Article

Treating Comorbid Anxiety in Adolescents With ADHD Using a Cognitive Behavior Therapy Program Approach

Journal of Attention Disorders
2017, Vol. 21(13) 1094–1104

DOI: 10.1177/1087054712473182
journals.sagepub.com/home/jad
SAGE

Stephen Houghton[1,2], Nadiyah Alsalmi[1], Carol Tan[3], Myra Taylor[1], and Kevin Durkin[2]

Abstract

Objective: To evaluate an 8-week cognitive behavior therapy (CBT) treatment specifically designed for adolescents with ADHD and comorbid anxiety. **Method:** Using a multiple baseline design, nine adolescents (13 years to 16 years 9 months) received a weekly CBT, which focused on four identified anxiety-arousing times. Participants self-recorded their levels of anxiety for each of the four times during baseline, intervention, and a maintenance phase. Anxiety was also assessed using the Multidimensional Anxiety Scale for Children (MASC). **Results:** Paired samples *t* tests supported the success of the intervention. Interrupted time-series data for each participant revealed varying rates of success across the four times, however. The MASC data revealed significant reductions in Physical Symptoms of Anxiety, Social Anxiety, Separation Anxiety, Harm Avoidance, and Total Anxiety. **Conclusion:** The data demonstrate the efficacy of a CBT program for the treatment of comorbid anxiety in adolescents with ADHD. *(J. of Att. Dis. 2017; 21(13) 1094-1104)*

Keywords

ADHD, anxiety, CBT, intervention

ADHD is a pervasive and persistent psychiatric disorder defined by the features of inattention, impulsivity, and hyperactivity (American Psychiatric Association [APA], 2000). Mostly diagnosed in childhood, it continues into adolescence in 50% to 70% of individuals (Barkley, Murphy, & Fischer, 2007; Foaraone, Biederman, & Mick, 2006). Although comorbid with a range of other psychopathologies (Brown, 2000), one of the most consistent findings in ADHD research over the past 25 years has been its very high co-occurrence with anxiety in referred and community samples (Hammerness et al., 2010; Schatz & Rostain, 2006; Sorenson, Plessen, Nicholas, & Lundervold, 2011). Specifically, 25% to 50% of individuals with ADHD also exhibit an anxiety disorder (Alqahtani, 2010; Mancini, Van Ameringen, Oakman, & Figueiredo, 1999; Tsang et al., 2015; Vloet, Konrad, Herpertz-Dahlmann, Polier, & Gunther, 2010).

Pharmacological intervention (i.e., stimulant medication) is the most widely used treatment for children and adolescents with ADHD and the majority of these young people show favorable responses to stimulants (Solanto, Arnsten, & Castellanos, 2001). However, a substantial number (i.e., 20%-30%) show no response or experience side effects (Swanson, McBurnett, Christian, & Wigal, 1995). Consequently, some primary care physicians express concerns about prescribing such medications to young people (Wilens et al., 2008). When anxiety is comorbid with ADHD, different pharmacological treatment needs also arise (Hammerness et al., 2010). For example, children and adolescents with ADHD and comorbid anxiety respond differently to treatments (Baldwin & Dadds, 2008), and a number of studies have demonstrated the lower effect of stimulants in individuals with comorbid anxiety compared with ADHD alone (see Tannock, Ickowicz, & Schachar, 1995; Ter-Stepanian, Grizenko, Zappitelli, & Joober, 2010).

There is now growing evidence that concurrent treatment of ADHD and anxiety may impact positively on both conditions (Jarrett & Ollendick, 2008). The Multimodal Treatments of ADHD study (MTA study; MTA Cooperative Group, 1999) reported that children with ADHD–Combined

[1]The University of Western Australia, Perth, Australia
[2]University of Strathclyde, Glasgow, UK
[3]Nanyang Technological University, Singapore

Corresponding Author:
Stephen Houghton, Graduate School of Education, The University of Western Australia, Crawley 6009, WA, Australia.
Email: Stephen.houghton@uwa.edu.au

(ADHD-C) type responded equally well, at short-term follow-ups, to a program of *concurrent* medication and behavioral intervention on core symptoms of ADHD. Moreover, this finding differed from the aggregate result of medication *alone* and surpassed behavioral intervention *alone*. Emerging from the literature as an effective psychosocial intervention for forms of child and adult psychopathology, such as OCD and depression (see Antshel, Faraone, & Gordon, 2014), is cognitive behavioral therapy (CBT). Conventional CBT interventions

> typically aim to provide people with insight into the roles their thoughts play in the generation and maintenance of their anxiety symptoms; assist them in identifying unhelpful thoughts that trigger such symptoms; and encourage and enable them to challenge these thoughts in ways that reduce their credibility and attenuate their emotional influence. (MacLeod & Mathews, 2012, p. 193)

Although there is evidence that CBT is efficacious with adults with ADHD (see Safren et al., 2005; Safren et al., 2010), its application with children and adolescents with ADHD, or ADHD with comorbid anxiety, has been limited. Of the few studies conducted, Costin, Vance, Barnett, O'Shea, and Luk (2002) recruited five boys (aged 10-12 years) with ADHD-C type, Oppositional Defiant Disorder and anxiety into an 8-week CBT family-based intervention. Overall, high levels of satisfaction with the program were reported but no changes in symptomatology were evident. In another study, Verreault, Berthiaume, Turgeon, Lageix, and Guay (2007) evaluated a 10-week CBT family-based anxiety protocol with 10 children (8 boys and 2 girls, aged 8-12 years) with ADHD and anxiety. An ADHD psychoeducational session for parents was also included in this study. Overall, parents and children reported changes in their own anxiety symptoms, but parents did not report any changes in their children's ADHD symptoms.

In an attempt to bring experimental control to the application of psychosocial treatment protocols for ADHD and anxiety, Jarrett and Ollendick (2012) used a multiple baseline research design with eight children (aged 8-12 years) with ADHD and one or more anxiety disorders. Parent behavior management training, parent and child education about anxiety, cognitive restructuring and graduated exposure to anxiety provoking situations were delivered. Seven of the eight families completed the entire 10-session treatment (over the 10 weeks). Repeated weekly measures revealed significant improvements in ADHD and anxiety symptoms, although the gains were generally more limited for ADHD symptoms.

Antshel, Faraone, and Gordon (2014) recruited a large sample of 68 adolescents with ADHD to participate in a 13- to 16-session CBT intervention program comprising psychoeducation about ADHD, training in organization and planning, reducing distractibility, cognitive restructuring, reducing procrastination, and improving communication. All participants were receiving concurrent pharmacotherapy. All completed the entire program. Parental and teacher ratings indicated improvements in adolescents with ADHD only, ADHD + Anxiety, and ADHD + Depression across several symptoms and functional variables. The participants also showed improvements in ecologically valid measures, such as school grades and attendance. However, many of these adolescents did not normalize their functioning and remained symptomatic and functionally impaired in one domain. The study did not distinguish anxiety symptoms, though improvements on internalizing were found in parent and adolescent ratings; furthermore, the fact that adolescents with ADHD + Anxiety were among the participants showing greatest improvements indicates that those with this comorbidity are able to benefit from CBT. Antshel et al. (2014) highlighted several reasons for developing psychosocial interventions, including evidence that some young people cannot tolerate stimulant medications, during adolescence poor compliance and stimulant misuse can become more prevalent, and adolescents tend to begin moving away from family in their search for independence. Hence, "it makes clinical sense to involve adolescents in treatment" (Antshel et al., 2014, p. 3) because increasingly its efficacy will depend on their readiness to engage with it.

In sum, a substantial proportion of adolescents with ADHD also present with anxiety. CBT is recognized as an effective mode of therapy for adults and children, and recent evidence indicates favorable outcomes for adolescents with ADHD. However, given the scarcity of literature and the need to develop and evaluate the efficacy of psychosocial interventions for adolescents with ADHD (and comorbid anxiety), the present research implemented an 8-week CBT intervention program with concurrent pharmacotherapy treatment.

Method

Participants

A total of 10 adolescents (7 males and 3 females) and their parents were involved in the study. All were recruited from a clinical facility attached to a university research and treatment program in Perth, the capital city of Western Australia. All of the adolescents were Australian Caucasian, resided in middle to high socioeconomic status (SES) areas, had a full scale IQ $\geq$80, and had been clinically diagnosed by a pediatrician as meeting the formal *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*; APA, 2000) diagnostic criteria for ADHD-C type. In addition, all were diagnosed with a comorbid Generalized Anxiety Disorder, again using the (*DSM-IV-TR*; APA, 2000) diagnostic criteria. There were no other diagnosed

comorbidities. To ensure accurate diagnoses, best estimate procedures (see Leckman, Sholomaskas, Thompson, Belanger, & Weissman, 1982) were used. That is, these diagnoses were discussed during a weekly meeting and confirmed whether a consensus diagnosis was reached between three pediatricians and two clinical psychologists.

At the time of the evaluation, the mean age of the adolescents was 14.2 years (SD = 1.6; range = 13 years to 16 years 9 months). All were receiving concurrent pharmacotherapy at the time of the CBT intervention program, predominantly methylphenidate (Ritalin). Parental reports at the time of recruitment indicated that all participants were responding satisfactorily to ongoing treatment for their ADHD. None of the adolescents had previously received psychosocial intervention.

The 10 adolescents were randomly assigned to one of two groups (henceforth, Groups 1 and 2, n = 5 per group). Both groups received the CBT anxiety reduction program via a multiple baseline research design. Although the multiple baseline has a distinct advantage over designs with a simple phase change (see Kazdin, 1982; Tawney & Gast, 1984), in this study, it was also chosen because a specialized population (children with two disorders) was recruited and a randomized control trial (RCT) was not possible. One of the adolescents subsequently declined to participate in the program following assignment to group but agreed to self-record levels of anxiety throughout the study. The inclusion of this individual as a constant series control (CSC) further strengthened experimental control. That is, it reduced the likelihood that extraneous events could have been responsible for any changes seen (Barlow, Hayes, & Nelson, 1986). When asked why he did not wish to participate in the program, he responded that on the evenings that the sessions would be delivered he "had better things to do."

Experimental Design

Group 1's (n = 4) baseline phase consisted of participants' self-recording their levels of anxiety at the four separate identified times each day over a period of 5 days. These times were immediately prior to leaving home for school (i.e., approximately 5 min before leaving), immediately prior to leaving the classroom for recess (i.e., as lesson period concluded), immediately prior to leaving the classroom to go home (i.e., as lesson period concluded), and immediately prior to beginning homework (i.e., approximately 5 min before beginning homework). These four different times were identified in previous research as being anxiety provoking phases of daily life for adolescents with ADHD (see Taylor & Houghton, 2008; Taylor, Houghton, & Durkin, 2007, 2008). Group 2 (n = 5) conducted the same data collection at the four specified times but over a period of 6 days. This resulted in 20 time-series data points in total for Group 1 baseline and 24 for Group 2.

The *intervention* (CBT Anxiety Reduction Program) comprised eight weekly sessions. During this period, participants in Groups 1 and 2 continued to self-record their levels of anxiety at each of the four specified daily times. Recording occurred on 3 days of the week, these 3 being randomly assigned to each group following the weekly CBT session so as to obtain as representative a measure as possible of the participant's anxiety levels during the regular school week (while not overburdening them with lengthy data collection demands). Therefore, the interrupted time-series data collected during the intervention phase comprised 24 data points for each of the four identified anxiety times, 96 data points for each participant in total, and 864 data points for the intervention phase for the nine participants in total.

Four weeks after the intervention had ceased, all participants were requested to conduct three further self-recording sessions (Monday, Wednesday, and Friday) throughout a 1-week period. As in previous phases, levels of anxiety were self-recorded at the four specified daily times.

Measures

Self-reported anxiety. A self-monitoring anxiety thermometer scale ranging from 1 to 10, with accompanying facial images depicting how anxious a person might feel, was specifically developed for this purpose. This type of scale provides a quick and reliable way to measure state anxiety (cf. Pijpers, Oudejans, & Bakker, 2005) and has been validated in previous research (Houtman & Bakker, 1989; Oudejans & Pijpers, 2010; Pijpers et al., 2005; Pijpers, Oudejans, Holsheimer, & Bakker, 2003). Validity and test–retest reliability of the anxiety thermometer are good, with correlation coefficients ranging between .60 and .87 for several comparisons (Bakker, Vanden Auweele, & Van Mele, 1996; Houtman & Bakker, 1989), including comparisons between anxiety scores taken before or after an event. Anxiety thermometer scores also appear to correlate equally with cognitive anxiety scores and somatic anxiety scores on the Competitive State Anxiety Inventory (CSAI-2; Mantens, Burton, Vealey, Bump, & Smith, 1990), on average r = .59 and r = .62, respectively (Bakker et al., 1996).

Cards with the anxiety thermometer scale were printed for each of the four specified times and participants completed one card for each time per designated day. Prior to baseline observations, all nine participants received a 1-hr training session in how to use the self-recording protocol.

The Multidimensional Anxiety Scale for Children (MASC; March, 1998), a self-report instrument, was administered pre- and post-CBT Anxiety Reduction Program. The MASC consists of 39 items that respondents rate using a 4-point scale anchored with the following response options: *never true about me* = 0, *rarely true about me* = 1, *sometimes true about me* = 2, and *often true about me* = 3. The 39 items

are distributed across four basic scales: Physical Symptoms (12 items), Social Anxiety (9 items), Harm Avoidance (9 items), and Separation Anxiety/Panic (9 items), and there is a scale for Total Anxiety. Internal consistencies ranging from .74 to .90 have been reported in previous research. In the present administration, the internal consistencies were satisfactory for each of the four subscales: Physical Symptoms (α = .88), Social Anxiety (α = .84), Separation Anxiety (α = .78), and Harm Avoidance (α = .74).

The MASC factor structure has been cross-validated with community and clinical samples of children and adolescents in a range of countries (for a review, see Houghton, Hunter, Trewin, Glasgow, & Carroll, 2012).

The CBT Anxiety Reduction Program

The CBT Anxiety Reduction Program was designed to assist adolescents with ADHD to manage their levels of anxiety in four identified times. The program was delivered by two provisionally registered doctoral-level clinical psychologists. These clinicians had received extensive training in the theoretical underpinnings and implementation of CBT. In addition, a third doctoral-level clinical psychologist acted as an observer in all program sessions for both groups to ensure standardization of program delivery.

The program (a full copy of which is available from the first author) was developed along the lines recommended by Hudson, Krain, and Kendall (2001) for children with ADHD and comorbid anxiety. That is, instructions were simplified, participants were required to repeat instructions, frequent breaks were built in to each session, and presentation format included the use of games, role-play, and other group and individual activities.

The first three sessions of the program involved psychoeducation about ADHD and the identification of different emotions, including anxiety, especially related to the four identified times. In the third session, participants were also taught relaxation techniques, how they could be applied to times of anxiety, and how they could be used to mitigate avoidance coping strategies related to anxiety. Sessions 4 to 6 focussed on the relationship between thoughts and feelings, cognitive restructuring strategies, thinking traps and problem solving, challenging negative emotions, and building positive emotions. Session 7 taught participants how to communicate their emotions effectively and how to self manage their anxiety. The final session reviewed the strategies learnt and presented ways in which these could be maintained over time. Each participant received a manual that included a description of each session, goals for that session, practice exercises, and homework.

Parent component. Parents and guardians were actively involved throughout the 8 weeks of the program. During each of the weekly CBT program sessions conducted for the adolescents, their parents received a 45-min group session with the first author. Topics covered in these sessions paralleled those of their sons/daughters but also included general information pertaining to ADHD and anxiety and parental management of ADHD and anxiety. Each session comprised a 30-min lecture followed by a question and answer component.

During each of these sessions (and during baseline and maintenance phases), parents were requested to report any changes in their adolescent's medication regime. No parents reported any changes.

Procedure

Prior to the research being conducted, ethical approval was obtained from The Human Research Ethics Committee of the administering institution. A group of 15 potential participants with ADHD and comorbid anxiety was identified from the database of a university-based clinic. A detailed information sheet explaining the research and the time commitment necessary to complete the program along with its benefits was then sent to the parents of the 15 adolescents. Of the 15 parents, 10 agreed for their adolescents to participate. Written consent was also obtained from the participants themselves. At the first (preliminary) meeting, the participants were all administered the MASC by a registered psychologist. Following this, the three clinical psychologists introduced themselves to the participants and explained the program and the self-recording protocol. The participants were randomly assigned to either Group 1 or Group 2 and instructed to begin self-recording their levels of anxiety in the four identified times and to continue the recordings for the specified baseline period.

Following baseline recordings, the participants were introduced to the CBT intervention program and completed it on a weekly basis over 8 weeks. At the conclusion of the program, the MASC was administered again. Four weeks following cessation of the intervention program, all participants were requested to self-record their levels of anxiety at the four identified times on three separate occasions over a 1-week period.

Data Analysis

The data were analyzed in several ways. First, a series of paired samples *t* tests was conducted for Group 1 mean baseline versus mean intervention and mean intervention versus mean maintenance data, separately. This was then conducted with the Group 2 data. To account for small sample sizes in this study, the adjusted *d* (i.e., d_{unbiased} or d_{unb}; Borenstein, Hedges, Higgins, & Rothstein, 2010; Fritz, Morris, & Richler, 2012) was also calculated. Second, as recommended in the data analysis of multiple baseline designs, the observational raw interrupted time-series data for each participant's behaviors were visually inspected for

trends in baseline and intervention effects (Kazdin, 1982). The visual analysis versus the statistical analysis of data has been debated for some time and so the mean rates of behaviors were also calculated. Fourth, unlike other interventions, the data were also analyzed for each behavior for each participant across each of the phases using Deakin-Monash Interrupted Time Series Analysis (DMITSA 2.0; Crosbie & Sharpley, 1991), a statistical program specifically designed for the analysis of interrupted time-series data and to overcome the rejection of small changes. The program uses a matrix algebra technique that can accurately assess slope in the data. Finally, the mean pre- and posttest scores obtained from the MASC administration were compared using paired samples *t* tests.

Results

Analysis 1: Group Mean Self-Report Anxiety Scores

There were statistically significant reductions in mean levels of self-reported anxiety for Group 1 from baseline to intervention conditions for three of the four identified times. That is, prior to leaving home for school, $t(3) = 3.85$, $p < .04$, $d = 3.59$, $d_{unb} = 2.61$, 95% confidence intervals (CI) = [.83, 8.76]; prior to recess, $t(3) = 5.41$, $p < .02$, $d = 1.53$, $d_{unb} = 1.11$, 2.61, 95% CI = [.87, 3.36]; and prior to beginning homework, $t(3) = 5.85$, $p < .02$, $d = 1.61$, $d_{unb} = 1.17$, 95% CI = [1.12, 3.80]. The effect sizes for baseline-intervention differences were moderate to large in these three specified times. In contrast, there was no significant change from baseline mean to intervention for the specified time of prior to leaving school for home, $t(3) = .91$, $p = .43$, $d = .29$, $d_{unb} = .21$, 95% CI = [−.76, 1.36]. For the intervention to maintenance phases, the mean anxiety levels did not increase or decrease significantly in three of the four specified times: prior to leaving school, $t(3) = 2.69$, $p = .07$, $d = 1.07$, $d_{unb} = .78$, 95% CI = [−.23, 2.73]; prior to recess, $t(3) = -.68$, $p = .54$, $d = -.22$, $d_{unb} = -.16$, 95% CI = [−1.61, 1.04]; and prior to leaving school for home, $t(3) = 1.15$, $p = .33$, $d = .56$, $d_{unb} = .41$, 95% CI = [−1.01, 2.16]. However, there was a further significant reduction in the specified time of prior to beginning homework, $t(3) = 3.50$, $p < .04$, $d = 1.69$, $d_{unb} = 1.23$, 95% CI = [0.12, 2.55], which displayed a moderate effect size. (Table 1 shows the means rates for Groups 1 and 2 in all phases.)

For Group 2, there was a statistically significant reduction in mean levels of self-reported anxiety from baseline to intervention conditions for only one of the four identified times, namely, prior to leaving home for school, $t(4) = 7.57$, $p < .003$, $d = 3.93$, $d_{unb} = 3.15$, 95% CI = [2.16, 4.66]. The baseline-intervention comparison yielded a large effect size. Conversely, the mean anxiety scores from baseline to intervention did not differ significantly in three of the specified times: prior to recess, $t(4) = 1.82$, $p = .14$, $d = .98$, $d_{unb} = .78$, 95% CI = [−0.60, 2.88]; prior to leaving school for home, $t(4) = 2.19$, $p = .09$, $d = 1.15$, $d_{unb} = .92$, 95% CI = [−0.52, 4.42]; and prior to beginning homework, $t(4) = 2.50$, $p = .07$, $d = 1.74$, $d_{unb} = 1.39$, 95% CI = [−0.35, 6.70]. The mean levels of self-reported anxiety did not increase or decrease significantly from the intervention to maintenance conditions for any of the four specified times: prior to leaving home for school, $t(4) = -.36$, $p = .77$, $d = -.19$, $d_{unb} = -.15$, 95% CI = [−1.82, 1.40]; prior to recess, $t(4) = .11$, $p = .92$, $d = .06$, $d_{unb} = .05$, 95% CI = [−1.37, 1.49]; prior to leaving school for home, $t(4) = .62$, $p = .57$, $d = .37$, $d_{unb} = .30$, 95% CI = [−0.63, 0.99]; and prior to beginning homework, $t(4) = 1.99$, $p = .12$, $d = 1.06$, $d_{unb} = .85$, 95% CI = [−0.21, 1.25].

Table 1. Mean Self-Reported Levels of Anxiety (Standard Deviations in Parentheses) for Groups 1 and 2 During Baseline to Intervention to Maintenance.

Specified time	Baseline (A)	Intervention (B)	Maintenance (C)
Group 1			
Prior to leaving home for school	7.71 (1.16)	2.92 (1.49)	1.67 (0.72)
Prior to recess	4.75 (1.64)	2.63 (1.06)	2.92 (1.50)
Prior to leaving school for home	3.13 (0.72)	2.28 (1.27)	2.25 (0.69)
Prior to beginning homework	5.04 (1.87)	2.59 (1.07)	1.25 (0.32)
Group 2			
Prior to leaving home for school	5.13 (1.17)	1.72 (0.36)	1.93 (1.55)
Prior to recess	3.07 (1.62)	1.92 (0.33)	1.87 (1.39)
Prior to leaving school for home	3.60 (2.31)	1.65 (0.62)	1.47 (0.30)
Prior to beginning homework	5.03 (2.51)	1.86 (0.61)	1.33 (0.33)

Analysis 2: Individual Participants' Interrupted Time-Series Scores

Visual examination. The visual inspection of the raw interrupted time-series data revealed that the trends of self-reported anxiety were relatively stable across all four specified times for almost all of the participants in Groups 1 and 2 during baseline. For Participant 2 (Group 1), Participant 2 (Group 2), and Participant 4 (Group 2), the baseline trends were relatively stable, but with some fluctuations. When the CBT intervention program was introduced (Intervention), the trends for all of the participants for all four identified times became descending in nature. When the intervention concluded (Maintenance), the trends of self-reported rates remained relatively stable, but for some

participants, there was some indication of slight ascending trends in anxiety across some of the identified times. For the CSC, who did *not* receive the intervention through personal choice, the raw interrupted time-series data revealed stable trends across the entire self-recording period with very little fluctuation across any of the four identified times. (The raw interrupted time-series data, along with means and ranges are available from the first author.)

Group 1

Tables 2 (for Group 1) and 3 (for Group 2) show the significant changes that occurred in individual participants' levels of self-reported anxiety across all four identified times as measured empirically by the interrupted time-series data. For Group 1, three of the four participants experienced significant changes in their mean levels of self-reported anxiety from baseline to intervention. Specifically, Participant 4 reported significant reductions in all four of the identified situations and Participant 3 in three of the times. For Participant 1, there was an increase in self-reported anxiety for the identified time of before leaving school for home. Participant 3 and Participant 1 reported a significant reduction in self-reported anxiety during the maintenance phase for the time of before recess. For the other participants, there were no significant changes during maintenance. Participant 2 evidenced no significant changes in self-reported anxiety during the baseline, intervention, and maintenance phases.

For Group 2, all five participants evidenced significant changes in levels of self-reported anxiety in *some* of the identified times. As can be seen in Table 3, all five participants reported significant reductions from baseline to intervention with Participant 5 doing so for all of the four identified times. Participant 3 reported significant reductions for three of the four times, Participant 4 for two of the times, and Participants 1 and 2 for one of the times. During maintenance, Participant 3 reported further reductions in levels of anxiety for the before school and before homework times, whereas Participant 5 reported significant increases for the before school and before recess times. There were no significant changes for any of the other times by any of the participants during maintenance.

Constant Series Control

The CSC did *not* receive the intervention but still self-recorded rates of anxiety during the four identified times. Although not as many data points were collected, there was easily sufficient for an analysis to be undertaken. To compare phases, the data were split at times to correspond to the same baseline and intervention phase changeover as for those who undertook the intervention. No data were collected by the CSC during the maintenance phase. For the CSC, the mean baseline and intervention phase changeover rates for self-reported anxiety, respectively, were as follows: before school $M = 6.5$, $M = 5.9$ DMITSA, $F(2, 8) = 1.754$, $p = .227$; before recess $M = 1.5$, $M = 1.6$ DITSMA, $F(2, 8) = .193$, $p = .829$; before going home, $M = 1.3$, $M = 1.0$ DITSMA, $F(2, 8) = .082$, $p = .922$; before homework $M = 6.5$, $M = 5.76$ DITSMA, $F(2, 8) = .056$, $p = .945$. Thus, there were no significant changes in any of the four identified times.

MASC Pre- and Posttest Mean Scores

As can be seen in Table 4, the MASC anxiety mean scores decreased significantly for all four types of anxiety and the overall anxiety score from pre- to post-CBT program. Here, the CIs are also reported: physical symptoms, $t(8) = 3.91$, $p = .004$, 95% CI = [0.16, 0.63]; social anxiety, $t(8) = .3.73$, $p = .006$, 95% CI = [0.14, 0.61]; separation anxiety, $t(8) = .4.81$, $p = .001$, 95% CI = [0.12, 0.34]; harm avoidance, $t(8) = 3.36$, $p = .010$, 95% CI = [0.11, 0.62]; and total anxiety, $t(8) = 1.16$, $p = .005$, 95% CI = [0.11, 0.47].

Discussion

Overall, the results suggest that the program, like other CBT programs for anxiety, was beneficial in reducing self-reported anxiety in the short term (see Silverman, Pina, & Viswesvaran, 2008). Specifically, the paired samples *t* tests revealed that Group 1 significantly reduced self-reported anxiety from baseline to intervention in three of the four identified times (i.e., prior to leaving home for school, prior to recess, and prior to beginning homework). Moreover, when the Group 1 participants rated their anxiety levels after the intervention had ceased, mean levels of anxiety in the "prior to leaving school" and "prior to recess" conditions remained the same as previously. For the identified time prior to beginning homework, there was a further significant reduction in self-reported anxiety. Thus, the group mean scores for Group 1 suggest that over time, the CBT intervention was successful, and that when the intervention was no longer in place, its effects were still evident, although to a lesser degree. This was not the case, however, for the Group 2 participants where there was a statistically significant reduction in self-reported anxiety for only one identified time of the four, namely, prior to leaving home for school. This was maintained following intervention cessation.

Possible explanations for this may be individual differences in participants, different skill levels in the clinicians, or pharmacological issues. For example, trends of anxiety were stable across baseline at all four time situations for five of the nine participants and relatively stable for two participants. On the other hand, the remaining two participants were characterized by unstable trends at baseline and mean levels that were the highest of all nine participants

Table 2. Significant Changes in Group 1 Participants' Individual Mean Self-Reported Levels of Anxiety (Standard Deviations in Parentheses) During Baseline to Intervention to Maintenance.

Group 1		Baseline (A) vs. Intervention (B)					Intervention (B) vs. Maintenance (C)				
Participants	Specified Time	A	B	DMITSA	*F*	*p*	B	C	DMITSA	*F*	*p*
1	Before recess	6.0	3.4	2, 21	2.693	.091	3.4	3.0	2, 3	4.408	.028*
	Before going to home	3.5	3.8	2, 21	4.238	.028*	3.8	2.3	2, 3	0.362	.701
3	Before school	7.6	2.1	2, 21	7.069	.004*	2.1	1.3	2, 3	1.220	.318
	Before recess	3.3	2.1	2, 21	1.661	.214	2.1	2.0	2, 3	4.489	.026*
	Before going to home	3.0	2.8	2, 21	4.199	.029*	2.8	3.0	2, 3	0.362	.701
	Before homework	3.6	2.0	2, 21	4.215	.029*	2.0	1.0	2, 3	1.379	.277
3	Before school	9.2	1.3	2, 21	79.876	.000**	1.3	1.0	2, 3	0.033	.967
	Before recess	3.3	1.4	2, 21	6.352	.007*	1.4	1.6	2, 3	0.963	.400
	Before going to home	2.2	1.1	2, 21	12.15	.000**	1.1	1.3	2, 3	0.964	.419
	Before homework	3.5	1.3	2, 21	3.993	.03*	1.3	1.0	2, 3	0.914	.935

Note. Participant 2 made no significant changes.
*$p < 05$. **$p < .01$.

Table 3. Significant Changes in Group 2 Participants' Individual Mean Self-Reported Levels of Anxiety (Standard Deviations in Parentheses) During Baseline to Intervention to Maintenance.

Group 2		Baseline (A) vs. Intervention (B)					Intervention (B) vs. Maintenance (C)				
Participants	Specified time	A	B	DMITSA	*F*	*p*	B	C	DMITSA	*F*	*p*
1	Before school	3.8	1.2	2, 21	11.728	.000**	1.2	1.6	2, 3	0.022	.978
2	Before school	4.0	1.6	2, 21	3.948	.035*	1.6	1.0	2, 3	0.027	.974
3	Before school	5.5	1.5	2, 21	34.557	.000**	1.5	1.3	2, 3	4.217	.031*
	Before going to home	2.5	1.7	2, 21	10.690	.001**	1.7	2.0	2, 3	0.067	.935
	Before homework	5.2	1.7	2, 21	31.068	.000**	1.7	1.3	2, 3	3.375	.05*
4	Before going to home	5.8	1.6	2, 21	3.499	.049*	1.6	1.3	2, 3	2.229	.137
	Before homework	8.8	1.5	2, 21	71.945	.000**	1.5	1.0	2, 3	0.321	.730
5	Before school	5.8	2.2	2, 21	16.955	.000**	2.2	4.6	2, 3	9.165	.002*
	Before recess	4.0	2.4	2, 21	6.09	.008*	2.2	4.3	2, 3	34.239	.000**
	Before going to home	6.3	2.6	2, 21	4.813	.019*	2.6	1.3	2, 3	0.768	.479
	Before homework	5.6	2.6	2, 21	8.452	.002*	2.6	1.6	2, 3	0.942	.408

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

Table 4. Group Mean (Standard Deviations in Parentheses) Pre- and Posttest Mean Intervention Scores for the MASC.

Anxiety type	Group pre- *M* (*SD*)	Group post- *M* (*SD*)
Physical symptoms	1.73 (0.53)	1.33 (0.39)
Social anxiety	1.62 (0.58)	1.25 (0.40)
Separation anxiety	1.14 (0.52)	.91 (0.44)
Harm avoidance	2.17 (0.35)	1.80 (0.25)
Total anxiety	1.46 (0.18)	1.16 (0.16)

Note. MASC = Multidimensional Anxiety Scale for Children.

across all four situations. Variability among participants, particularly at baseline, is known to influence response to treatment (see Tamm et al., 2012).

Many components of treatment fidelity were built-into the research in an attempt to address such issues, including the ongoing assessment, monitoring, and enhancement of the study, as suggested by Borrelli (2011). For instance, prior to the intervention, the treatment manual and the self-recording protocol were reviewed by a panel of academics with experience in child and adolescent psychopathology and clinical psychology. This ensured that these materials were user-friendly and theoretically based. In addition, the number, frequency and length (of time) for each intervention session were discussed. Throughout the intervention, the length of sessions were also monitored according to the participant's status (e.g., tired) so as to build in some degree of flexibility. The clinicians were of equivalent experience and were carefully trained in the administration of

this program; and their delivery was monitored by a third clinician to check for treatment differentiation, treatment competency, and treatment adherence. On the basis of the observations of the third clinician (in all program sessions), we are confident that each clinician delivered only the target treatment as intended, and delivered it skillfully, and completed the full plan. Although no direct measures were taken of whether the participants actually used the strategies covered in the treatment in the specific situations, there was evidence of fidelity of treatment receipt. For example, clinicians reported that participants demonstrated the skills used in the treatment during role-play situations. Furthermore, all parents reported that when they asked their adolescent whether they were applying the skills learned in the treatment program they responded in the affirmative. The self-report data also suggested that they were applying the skills in the four situations. Thus, this study incorporated a high degree of treatment fidelity, all of which increased scientific confidence that changes in the dependent variable were due to manipulation of the independent variable.

With respect to pharmacological issues, in the interests of ecological validity (Antshel et al., 2014), we did not require participants to modify their ongoing medical regimens. Although medication regimes did not change during the program, the dosage of medications and the different medications being taken were, however, unknown and this may have masked the true extent of any anxiety and therefore the pre- and posttest effects (see Tannock, 1998).

Unlike other intervention studies, this present research also evaluated the effectiveness of the CBT program on each individual participant's self-reported anxiety levels. Although popular in evaluations, comparison of group means can mask any real effects. Specifically, several participants within a group may experience large gains or reductions in their levels of anxiety, whereas most others experience only small changes. However, the large changes experienced by the few can have an overall significant effect on the entire group, thereby distorting the representation of the effectiveness of a program. Overall, with the exception of Participant 2 in Group 1, all of the participants experienced significant changes in their self-reported anxiety levels, in some of the identified anxiety times. Participants 4 (Group 1) and 5 (Group 2) evidenced significant changes in *all* four of the identified anxiety times. Of the other participants, six evidenced significant changes in anxiety during the "before leaving for school" time, six in the "prior to going home" time, five in the "prior to beginning homework" time, and two in the "before recess" time. Moreover, when levels of self-reported anxiety were examined following the cessation of the CBT program, there were very few changes. This affords further confidence in the efficacy of the intervention. While no maintenance data were collected in the Verreault et al. (2007) study, Jarrett and Ollendick (2012) conducted posttreatment assessments and obtained similar outcomes to those in this study.

The inclusion of a CSC also strengthens the claims made regarding the efficacy of the CBT program. This CSC produced 20 data points for the immediately prior to leaving home for school time, 8 for immediately prior to leaving the classroom for recess time, 9 for immediately prior to leaving the classroom to go home time, and 17 for immediately prior to beginning homework time. The interrupted time-series data points (i.e., self-recorded levels of anxiety) for the CSC showed very little variability across the entire study period. Moreover, when split into two phases representing a baseline and intervention equivalent there were no statistically significant changes in levels of anxiety. Although the "multiple baseline itself is strong without the CSC, its inclusion provides additional control and strengthens the between series comparisons" (Barlow et al., 1986, p. 267).

Finally, the pre- versus posttest MASC scores revealed that overall, there were significant reductions in all four dimensions of anxiety, namely, physical symptoms of anxiety, social anxiety, separation anxiety, and harm avoidance; there was also a significant reduction in Total Anxiety. To date, the majority of studies conducted that have examined anxiety in children and adolescents with ADHD have tended to report scores for "internalizing disorders" or "global anxiety,", rather than separate dimensions (see Houghton et al., 2012). Given the adverse effects of ADHD and comorbid anxiety (Hammerness et al., 2010; Schatz & Rostain, 2006) and the different response rates to medication and/or less robust effects of treatment (Baldwin & Dadds, 2008; Ter-Stepanian et al., 2010), it is important to examine different dimensions of anxiety. This study did so and found that improvements were obtained, following CBT, in each dimension.

This study was unique in that it devised a CBT program that specifically focused on four previously identified anxiety-arousing times for individuals with ADHD. Thus, rather than being a generic program, it targeted specific anxiety-arousing times. This more specific targeting may have contributed to its success because it provided participants with readily distinguished parts of their day in which to focus on their anxiety management. It is possible that a broader instruction, not focusing on high risk times for anxious feelings, may be less helpful.

To the present date, it appears that only three studies have been conducted using CBT with adolescents with ADHD and comorbid anxiety (see Jarrett & Ollendick, 2012). Therefore, this study adds substantially to the limited research literature. Although the three previous research studies (along with those conducted with adults with ADHD and anxiety) in this area have attempted to address research design issues, most (apart from the Jarrett & Ollendick, 2012 study) have not used statistical analyses of the findings.

Similar to Jarrett and Ollendick (2012), this study used a multiple baseline design. In addition, it included a CSC and conducted a statistical analysis of group *and* individual data. In doing so, it has provided a stringent test of program efficacy and thus allows confidence in the conclusions drawn.

The present intervention program drew on the traditional contents of CBT programs and applied these to four specific anxiety-arousing times identified in previous research as problematic to adolescents with ADHD. It would appear that participants found the program helpful, relevant, and motivating, as all completed it. Jarrett and Ollendick (2012) argued that program/treatment completion is an important outcome measure for program success.

Although this study and its findings provide evidence for the efficacy of the CBT program, a number of limitations should be acknowledged. For example, the relatively small sample limits claims about generalization. However, the application of a multiple baseline research design, the inclusion of a CSC, tailoring the intervention program devised to meet the needs of a group with specific needs, conducting maintenance checks following the cessation of the intervention program, and using group and individual statistical analyses demonstrate that optimum value was obtained from this sample. It must also be noted that the levels of anxiety were in the low to moderate range and this may be a limitation in terms of generalization of the treatment findings.

Responsiveness to interventions for ADHD is related to factors such as the quality of the environment (e.g., SES; Jensen et al., 2007). In this study, the participants were recruited from a university-based clinic that receives referrals from pediatricians, the majority of who see only private patients. Thus, it is possible that the recruitment method may have contributed to producing a biased sample in as much as these parents are financially well placed to access pediatricians and are often highly motivated to seek such support.

It must also be acknowledged that our results are based solely on self-report data. Previous studies have used teacher and parent ratings. However, it has been argued that these may be less reliable (than self-report) in gauging symptoms of anxiety and may underestimate symptom prevalence and consequently limit the generalizability of many of the findings (Schatz & Rostain, 2006). According to Baldwin and Dadds (2007), parents and teachers have great difficulty perceiving the internal world of their children and children often have difficulty reporting their internal states to their parents and teachers. Therefore, self-report measures of anxiety such as utilized here may elicit more valid responses from children. The optimal strategy may be to use two or more sources (cf. Anstel, Faraone, & Gordon, 2012) and the present findings indicate that adolescents' self-reports can contribute sensitive measures of responsivity to interventions.

Despite these limitations, the present findings suggest that further studies of CBT with adolescents with ADHD and comorbid anxiety are warranted. Although such future studies might include RCTs, primarily because they provide greater causal clarity (see Barlow & Nock, 2009), the implementation of a novel treatment such as here may mean the application of RCTs are premature.

In conclusion, the gains demonstrated in this study are promising. To the best of our knowledge, it provides the first evidence that CBT approaches can be therapeutically useful components of treatment packages designed to alleviate anxiety in adolescents with ADHD. Future research could usefully extend these findings by enlisting larger samples and comparing outcomes among adolescents with ADHD and anxiety together with other patterns of comorbidities, taking into account (or directly manipulating) contemporaneous medication treatments. An accumulating body of evaluation studies will in due course inform the design and administration of full scale RCT.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) declared receipt of the following financial support for the research, authorship, and/or publication of this article: Australian Research Council. Title: Salience, Organisation and Management of Anxiety towards Time in Children with ADHD: A new model and intervention. 2005-2008. ($225,000). (Co chief investigators Professor Stephen Houghton, Professor Kevin Durkin, & Dr John West). Grant number #DP0556257.

References

Alqahtani, M. M. (2010). The comorbidity of ADHD in the general population of Saudi Arabian school-age children. *Journal of Attention Disorders*, *14*, 25-30.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev). Washington, DC: Author.

Antshel, K., Faraone, S., & Gordon, M. (2014). Cognitive behaviour treatment outcomes in adolescent ADHD. *Journal of Attention Disorders*, *18*, 483-495. doi:10.1177/1087054712443155

Bakker, F. C., Vanden Auweele, Y., & Van Mele, V. (1996). *Handleiding bij de Competitie-Belevings-Vragenlijst CBV en deVragenlijst Beleving voor een Sportwedstrijd* [VBS manual for the Dutch version of the Sport Competition Anxiety Test (SCAT) and the Dutch version of the Competitive State Anxiety Inventory-2 (CSAI-2)]. Lisse, Netherlands: Swets & Zeitlinger.

Baldwin, J. S., & Dadds, M. (2007). Reliability and validity of parent and child versions of the Multidimensional Anxiety Scale for Children in community samples. *Journal of the American Academy of Child & Adolescent Psychiatry*, *46*, 252-260.

Baldwin, J. S., & Dadds, M. (2008). Examining alternative explanations of the covariation of ADHD and anxiety symptoms in children: A community study. *Journal of Abnormal Child Psychology*, *36*, 67-79.

Barkley, R. A., Murphy, K., & Fischer, M. (2007). *ADHD in adults: What the science says*. New York, NY: Guilford.

Barlow, D. H., Hayes, S. C., & Nelson, R. O. (1986). *The scientist practitioner: Research and accountability in clinical and educational settings*. New York: Pergamon General Psychology.

Barlow, D. H., & Nock, M. K. (2009). Why can't we be more idiographic in our research? *Perspectives on Psychological Science*, *4*, 19-21.

Borenstein, M., Hedges, L. V., Higgins, U. P. T., & Rothstein, H. R. (2010). A basic introduction to fixed-effect and random-effects models for meta-analysis. *Research Synthesis Methods*, *1*, 97-111.

Borrelli, B. (2011). The assessment, monitoring, and enhancement of treatment fidelity in public health clinical trials. *Journal of Public Health Dentistry*, *71*, S52-S63.

Brown, T. (2000). *Attention-deficit disorders and comorbidities in children, adolescents and adults*. Washington, DC: American Psychiatric Press.

Costin, J., Vance, A., Barnett, R., O'Shea, M., & Luk, E. (2002). Attention deficit hyperactivity disorder and comorbid anxiety: Practitioner problems in treatment planning. *Child and Adolescent Mental Health*, *7*, 16-24.

Crosbie, P., & Sharpley, T. (1991). *DMITSA 2.0: A statistical program for analyzing data from interrupted time series*. Melbourne, Victoria, Australia: Monash University.

Foaraone, S., Biederman, J., & Mick, E. (2006). The age-dependent decline of attention deficit hyperactivity disorder: A meta-analysis of follow up studies. *Psychological Medicine*, *36*, 159-165.

Fritz, C. O., Morris, P. E., & Richler, J. J. (2012). Effect size estimates: Current use, calculations, and interpretation. *Journal of Experimental Psychology: General*, *141*, 2-18. doi:10.1037/a0024338

Hammerness, T., Geller, G., Petty, A., Lamb, P., Bristol, C., & Biederman, J. (2010). Does ADHD moderate the manifestation of anxiety disorders in children? *European Child Adolescent Psychiatry*, *19*, 107-112.

Houghton, S., Hunter, S., Trewin, T., Glasgow, K., & Carroll, A. (2012). The Multidimensional Anxiety Scale for Children (MASC): A further validation with Australian adolescents with and without attention-deficit/hyperactivity disorder. *Journal of Attention Disorders*. doi:10.1177/1087054712439100

Houtman, I. L. D., & Bakker, F. C. (1989). The anxiety thermometer: A validation study. *Journal of Personality Assessment*, *53*, 575-582.

Hudson, J. L., Krain, A. L., & Kendall, P. C. (2001). Expanding horizons: Adapting manual based treatments for anxious children with comorbid diagnoses. *Cognitive and Behavioral Practice*, *8*, 338-346.

Jarrett, M. A., & Olendick, T. H. (2008). A conceptual review of the comorbidity of attention-deficit/hyperactivity disorder and anxiety: Implications for future research and practice. *Clinical Psychology Review*, *28*, 1266-1280.

Jarrett, M. A., & Olendick, T. H. (2012). Treatment of comorbid attention-deficit/hyperactivity disorder and anxiety in children: A multiple baseline design analysis. *Journal of Consulting and Clinical Psychology*. *80*, 239-244. doi:10.1037/a0027123

Jensen, P. S., Swanson, J., Arnold, L. E., Vitiello, B., Abikoff, H. B., Greenhill, L. L., & Hur, K. (2007). Three-year follow-up of the NIMH MTA study. *Journal of the American Academy of Child & Adolescent Psychiatry*, *46*, 989-1002.

Kazdin, A. E. (1982). Single-case experimental designs in clinical research and practice. *New Directions for Methodology of Social & Behavioral Science*, *13*, 33-47.

Leckman, J., Sholomaskas, D., Thompson, W., Belanger, A., & Weissman, M. (1982). Best estimate of lifetime psychiatric diagnosis: A methodological study. *Archives of General Psychiatry*, *39*, 879-883.

MacLeod, C., & Mathews, A. (2012). Cognitive bias modification approaches to anxiety. *Annual Review of Clinical Psychology*, *8*, 189-217.

Mancini, C., Van Ameringen, M., Oakman, J. M., & Figueiredo, D. (1999). Childhood attention deficit/hyperactivity disorder in adults with anxiety disorders. *Psychological Medicine*, *29*, 515-525.

Mantens, R., Burton, D., Vealey, R. S., Bump, L. A., & Smith, D. E. (1990). Development and validation of the Competitive State Anxiety Inventory-2 (CSAL-2). In R. Martens, R. S. Vealey & D. Burton (Eds.), *Competitive anxiety in sport* (pp. 117-190). Champaign. IL: Human Kinetics.

March, J. S. (1998). *Manual for the Multidimensional Anxiety Scale for Children (MASC)*. Toronto, Ontario, Canada: Multi-Health Systems.

MTA Cooperative Group. (1999). A 14-month randomised clinical trial of treatment strategies for attention-deficit/hyperactivity disorder. Multi Modal Treatment Study of children with ADHD. *Archives of General Psychiatry*, *56*, 1073-1086.

Oudejans, R. R. D., & Pijpers, J. R. (2010). Training with mild anxiety may prevent chocking under high levels of anxiety. *Psychology of Sport and Exercise*, *11*, 44-50.

Pijpers, J. R., Oudejans, R. R. D., & Bakker, F. C. (2005). Anxiety-induced changes in and movement behavior during the execution of a complex whole-body task. *Quarterly Journal of Experimental Psychology, 58A*, 421-445.

Pijpers, J. R., Oudejans, R. R. D., Holsheimer, F., & Bakker, F. C. (2003). Anxiety performance relationships in climbing: A process-oriented approach. *Psychology of Sport and Exercise*, *4*, 283-304.

Safren, S. A., Otto, M. W., Sprich, S., Winett, C. L., Wilens, T. E., & Biederman, J. (2005). Cognitive-behavioral therapy for ADHD in medication-treated adults with continued symptoms. *Behavior Research and Therapy*, *43*, 831-842.

Safren, S., Sprich, S., Mimiaga, M., Surman, C., Knouse, L., Groves, M., & Otto, M. W. (2010). Cognitive-behavioral therapy versus relaxation with educational support for

medication-treated adults with ADHD and persistent symptoms: A randomized controlled trial. *Journal of the American Medical Association*, *304*, 875-880.

Schatz, D. B., & Rostain, A. L. (2006). ADHD with comorbid Anxiety: A review of the current literature. *Journal of Attention Disorders*, *10*, 141-149.

Silverman, W., Pina, A., & Viswesvaran, C. (2008). Evidence-based psychosocial treatments for phobic and anxiety disorders in children and adolescents. *Journal of Clinical Child & Adolescent Psychology*, *37*, 105-130.

Solanto, M. N., Arnsten, A. F. T., & Castellanos, F. X. (2001). The neuroscience of stimulant drug action in ADHD. In M. N. Solanto, A. F. T. Arnsten & F. X. Castellanos (Eds). *Stimulant drugs and ADHD* (pp. 355-380). New York, NY: Oxford University Press.

Sorenson, L., Plessen, K., Nicholas, J., & Lundervold, A. J. (2011). Is behavioral regulation in children with ADHD aggravated by co morbid anxiety disorder? *Journal of Attention Disorders*, *15*, 56-66.

Swanson, J., McBurnett, K., Christian, D. L., & Wigal, T. (1995). Stimulant medications and the treatment of children with ADHD. *Advances in Clinical Child Psychology*, *17*, 265-322.

Tamm, L., Trello-Rishel, K., Riggs, P., Nakonezny, P. A., Acosta, M., Bailey, G., & Winhusen, T. (2012). Predictors of treatment response in adolescents with comorbid substance use disorder and attention-deficit/hyperactivity disorder. *Journal of Substance Abuse Treatment*. Retrieved from http://dx.doi.org/10.1016/j.jsat.2012.07.001

Tannock, R. (1998). Attention deficit hyperactivity disorder: Advances in cognitive neurobiological and genetic research. *Journal of Child Psychology and Psychiatry*, *39*, 65-99.

Tannock, R., Ickowicz, A., & Schachar, R. (1995). Differential effects of methylphenidate on working memory in ADHD children with and without comorbid anxiety. *Journal of the American Academy of Child & Adolescent Psychiatry*, *34*, 886-896.

Tawney, J. W., & Gast, D. L. (1984). *Single subject research in special education*. Columbus, OH: Merrill.

Taylor, M. F., & Houghton, S. (2008). Examination-related anxiety in students diagnosed with AD/HD and the case for an allocation of extra time: Perspectives of teachers, mothers and students. *Emotional and Behavioural Difficulties*, *13*, 111-125.

Taylor, M. F., Houghton, S., & Durkin, K. (2007). Towards a theory of how mothers children diagnosed with AD/HD deal with the issues of homework completion and assignment deadlines: A grounded theory study. *International Journal of Learning*, *14*, 225-232.

Taylor, M. F., Houghton, S., & Durkin, K. (2008). Getting children with attention deficit hyperactivity disorder to school on time: Mothers' perspectives. *Journal of Family Issues*, *29*, 918-943.

Ter-Stepanian, M., Grizenko, N., Zappitelli, M., & Joober, R. (2010). Clinical response to methylphenidate in children diagnosed with attention-deficit hyperactivity disorder and comorbid psychiatric disorders. *Canadian Journal of Psychiatry*, *55*, 305-312.

Tsang, T., Kohn, M., Efron, D., Clarke, S., Clarke, R., Lamb, C., & Williams, L. (2015). Anxiety in young people with ADHD: Clinical and self-report outcomes. *Journal of Attention Disorders, 19*, 18-26. doi:10.1177/1087054712446830

Verreault, M., Berthiaume, C., Turgeon, L., Lageix, P., & Guay, M. C. (2007, July). *Efficiency of a cognitive behavioural treatment addressing anxiety symptoms in children with comorbid ADHD and anxiety disorder*. Poster session presented at World Congress of Behavioral and Cognitive Therapies, Barcelona, Spain.

Vloet, T., Konrad, K., Herpertz-Dahlmann, B., Polier, G., & Gunther, T. (2010). Impact of anxiety disorders on attentional functions in children with ADHD. *Journal of Affective Disorders*, *124*, 283-290.

Wilens, T., Adler, L., Adams, J., Sgambati, S., Rotrosen, J., Sawtelle, R., & Fusillo, S. (2008). Misuse and diversion of stimulants prescribed for ADHD: A systematic review of the literature. *Journal of the American Academy of Child & Adolescent Psychiatry*, *47*, 21-31.

Author Biographies

Stephen Houghton is a Registered Psychologist and Director of the Centre for Child and Adolescent Related Disorders at the University of Western Australia. He is Visiting Professor in the School of Psychological Sciences and Health at the University of Strathclyde, Scotland. His research activities focus on childhood and adolescent developmental psychopathology.

Nadiyah Alsalmi is an educator with the Department of Education in Saudi Arabia. She specializes in the assessment and treatment of children with developmental disorders.

Carol Tan is a lecturer at the National Institute of Education, Nanyang Technological University, Singapore. Her main research interest is in children and adolescents with disruptive behavior disorders.

Myra Taylor is a Research Fellow at the University of Western Australia specializing in developmental disorders.

Kevin Durkin, of the School of Psychological Sciences and Health at the University of Strathclyde, has research interests in developmental disorders, social and communicative development, and aspects of language development.