3 privileges

Level 5

- Can have water bottle at desk
- Get paid for jobs
- Level 1-4 privileges

Level 6

- Can bring iPad to middle room during Patrols (Wi-Fi off)
- Can wear a hat in class
- Level 1-5 privileges

Level 7

- Can get a personalized wallet and “credit card”
- Free water/ice refill
- Level 1-6 privileges

Level 8

- Can get videos approved for sharing at Patrols
- Can help staff make copies
- Can help staff laminate items
- Level 1-7 privileges

Level 9

- Can earn staff water and ice refills
- Can get pre-approved YouTube videos for sharing (1 per month)
- Can buy different color options for greens on the chart
- Earn level 10 privileges during lunch
- Can bring a pet for sharing with permission from parents
- Level 1-8 privileges

Level 10

- Can transfigure or change your level character
- Can use a mechanical pencil
- Can sit anywhere during lunch and share food with staff permission
- Earn level 10 parties
- Can keep Wi-Fi on during Patrols (must stay in the classroom)
- Level 1-9 privileges

Appendix D

Operational Definitions of Social Skills Vocabulary

Good Sportsmanship: Children demonstrate adaptive social skills during a group game, activity or sports event.

Cooperation: "When two or more people work together to get something done."

Examples:

- Two students complete a puzzle together.
- A child helps to get dinner ready by setting the table while the food is being prepared.

Nice Sayings: "Saying or doing something nice"

Examples:

- A student mentions what a great job someone has done.
- A student wishes (out loud) that someone does well at attempting something.
- A student gives a teammate a high five.
- A child greets his/her mother or father, sibling, or friend.

Following Directions: Following directions might include some or all of the following…

Examples:

- Doing exactly what was asked. Begin doing what was asked within five seconds.
- Doing what was asked without reminders.
- Doing what was asked without a fuss.

Following Rules: "Following rules that have been set up for the class or activity."

Examples:

- Student asks permission before touching something that belongs to another.
- Student keeps his or her hands to him/her- self.
- A child plays in the front yard after a parent establishes the rule of not leaving the yard (because dinner is almost ready).

Helping: "Doing something for someone."

Examples:

- Carrying equipment for someone.
- Lifting someone who has fallen.
- Passing out paper for the teacher.

Sharing: "Allowing someone else a chance to do what you are doing."

Examples:

- Students take turns rolling the dice during a board game.
- Students allow others to play in their handball game.
- A child allows a sibling or friend to play with his or her toys.

Staying with the Game/Activity: "Sticking with the activity; staying on task."

Examples:

- A student continues to work on an unwanted math assignment.
- A child who has fallen and is not injured, continues to participate in a game.

Participation: "Trying hard or giving your best effort."

Example:

- Student gives their best effort in a game or activity

Accepting: "When something happens that you don't like or don't want, and you continue to follow rules and get along with others."

Examples:

- A student lowers his or her hand after the teacher states, "No more questions right now."
- A child says "okay" and follows the direction to turn off the television.

<u>Operational Definitions of Assertion, Aggressive Behavior and Passivity</u>

Assertive behavior: "Cool Craig" (A puppet character used to depict an assertive style of interaction). Using "Cool Craig" manner might include some of the following:

Examples:

- Running your fastest in a relay race.
- Doing your neatest work.
- An appropriate tone of voice (developed through role-playing).
- Relaxed body posture (head, neck, face, arms, and hands).
- Appropriate content in conversation.
- Appropriate length of contribution to conversation.

Aggression: "Mean Max" (A 'puppet' character depicting an aggressive style of interaction). Using a "Mean Max" might include some of the following.

Examples:

- Poor eye contact (glaring).
- Grumbling, mean tone of voice.
- Inappropriately loud voice (yelling).
- Mumbled, unclear speech.
- Strained body posture (tightened face muscles, clenched fists).
- Inappropriate content in conversation (teasing, name-calling).

Passive: "Wimpy Wally" (A 'puppet' character depicting a passive style of interaction). Using a "Wimpy Wally" might include some or all of the following.

Examples:

- Poor eye contact (looking down or away).
- Whiny tone of voice.
- Low volume in using voice.
- Mumbled, unclear speaking.
- Lowered head while speaking.
- Incomplete sentences during conversation.

Social Problem Solving Model

Problem Solving: "Five steps to getting your problem solved and staying out of trouble." Five Problem Solving Steps:

1. What is the problem?
2. What are the choices? (brain storms any choices).
    • Will it solve the problem?
    • What is the risk of making this choice?
3. Choose one and a backup.
4. Just Do it.
5. Did it work?
    • Yes; problem solved.
    • **No; attempt new solution go back to Step 3**

Ignoring: "Not showing that something or someone is bugging you."

Examples:

- A student continues to work in spite of the noises in the classroom.
- A student continues to look at the teacher while another student inappropriately calls out to him or her.
- A child continues to look out the car window while his or her sibling is making 'teasing' faces.

Appendix E

SWAN Rating Scale (Swanson) – PARENT RATINGS

swan_date

Child Name: _____ **Today's Date:** ___/___/____

swan_rater swanrater_oth (text)

Completed by: *(primary caretaker, check one)* ❑ Mother ❑ Father ❑ Other _____

Please print additional copies for second parent or guardian to complete and return.

Children differ in their abilities to focus attention, control activity, and inhibit impulses. For each item below, how does this child compare to other children of the same age? Select the best rating based on **your observations over the PAST MONTH. Compared to other children, how does this child do the following?**

swan1 - swan18 **Over the past month, my child…**	1 Far below	2 Below	3 Slightly below	4 Average	5 Slightly above	6 Above	7 Far Above
1. Gives close attention to detail and avoids careless mistakes	1	2	3	4	5	6	7
2. Sustains attention on tasks or play activities……	1	2	3	4	5	6	7
3. Listens when spoken to directly……	1	2	3	4	5	6	7
4. Follows through on instructions; finishes school work/chores	1	2	3	4	5	6	7
5. Organizes tasks and activities……	1	2	3	4	5	6	7
6. Engages in tasks that require sustained mental effort……	1	2	3	4	5	6	7
7. Keeps track of belongings and items necessary for activities	1	2	3	4	5	6	7
8. Ignores extraneous stimuli (distractions)……	1	2	3	4	5	6	7
9. Remembers daily activities……	1	2	3	4	5	6	7
	Far below	Below	Slightly below	Average	Slightly above	Above	Far Above
10. Sits still (controls movement of hands/feet or controls squirming)……	1	2	3	4	5	6	7
11. Stays seated (when required by class rules or social conventions)……	1	2	3	4	5	6	7
12. Controls motor activity (can stop inappropriate running or climbing)……	1	2	3	4	5	6	7
13. Plays quietly (keeps noise level reasonable)……	1	2	3	4	5	6	7
14. Settles down and rests (controls constant activity)……	1	2	3	4	5	6	7
15. Controls talking too much……	1	2	3	4	5	6	7
16. Thinks before answering questions (controls blurting out answers)……	1	2	3	4	5	6	7
17. Waits for his/her turn (stands in line and takes turns)……	1	2	3	4	5	6	7
18. Enters into conversations and games (controls interrupting or intruding)……	1	2	3	4	5	6	7

Appendix F

Child Name: _____ Date of Completion [ ]

FOLLOW-UP PHONE INTERVIEW

Documenting attempts for contacting families:

1. First phone call (left voicemail?) (Date/Time: _____)
2. Second phone call (left voicemail?) (Date/Time: _____)
3. Third phone call (left voicemail?) (Date/Time: _____)

Date of Most Recent Transition	__ __ / __ __ / __ __
Follow-up Phone Interview Date **document prior attempts to contact above*	__ __ / __ __ / __ __
Name of Person Conducting Phone Interview	
Did you participate in a Transition Plan meeting?	❑ Yes ❑ No
If yes, who was in the meeting?	
Is your child in a program-related Outpatient Tx program? *(Including Services at the Center for Autism or Pediatrics)*	❑ Yes ❑ No
If yes: Outpatient Tx Type	
If yes: Outpatient Tx Provider Name	
Did your child participate in the Junior Counselor Program?	❑ Yes ❑ No ❑ N/A
If yes: Junior Counselor CHM* Provider Name	
Is your child currently receiving therapeutic services for behavioral or emotional difficulties outside of this program?	❑ Yes ❑ No
If yes: Type of services (use second page if necessary)	
If yes: Name of Provider (use second page if necessary)	

Transition Placement Name	
Transition Placement Type	❑ General Ed Public ❑ General Ed Parochial ❑ General Ed Private ❑ Public SDC ❑ Private Special Education ❑ NPS ❑ Residential ❑ Home School
Does your child have an IEP in place?	❑ Yes ❑ No
If yes: Do you know their primary eligibility category for Special Education Services?	❑ OHI* ❑ Autism ❑ SLI* ❑ SLD* ❑ ED* ❑ Other_____

Does your child receive a 504 plan in a public school or have a formal accommodation plan in a private school in his/her current academic setting?	❑ Yes ❑ No
Do you feel that your child's current school is meeting her/his individual needs?	❑ Not at all ❑ Somewhat ❑ Mostly ❑ Very Much
Do you feel that the skills your child learned in this program helped her/him socially?	❑ Not at all ❑ Somewhat ❑ Mostly ❑ Very Much
Do you feel that the skills your child learned in this program helped her/him academically?	❑ Not at all ❑ Somewhat ❑ Mostly ❑ Very Much
How much do you agree with this statement? "I believe this program was the right placement for my child."	❑ Strongly Disagree ❑ Disagree ❑ Agree ❑ Strongly Agree

Appendix G

Transition Follow-up Phone Interview Script

Intro:

Hi, my name is _____, and I'm a graduate student working at the [*name of program*]. How are you doing today?

Reason:

This call is just a simple follow-up check in to see how [*name of child*] has been doing since leaving the program. I know it's been about _____ months/years since he/she transitioned out of our program. Would this happen to be a good time to answer a brief questionnaire about how he/she is doing? It should only take about 10 minutes. …

NO → Not a problem. What time might be better for me to call you back? _____ Alright then, thanks! Have a great day. **(Hang up).**

YES → Alright, let's dive right in! **(Go over questionnaire).**

Now, I would like you to think about your child's behavior over the past month. I am going to say several statements and I want you to compare your child's current behavior to that of similar age peers. This will be on a scale of 1 – far below peers of his/her age to 7 – far above peers of his/her age, so a 4 would be about average compared to his/her peers. Does that make sense? **(Go over SWAN measure).**

End: Alright, that's it! Do you have any other questions I might be able to answer for you? … Alright then, thank you so much for your time. We hope nothing but the best for you and your family. If you ever need any of the services at [*name of program*] again in the future, please do not hesitate to give us a call. Have a great day. Bye! **(Hang up).**

Miscellaneous Questions/Comments:

If they have concerns about privacy: These questions are for programmatic evaluation purposes, and will not be accessible to anyone outside of the [*name of program*] staff members. Further, any data used for research purposes will be de-identified.

What kind of purposes? The team evaluates the data to get a general sense of how families that have transitioned are faring. We are also interested in the satisfaction of past families and are always looking for better ways to improve our program.

If they ask for a general number: The front desk can be reached at (xxx) xxx-xxxx.

If they want to talk to data management for data-related questions: The data manager is [*name*], and he/she can be reached at (xxx) xxx-xxx or [*email*].

If they ask you a question you don't know the answer to: You know, I'm actually not sure about that. But if you'd like to find out more, you are definitely welcome to call … **(direct general questions to the front desk, any other questions can be directed to the data manager).**