# The Impact of Modified Cognitive-Behavioral Group Therapy in Social Adjustment Functions of Children with ADHD and Their Parents' Stress Levels: A Nonrandomized Clinical Trial

Xiangyu Jiang<sup>1</sup> and Minrong Chen<sup>2</sup>

 $^1 \rm University$  of Minnesota Twin Cities College of Education and Human Development  $^2 \rm Fuzhou$  Children's Hospital of Fujian Province

September 11, 2023

# Abstract

This study aims to investigate the potential of a modified Cognitive-Behavioral Group Therapy (CBGT) intervention in promoting social adjustment and reducing parental stress among children exhibiting symptoms of attention deficit hyperactivity disorder (ADHD). The research also highlights the mechanisms and advantages of employing modified CBGT counseling to address negative symptoms associated with ADHD in children. The study was conducted at Fuzhou Children's Hospital of Fujian Province, involving two CBGT counseling sessions held in 2021 and 2022, with a total of 20 pairs of parents and children with ADHD participating. The assessment utilized measures such as SNAP, Barratt Impulsivity, and Conners to evaluate changes in the children's social adjustment abilities and core/associated ADHD symptoms before and after CBGT intervention. Additionally, the Parental Stress Index was employed to gauge the level of stress experienced by the parents. The results demonstrated that modified CBGT interventions effectively alleviate ADHD symptoms, enhance parent-child relationships, and reduce parental stress levels. Consequently, CBGT interventions have shown substantial improvements in children's social adjustment abilities and have proven to be a significant source of relief for parents. The study also addresses the limitations associated with existing ADHD treatments and CBGT interventions.

## Introduction

Attention deficit hyperactivity disorder (ADHD) is a prevalent neurodevelopmental disability that significantly impacts cognition, parent-child relationships, academic performance, and psychosocial functioning (Jasmin & Priti, 2013). The formation of ADHD is influenced by various factors, with genetic and environmental factors being the primary causative agents. ADHD is known to have a high heritability rate and may be triggered by additional factors such as family adversity, low socioeconomic status, or head injuries (Thapar et al., 2012). Adolescents with ADHD commonly exhibit symptoms like poor concentration, high levels of activity, and impulsiveness (Harpin, 2005). If left untreated, these impairments often persist into adulthood, posing significant challenges in daily life skills and future employment prospects. Furthermore, research conducted by Nøvik et al. (2020) reveals that individuals with ADHD face a higher risk of developing comorbidities compared to the general population. These comorbidities include anxiety, depression, bipolar disorder, and personality disorders, among others. Additionally, studies by Ghosh et al. (2017) indicate a strong comorbidity between ADHD and oppositional defiant disorder (ODD), characterized by frequent and persistent angry or irritable moods that overlap with symptoms of ADHD.

Social adjustment refers to an individual's capacity to engage in appropriate social behavior and adapt to various social situations (Romera et al., 2016). It reflects one's ability to navigate the expectations and constraints of society, including establishing satisfying interpersonal relationships with peers and family members and fostering a harmonious work environment (American Psychological Association, 2022). Harpin

(2005) highlights that children and adolescents with ADHD often struggle to meet these demands, leading to difficulties in successfully adapting to their social surroundings. In line with the findings of Aduen et al. (2018), research indicates that children with ADHD commonly experience impaired social functioning and face challenges in social adjustment, including higher rates of peer rejection and reduced participation in social activities with friends.

In addition, Deault (2010) found that impaired social function might also trigger family dysfunction, causing more stress at home, higher possibilities of parental psychopathology and toxic parent-child relationships. These adverse psychosocial influences on family members especially set forth high levels of parenting stress. As a result of regaining an important role after giving birth to a baby, most parents experience various levels of parental stress. As Biodic et al. (2019) presented, parents of adolescents with ADHD tend to show higher levels of anxiety in all domains since parenting stress is related to dysfunctional parent-child interactions. It is very challenging for parents to educate their children with ADHD, which entails a lot of effort and stress. At the same time, children with ADHD are prone to be more impulsive in behaviors and more emotional in sentiment, which hinders a good relationship with parents in return.

Since the pattern of lacking social adjustment among children with ADHD leads to maladaptive social life and an increase of parenting stress, it draws great attention for an immediate need and target to apply intervention. Appropriate interventions are crucial to solve these issues as soon as possible to avoid longterm and unreversed side effects of the disability, such as long-term drawback on problematic interpersonal relationship, academic failure and even to delinquent behavior and substance abuse (Aduen et al., 2018). Aduen et al. (2018) also found that pharmacological treatment and social skills interventions both are beneficial to alleviate the symptoms of ADHD and can help with dysfunctional social interactions. According to Polanczyk et al. (2014), 66% of children with ADHD took medication for the disorders have improved attention, perseverance, and work productivity. Pharmacotherapy has long been considered to be a prevalent and effective treatment for ADHD, but applying medication to patients with ADHD exclusively is not sufficient to reduce ADHD symptoms and its co-morbidities as suggested. Therefore, this study aims to investigate whether coordinating CBGT with non-pharmacological intervention will decrease parenting stress and improve social adaptation abilities of children with ADHD. The non-pharmacological interventions include cognitive behavioral therapy, attention skills treatment and behavioral therapy (Aduen et al., 2018), which offers an inspiration of our experiment on testing the effectiveness of CBGT on enhancing social adjustment functioning and decreasing parenting stress.

Cognitive-Behavioral Therapy (CBT)11CBT: cognitive-behavioral therapy is a psychological intervention that is known for mental disorders for a wide range of people, and it offers remarkable improvement in adaptive functioning along with ADHD symptoms (Nøvik et al., 2020). Based on the definition of CBT, Cognitive-Behavioral Group Therapy (CBGT) involves clients expressing their thoughts and feelings in a group setting and having opportunities to discuss and cooperate interpersonally (Moloud et al., 2022). Traditionally, CBGT involves a group of people guided by one or more therapists to enhance their social functioning through group collaboration and behavioral experiments (Thimm & Antonsen, 2014). At the same time, other members of the group act as co-therapists and benefit from the cohesive nature of the group as well (Ezhumalai et al., 2018). In addition to the traditional CBGT, our study applied a modified CBGT that incorporated pain tolerance social skills to the behavioral section for teens and targeted coaching for parents. Parents coach focused on using Dialectical behavioral therapy-based (DBT) parental coping strategies, which is an effective way to address any factors that impede parents' motivation to acquire new skills for adolescent emotional and behavioral problems (Swales & Dunkley, 2020) The DBT parent coaching provides guidance for parents to understand the formation and maintenance of the biological and social patterns of adolescent behavioral problems with ADHD and how to deal with them effectively. We believe that the group is able to create an environment in which children can see the impact of their actions on others and receive feedback from others on their actions. Any distorted thinking patterns or difficulties in school and family life can clearly be identified at this point.

Researchers have found that school-based cognitive behavioral therapy was effective in treating anxiety dis-

orders, depression disorders, ADHD, and obsessive-compulsive disorders (Parker et al., 2016). The possibility that CBT helps to improve cognitive functioning and ADHD symptoms is the reason why we believed that modified CBGT was beneficial to both socially adaptive functioning adolescents with ADHD and impulsivity aggression comorbidity as well as their parents' stress. But Nøvik et al. (2020) stated that there were only three published studies on CBT with ADHD adolescents, and the information and effects of group therapy on ADHD were hard to retrieve. For this reason, we examined the effectiveness of a modified Cognitive Behavioral Group Therapy (CBGT) in treating children with ADHD and parenting stress to provide more information for future research. CBT helps improve cognitive function and may assist in the improvement of ADHD symptoms and function. The DBT-based parent coaching component simultaneously aims to enhance parents' comprehension of ADHD adolescents, foster greater recognition, and develop more effective communication skills. These improvements contribute to the creation of a more inclusive microenvironment that supports ADHD adolescents in distress. Consequently, we strongly believe that the modified CGBT therapy holds significant benefits for both ADHD-impulsive aggression comorbid adolescents dealing with social adjustment dysfunction and their parents, reducing parental stress levels. Additionally, we expand the research direction and perspective of pre-adolescents with ADHD and their associated comorbidities. As a result, our study indicates that through the CBGT intervention for both children and parents, the core symptoms of ADHD of these children have been alleviated as well as their ability to interact well with their families and peers. In addition to that, the positive outcomes of these programs have a subsequent effect on the parents' stress levels.

## Material and Methods

#### **Recruitment Requirement**

As the recruitment criteria for children with ADHD, it was required that their diagnoses meet the DSM-V diagnostic criteria for ADHD and should be confirmed by a psychiatrist. The criteria entailed an impulsive behavior, academic difficulties resulting from lack of self-control, as well as emotional irritation on most occasions. Children with ADHD must score above 85 points on the Wechsler Intelligence Scale in order to meet these criteria. This scale measures children between the ages of 6 and 16 in terms of their ability to perform a variety of intellectual tasks, which include general cognitive abilities, verbal comprehension, perceptual reasoning, working memory, and processing speed (Gomez et al., 2016). Participants were required to be 9-14 years old, with no gender limitations. They should be able to express themselves verbally, have the ability to express feelings, and be able to think critically. Conduct Disorder, Major Psychosis, Pervasive Developmental Disorder, Mental Retardation, Epilepsy, and other organic nervous system disorders should be excluded from the evaluation.

## Study Design

There were two studies testing CBGT effectiveness on children with ADHD both in 2020 and 2021. The first study involved 9 children with ADHD and one child dropped out halfway because of a young age combined with low cognition; the second study involved 13 children with ADHD and one dropped out due to lack of persistence. Among these 20 children with ADHD, 19 appeared to exhibit moderate to severe attention deficits, while 15 showed severe attention deficits. There were 11 children with moderate hyperactivity and impulsivity symptoms and 7 with severe hyperactivity symptoms. There were 18 cases with moderate or above oppositional defiant disorder symptoms and 10 cases with severe oppositional defiant disorder symptoms. Nevertheless, even though there were only 2 children with ADHD did not show symptoms of ODD and impulsivity, they also displayed emotional problems, hostility, and interpersonal difficulties with peers, teachers and parents. Furthermore, these children only received methylphenidate from the hospital, which is the most commonly used medication for reducing core symptoms of hyperactivity, impulsivity and inattention in children and adolescents with ADHD (Storebø, 2018). Even though 17 of 20 children received medication, the reduction rate of drug therapy alone was less than 30% and no adjustment of drug therapy regimen was made during psychotherapy in the last three months. Because these children's condition only improved slightly with the help of medication in the early stages of ADHD, the limited effects of drugs on children three months before the intervention can be neglected. To achieve a full remission from ADHD, we aimed to apply CBGT intervention to remedy it with its comorbidity in a non-pharmaceutic way.

The basic structure and content were practically the same in both studies. The reason why we conducted the study twice is to make sure the class size is small each time to verify its effectiveness that the group leader would be able to pay attention to each child and at the same time to repeatedly prove the benefits of CBGT on parents and children. Each study was composed of 3-month sessions concerning parental stress problems and preadolescent children with ADHD, while four parent classes and ten children's classes were included. Further, sessions for parents were conducted in the form of teaching and discussion, while sessions for preadolescents were structured with closed youth groups of participants once a week for 120 minutes each time. We sampled both studies in the same way, by selecting children with ADHD aged 9-14 who meet the requirement and voluntarily attend the group therapy from the Fuzhou Children's Hospital of Fujian Province.

Before we started the intervention, all children participants agreed and signed the informed consent (see Appendix A). We also obtained general demographic data as supplemental information as part of the investigation of the medical records, including parent socioeconomic status (SES), whether or not the family has one child, family type, parental relationship, parenting style, primary caregiver, and child's personality, as listed in Table A.1.

At the beginning and the end of the study, we provided questionnaires and collected Parenting-Stress Index-Short Form (PSI-SF), SNAP-IV, Conners Scale, Barratt impulsivity Scale to analyze the effectiveness of the therapy by statistics and graphs. After gathering adequate data for the experiment, these children with ADHD and their parents would begin their CBGT intervention classes led by the Director of the Department of Psychiatry.

#### Intervention

#### Parents' Session

In modified CBGT courses, four 120-minute parenting sessions followed after each of the first, fourth, seventh, and tenth children's classes. These classes consisted of four components in general. The first component allowed parents to gain a comprehensive awareness of ADHD health education lecture. The lecture provided parents with information regarding ADHD prevalence, biological and psychosocial pathogenic factors, clinical manifestations, diagnosis, treatment plans, course characteristics, prognosis, maintenance, exacerbation, and remission of psychological factors, common adverse drug reactions, and management techniques. The second, third and fourth parts of the session presented to parents the understanding of emotional and behavioral problems of ADHD adolescents based on DBT theory, the biological factors of impulsive behaviors of ADHD children, and the impact of long-term social and family school disapproval on the maintenance and deterioration of the problems. They taught how to recognize, how to use wisdom to deal with difficult situations, and how to use reinforcement and restriction techniques. And by practicing mindfulness, learning to do with one's mind, without judgment, and learning to relax and care for oneself. The purpose is to reduce parents' self-blame, guilt, anxiety and other emotions, improve the understanding of teenagers, and more effectively assist themselves and teenagers to cope with various stressful situations.

#### accelerate CBGT Children's Session

The CBGT modified counseling consisted of ten 120-minute sessions with children. The courses were designed to improve the social adaptation function of ADHD patients and enhance the relationship between parents and children based on their characteristics of low emotional control, hyperactivity, and low attention ability. In order to monitor the vertical and horizontal engagement of each member of the group, two observers were assigned to document the detailed performance of each child during the counseling session. These sessions were based on three main topics. In order to reduce unintended impulsivity caused by children with ADHD, the first goal was to assist them to analyze situations that trigger their emotional disharmony. As children learned more about how to identify crucial moments, they were provided with simulative scenarios that intend to trigger their anger and impulsivity. When they were presented with these situations, they were encouraged to stop and consider whether they had interpreted the situation correctly or if it came from their automatic thinking. The second component involved teaching coping techniques, including anger management and relaxation techniques. Parker et al. (2016) suggested that anger mediates the relationship between automatic thoughts and harmful behaviors; therefore, we taught children using different cognition models to make them less likely to believe their automatic thoughts. In the last part of the session, children were asked to collaborate and brainstorm to envision their future since research shows that positive psychology provides individuals with positive emotions and social support (Park et al., 2014).

SPSS26.0 was used for in-group test analysis. We applied a Paired Sample t-test in the study to compare the factor scores of four assessments to test whether they have significant differences between pre-CBGT and post-CBGT interventions. All the assessments were self-reported, filled out by children and parents who participated in the study.

In Table A.2, SNAP refers to Swanson, Nolan and Pelham Teacher and Parent Rating Scale, which is used as a measurement of core symptoms of ADHD, including parent ratings and teacher ratings. In the assessment, parent ratings are good predictors of research on inattention and hyperactivity/impulsivity subscales, while teacher ratings work for only hyperactivity/impulsivity scores (Hall et al., 2020). In the scale, Inattention is denoted with (I), Hyperactivity-Impulsivity is denoted with (HI), and Oppositional items are denoted with (O). Second assessment is Barratt, which refers to Barratt Impulsiveness Scale, a measure for impulse control, including major sub-traits of impulsivity: non-planning impulsiveness, motor impulsiveness, and attentional impulsiveness (Reise et al., 2013). In the scale, Nonplanning Impulsiveness is denoted with (N). Motor Impulsiveness is denoted with (M), and Attentional Impulsiveness is denoted with (A). The third assessment is PSI-SF, which refers to Parenting Stress Index-Short Form, is used as a measure of parenting stress that happens when parents feel overwhelmed or lack the skills to cope with their children. The form contains three subscales, Parental Distress, Parent-Child Dysfunctional Interaction, and Difficult Child (Rivas et al., 2021). In the scale, Parental Distress is denoted with (PD), Total Stress Scale is denoted with (Total), Parent-Child Dysfunctional Interaction is denoted with (PSDI), and Difficult Children is denoted with (DC). The last assessment is Conners, which refers to The Conners' Rating Scales, is used to assess ADHD and other existing difficulties in children. There are two rating scales in Conners, one for teachers and the other for parents (Izzo, et al., 2019). We only used parent rating scales for our study. In the scale, Conduct Problem is denoted with (CP), Psychosomatic is denoted with (P), Anxiety is denoted with (A), Learning Problem is denoted with (LP), Impulsivity is denoted with (I), and Hyperactivity is denoted with (H).

## Results

According to Table A.2, the results show significant differences in SNAP (I), SNAP (H-I), SNAP (O), PSI-SF (Total), PSI-SF (DC), Barratt (N), and CONNERS (CP), CONNERS (P), CONNERS (A) scores. There is a significant difference between pretest and posttest test scores in the experimental group. A significant difference is not found between PSI-SF (PD), PSI-SF (PCDI), CONNERS (P), CONNERS (A), CONNERS (I), Barratt (M), Barratt (A), Barratt (Total) scales before and after measurement.

#### Discussion

As shown in Table A.2, it is demonstrated that modified CBGT significantly influenced three assessments of SNAP, PSI-SF (Total), PSI-SF (DC), Barratt (N), and CONNERS (CP), CONNERS (P), and CONNERS (A). Nevertheless, the results indicate that CBGT is not effective on PSI-SF (PD), PSI-SF (PCDI), CONNERS (P), CONNERS (A), CONNERS (I), Barratt (M), Barratt (A), Barratt (Total) scores. One possible reason for the ineffectiveness is that the group intervention cannot be effective in every aspect by itself. Despite the use of medication, CBGT for children with ADHD only contains a short period of treatment, resulting in many unrelieved symptoms that require long-term management. In addition, a study indicates that children with ADHD who have a poor family environment, specifically low education levels, inferior occupation status, and unstable emotions, may be more likely to develop ADHD (Huang et al., 2018). The data in Table A.1 indicate a number of external factors, including children's personalities, family members' involvement, and daily income, that may contribute to the insignificant data on ADHD. As

a result of these effects, different subsets of the scale may exhibit nuances.

Two subsets of data indicate that CBGT intervention has no significant effect on non-planning impulsiveness in children or parental distress among parents; however, the intervention significantly alters parents' basic cognition of ADHD and provides better flexibility and understanding in their relationship with their children. As a result, modified CBGT counseling was successful in reducing ADHD-related symptoms, as well as parenting stress caused by

According to research (Hamed, 2015), ADHD is one of the most frequently diagnosed disorders in children and adolescents (Theule et al., 2018), with a prevalence rate of 5%-11%. In spite of this high prevalence rate, there is a low level of consultation and compliance due to a lack of understanding or even a misunderstanding of ADHD in China. In light of these misunderstandings, parents are more likely to form negative opinions regarding their children's current situation and future, which greatly inhibits positive family relationships. The importance of CBGT intervention for ADHD patients in China is therefore exceptional. It is possible to eliminate their misperceptions and rejections of their children due to their abnormal functioning by offering targeted professional parent courses. By participating in CBGT courses, parents were able to re-build their confidence regarding the restoration of family relationships, while gaining a greater understanding of their child's prognosis. Furthermore, interveners and parents can communicate and receive feedback during the class to improve the skills of parents in mastering education methods applied to practical problems, which may alleviate their anxiety and depression to a certain degree.

In the meantime, CBGT interventions had significant positive effects on children as well. Parents may initiate using a positive parenting approach to children when they have reached a certain level of ease, such as a peaceful and harmonious way of communicating with their children instead of blaming and criticizing them repeatedly. Due to such conversion, children with ADHD were more likely to comply with the corresponding drug treatment and thereby increased the effectiveness of the treatment. Likewise, when children with ADHD symptoms subsided, parents may be able to confirm the effectiveness of the intervention and thereby greatly increase compliance with consultations and pharmacology. By utilizing CBGT courses as a trigger, we are able to manipulate self-recovery by pushing both parents and children into the cycle. In short, the CBGT parents course prevented parents from misinterpreting ADHD symptoms in order to reduce anxiety caused by unknowns, as well as educating them the accurate ways to interaction with children. Conversely, when the symptoms of ADHD were significantly reduced following CBGT courses, so was the level of parenting stress. Accordingly, low anxiety promotes more positive education and a relaxed family environment, which in turn accelerates the rehabilitation of children with ADHD symptoms.

Although the result was promising and anticipated, the process of performing group therapy on children with ADHD and emotional problems was particularly difficult. The children typically exhibited a lack of selfcontrol and compliance in class, resulting in a distraction of more than 90 minutes during a 120-minute class. The children did not only exhibit hyperactivity, but also emotional dysregulation and aggressive behavior, which made it difficult for us to control them (Schoorl et al., 2016). The observed characteristics of these children with ADHD who lack self-control and experience emotional dysfunction suggest that they might have trouble functioning well in the society. ADHD would be a long-term issue without early intervention, as Hamed et al. (2015) found, about 1/3 to 1/5 ADHD patients will have persistent symptoms into their adulthood. The prolonged effects of ADHD engender plenty of inabilities in social adjustment along the lifetime of ADHD patients. Halperin et al. (2012) evidenced that environmental and physical influences can affect one's neural development, leading to long-term track of ADHD symptoms, which may cause irreversible social dysfunction. Based on this concept, early treatment of ADHD avoids enduring impacts by reducing the likelihood of being exposed to neurodevelopmental disorder for a long time. Therefore, this study gathered children with ADHD at their preadolescent ages in order to intervene at the optimal period of time that renders the best outcome of treating ADHD symptoms.

## Conclusion

As a consequence, the modified CBGT intervention offered implications for treating ADHD symptoms,

which is an area that few research studies explored before. Additionally, both the CBGT counseling and the conciliatory ADHD symptoms help to largely decrease parenting stress by modeling different parenting skills. Overall, the results were optimistic that the intervention was beneficial not solely for children with ADHD themselves, but also for the family as a whole. Furthermore, we achieved our primary goal of improving social adjustment abilities by providing group counseling to facilitate the improvement of attention level and reduction of hyperactivity of children with ADHD, so that they can assimilate into a normal social environment.

In light of this experiment, there were certainly some limitations that could be addressed in the future. Although the application of medication was stopped in the last three months before participating in the study, the effectiveness of medication on individuals would still cause difference. It is possible that the drugs might have a continuous impact on neurons and transmitters of these children, which made it very difficult for us to do a pharmacodynamic analysis in terms of neurology to detect the effect of the dose on individual's brain and somatic functions. Moreover, the sample size of the study was small and limited to the Psychology Department in the hospital, so generalizing from these two studies is quite difficult. But it would be applicable to have the modified intervention multiple times in a year with different groups of children and parents, which allows the sample size to grow and at the same time offers more opportunities for children with ADHD problems to improve their social abilities. Overall, our results show that modified CBGT can effectively treat children with ADHD, which indicates that further research is extremely significant in the application of such interventions. In spite of the fact that many ADHD treatment methods exist, CBGT intervention is an emerging concept that offers many benefits both to children with ADHD as well as their parents. A future topic to continue researching would be the conduct of more research on ADHD and associated disorders using CBGT intervention.

## References

Aduen, P. A., Day, T. N., Kofler, M. J., Harmon, S. L., Wells, E. L., & Sarver, D. E. (2018). Social Problems in ADHD: Is it a Skills Acquisition or Performance Problem?. *Journal of psychopathology and behavioral assessment*, 40 (3), 440–451.https://doi.org/10.1007/s10862-018-9649-7

Andersen, A., Sund, A., Thomsen, P., Lydersen, S., Young, S., & Nøvik, T. (2022). Cognitive behavioural group therapy for adolescents with ADHD: A study of satisfaction and feasibility. Nordic Journal of Psychiatry, 76(4), 280-286. https://doi.org/10.1080/08039488.2021.1965212

American Psychological Association. (n.d.). Apa Dictionary of Psychology . American Psychological Association. Retrieved November 9, 2022, from https://dictionary.apa.org/

Barbaresi, W. J., Campbell, L., Diekroger, E. A., Froehlich, T. E., Liu, Y. H., O'Malley, E., Pelham, W. E., Jr, Power, T. J., Zinner, S. H., & Chan, E. (2020). Society for Developmental and Behavioral Pediatrics Clinical Practice Guideline for the Assessment and Treatment of Children and Adolescents with Complex Attention-Deficit/Hyperactivity Disorder. *Journal of developmental and behavioral pediatrics : JDBP ,41 Suppl 2S*, S35–S57. https://doi.org/10.1097/DBP.000000000000770

Breaux, R., Waschbusch, D. A., Marshall, R., Humphrey, H., Pelham, W. E., Jr, & Waxmonsky, J. G. (2020). The Role of Parental Knowledge and Attitudes about ADHD and Perceptions of Treatment Response in the Treatment Utilization of Families of Children with ADHD. Evidence-based practice in child and adolescent mental health, 5(1), 102–114. https://doi.org/10.1080/23794925.2020.1727797

Biondic, D., Wiener, J. & Martinussen, R. Parental Psychopathology and Parenting Stress in Parents of Adolescents with Attention-Deficit Hyperactivity Disorder. J Child Fam Stud 28, 2107–2119 (2019). https://doi.org/10.1007/s10826-019-01430-8

Coelho, L.F., Barbosa, D.L.F., Rizzutti, S. *et al.* Group cognitive behavioral therapy for children and adolescents with ADHD. *Psicol. Refl. Crit.* 30, 11 (2018). https://doi.org/10.1186/s41155-017-0063-y

Deault L. C. (2010). A systematic review of parenting in relation to the development of comorbidities and

functional impairments in children with attention-deficit/hyperactivity disorder (ADHD). Child psychiatry and human development, 41 (2), 168–192.https://doi.org/10.1007/s10578-009-0159-4

Ezhumalai, S., Muralidhar, D., Dhanasekarapandian, R., & Nikketha, B. S. (2018). Group interventions. Indian journal of psychiatry, 60(Suppl 4), S514–S521. https://doi.org/10.4103/psychiatry.IndianJPsychiatry\_42\_18

Garg, J., & Arun, P. (2013). A Follow-up Study of Academic Functioning and Social Adjustment in Children with Attention Deficit Hyperactivity Disorder. Indian journal of psychological medicine, 35 (1), 47– 52.https://doi.org/10.4103/0253-7176.112201

Ghosh, A., Ray, A., & Basu, A. (2017). Oppositional defiant disorder: current insight. Psychology research and behavior management, 10, 353–367. https://doi.org/10.2147/PRBM.S120582

Gomez, R., Vance, A., & Watson, S. (2016). Structure of the Wechsler Intelligence Scale for Children - Fourth Edition in a Group of Children with ADHD. Frontiers in Psychology, 7, 737. https://doi.org/10.3389/fpsyg.2016.00737

Hall, C. L., Guo, B., Valentine, A. Z., Groom, M. J., Daley, D., Sayal, K., & Hollis, C. (2020). The Validity of the SNAP-IV in Children Displaying ADHD Symptoms. Assessment , 27 (6), 1258–1271.https://doi.org/10.1177/1073191119842255

Halperin, J. M., Bédard, A. C., & Curchack-Lichtin, J. T. (2012). Preventive interventions for ADHD: a neurodevelopmental perspective. *Neurotherapeutics : the journal of the American Society for Experimental NeuroTherapeutics , 9* (3), 531–541. https://doi.org/10.1007/s13311-012-0123-z

Hamed, A. M., Kauer, A. J., & Stevens, H. E. (2015). Why the Diagnosis of Attention Deficit Hyperactivity Disorder Matters. *Frontiers in psychiatry*, 6, 168. https://doi.org/10.3389/fpsyt.2015.00168

Harpin V. A. (2005). The effect of ADHD on the life of an individual, their family, and community from preschool to adult life. Archives of disease in childhood, 90 Suppl 1 (Suppl 1), i2– i7.https://doi.org/10.1136/adc.2004.059006

Hensley, W. (1985). The impact of the experimenter expectancy effect on the measurement of self-esteem and communication anxiety. *Applied Psychology*, 34 (2), 291-298. https://doi-org.ezp3.lib.umn.edu/10.1111/j.1464-0597.1985.tb01322.x

Huang, Y., Xu, H., Au, W., Xu, C., & Wu, K. (2018). Involvement of family environmental, behavioral, and social functional factors in children with attention-deficit/hyperactivity disorder. *Psychology research and behavior management*, 11, 447–457. https://doi.org/10.2147/PRBM.S178080

Moloud, R., Saeed, Y., Mahmonir, H. *et al.* Cognitive-behavioral group therapy in major depressive disorder with focus on self-esteem and optimism: an interventional study. *BMC Psychiatry* 22, 299 (2022). *https://doi.org/10.1186/s12888-022-03918-y* 

Nøvik, T. S., Haugan, A. J., Lydersen, S., Thomsen, P. H., Young, S., & Sund, A. M. (2020). Cognitivebehavioural group therapy for adolescents with ADHD: study protocol for a randomised controlled trial. *BMJ open*, 10 (3), e032839.https://doi.org/10.1136/bmjopen-2019-032839

Polanczyk, G. V., Willcutt, E. G., Salum, G. A., Kieling, C., & Rohde, L. A. (2014). ADHD prevalence estimates across three decades: an updated systematic review and meta-regression analysis. *International journal of epidemiology*, 43 (2), 434–442.https://doi.org/10.1093/ije/dyt261

Parker, J., Zaboski, B., & Joyce-Beaulieu, D. (2016). School-based cognitive-behavioral therapy for an adolescent presenting with ADHD and explosive anger: A case study. *Contemporary School Psychology*, 20 (4), 356–369. https://doi.org/10.1007/s40688-016-0093-y

Park, N., Peterson, C., Szvarca, D., Vander Molen, R. J., Kim, E. S., & Collon, K. (2014). Positive Psychology and Physical Health: Research and Applications. *American journal of lifestyle medicine*, 10 (3),

#### 200-206.https://doi.org/10.1177/1559827614550277

Rivas, G. R., Arruabarrena, I., & de Paúl, J. (2021). Parenting Stress Index-Short Form: Psychometric properties of the Spanish version in mothers of children aged 0 to 8 years. *Psychosocial Intervention*, 30 (1), 27–34. https://doi.org/10.5093/pi2020a14

Reise, S. P., Moore, T. M., Sabb, F. W., Brown, A. K., & London, E. D. (2013). The Barratt Impulsiveness Scale-11: reassessment of its structure in a community sample. *Psychological assessment*, 25 (2), 631–642.https://doi.org/10.1037/a0032161

Romera, E. M., Gómez-Ortiz, O., & Ortega-Ruiz, R. (2016). The Mediating Role of Psychological Adjustment between Peer Victimization and Social Adjustment in Adolescence. Frontiers in psychology, 7, 1749. https://doi.org/10.3389/fpsyg.2016.01749

Schoorl, J., van Rijn, S., de Wied, M., van Goozen, S., & Swaab, H. (2016). Emotion Regulation Difficulties in Boys with Oppositional Defiant Disorder/Conduct Disorder and the Relation with Comorbid Autism Traits and Attention Deficit Traits. PloS one, 11(7), e0159323.https://doi.org/10.1371/journal.pone.0159323

Storebø, O. J., Pedersen, N., Ramstad, E., Kielsholm, M. L., Nielsen, S. S., Krogh, H. B., Moreira-Maia, C. R., Magnusson, F. L., Holmskov, M., Gerner, T., Skoog, M., Rosendal, S., Groth, C., Gillies, D., Buch Rasmussen, K., Gauci, D., Zwi, M., Kirubakaran, R., Håkonsen, S. J., Aagaard, L., ... Gluud, C. (2018). Methylphenidate for attention deficit hyperactivity disorder (ADHD) in children and adolescents - assessment of adverse events in non-randomised studies. *The Cochrane database of systematic reviews*, 5 (5), CD012069.https://doi.org/10.1002/14651858.CD012069.pub2

Swales, M., & Dunkley, C. (2020). Principles of Skills Assessment in Dialectical Behavior Therapy. Cognitive and Behavioral Practice, 27(1), 18-29. https://doi.org/10.1016/j.cbpra.2019.05.001.

Theule, J., Cheung, K., & Aberdeen, K. (2018). Children's ADHD interventions and parenting stress: A meta-analysis. *Journal of Child and Family Studies*, 27 (9), 2744–2756. https://doi.org/10.1007/s10826-018-1137-x

Thimm, J.C., Antonsen, L. Effectiveness of cognitive behavioral group therapy for depression in routine practice. *BMC Psychiatry* 14, 292 (2014). https://doi.org/10.1186/s12888-014-0292-x

Thapar, A., Cooper, M., Jefferies, R., & Stergiakouli, E. (2012). What causes attention deficit hyperactivity disorder?. Archives of disease in childhood, 97(3), 260–265. https://doi.org/10.1136/archdischild-2011-300482

## Table A.1

General Demographic Information on Parents and Children

Demographic Characteristics	Response 1	Response 2	Response 3	Response 4	Response 5
One-child	Yes	No	NA	NA	NA
Family Type	Nucleus	Multigenerational Family	Adoption	Reconstituted Family	Single Parent
Parental	Concord	Discord	Live Apart	Divorce	Other
Relationship					
Parenting	Ingratiate	Criticize	Neglect	Reasonable	Authoritative
Style (Father)					
Parenting Style	Ingratiate	Criticize	Neglect	Reasonable	Authoritative
(Mother)					
Parenting	Consistent	Inconsistent	NA	NA	NA
Style					
consistency					

Education (Father)	Elementary School	Middle School	High School	Junior College	Bachelor or above
Education (Mother)	Elementary School	Middle School	High School	Junior College	Bachelor or above
Primary Caregiver	Parents	Grandparents	Nanny	Foster Care	NA
Family Income	Very High	Relatively High	Ordinary	Poor	Very poor
Children's Personality	Introverted	Extroverted	Ordinary	NA	NA

Note. The information was collected by self-rating.

# Table A.2

Comparison of Four Scale Data Before and After CBGT Intervention

Assessment	Pretest Result	Posttest Result	p	t
	Factor Scores	Factor Scores		
SNAP (I) SNAP	$2.280{\pm}0.553$	$1.750{\pm}0.644$	$0.001 \ 0.009 \ 0.001$	$4.135\ 2.892\ 3.798$
(H-I) SNAP (O)	$1.675 {\pm} 0.854$	$1.21{\pm}0.61$		
	$1.865 {\pm} 0.597$	$1.35 {\pm} 0.583$		
Barratt (N)	$59.55{\pm}17.043$ 65	$52.875 {\pm} 16.248$	$0.009 \ 0.227 \ 0.139$	$2.918 \ 1.208 \ 1.479$
Barratt (M)	$61.5 \ 64.765$	$61.25 \ 53.75 \ 53.325$	0.062	1.867
Barratt (A)				
Barratt (Total)				
PSI-SF (PD)	$33.95 {\pm} 9.006$	$31.25{\pm}6.98$	$0.169 \ 0.059 \ 0.017$	$1.431 \ 2.013 \ 2.613$
PSI-SF (PCDI)	$-32.25 \pm 6.189$	$28.75 {\pm} 5.839$	0.007	2.692
PSI-SF (DC)	$40.0{\pm}6.095\ 100.5$	$36.85{\pm}5.914$ 95.5		
PSI-SF (Total)				
Conners (CP)	$1.349{\pm}0.434$	$0.942{\pm}0.35$	$0.000 \ 0.006 \ 0.005$	$5.27 \ 3.087 \ 3.158$
Conners (P)	$1.978 {\pm} 0.502$	$1.588{\pm}0.439$	$0.112 \ 0.937 \ 0.154$	$1.59 \ 0.079 \ 1.425$
Conners (A)	$1.564{\pm}0.485$ 0.5	$1.21{\pm}0.479$ 0.2		
Conners (LP)	0.5  1.6	0.5  1.25		
Conners (I)				
Conners (H)				

# Appendix A

As part of the Cognitive Behavioral Intervention Group for Teens with ADHD, I agreed to discuss the problems I was experiencing at home and at school and provide guidance to others to assist them. Additionally, I am aware that we will be engaging in a lot of role-playing. I am committed to attending all group activities and arriving on time. I understand that members of the therapist group are not permitted to discuss the contents of the group with anyone other than their supervisors due to confidentiality. The leader will provide the location of each group activity, and I am willing to express my worries, participate in role play and complete the assigned homework. Lastly, I know we will have 10 group sessions, each lasting 100 minutes long.