



The Effectiveness of Verbal Self-instruction Program on the Symptoms of ADHD: Controlled Before and After Study

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ABSTRACT

The high prevalence of hyperactivity disorder and its related problems is the reason for the importance of seeking new therapies. Although several behavioral-cognitive models have been advocated in the literature, we are looking for research on what constitutes the most effective behavioral-cognitive model. Objectives: To determine the efficacy of verbal self-instruction program and to assess which component of the program was most predictive of decreasing the symptoms of ADHD in three medical and counseling centers in Hefei (China). Design: A randomized controlled clinical trial design was utilized with data before and after the program. Our sample consisted of 33 ADHD children admitted to the centers in March 2016. Results: The symptoms of ADHD were significantly reduced in the experimental group. Furthermore, perceived behavioral control increased in the experimental group but remained unchanged in the control group. Conclusion: The verbal self-instruction program was effective in decreasing the symptoms of ADHD.

Key Words: Verbal Self-Instruction, ADHD, Symptoms, Children

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Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common childhood disorders (Rappley, 2005). According to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV), there is three subclasses for hyperactivity disorder including a) Hyperactivity-Impulsivity Domain type, b) Attention Deficit Domain type, and c) combined type (WHO, 1993).

The prevalence of this disorder in school-age is between 3% and 5% (Wang, 2017). The onset of this disorder is from childhood. In other words, the general symptoms of attention deficit, hyperactivity and impulsivity begin from childhood and often persist into adulthood (Faraone *et al.*, 2000). The important point is that if this disorder is not timely diagnosed, it will

turn into an adult hyperactivity disorder and bring about irreparable consequences such as delinquency, imprisonment, job failure, divorce and educational and family problems. 1-6% of all normal adults have ADHD (Wender *et al.*, 2001). 60-70% of children with ADHD have shown the clinical features of this disorder to be up to adulthood (Wender, 1998). Today, contrary to previous beliefs, it is believed that this disorder does not resolve in most cases with age, and the symptoms will continue with the likelihood of 85% until adolescence and with the likelihood of 50-70% until adulthood (Hechtman *et al.*, 1984). Studies have shown that due to the chronicity of the disorder, the patients are exposed to other psychiatric disorders in adulthood, including

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antisocial personality disorder, alcoholism, addiction and interpersonal and psychological problems, and in general, hyperactivity causes the affected person's social situation to be badly damaged (Weiss *et al.*, 2002).

This disorder has not been fully understood until today. Recent studies have suggested that some genetic and environmental factors, such as early birth and mother's smoking during pregnancy, are involved in the disorder (Zhu *et al.*, 2014), while some studies have shown the neurological (neurological) fundamentals it (Mueller and Tomblin, 2012). Since 1930, abnormalities have been reported in electroencephalograms (EEG) of ADHD patients. The EEG of the patients shows a high activity of Theta gentle waves in the central and forehead cortex of the brain. In addition, the results of PET and SPECT report disturbances in their brain metabolism in the cortex of central and forehead. In children with this disorder, there is a reduction in brain metabolism in prefrontal cortex (Miao *et al.*, 2017). In addition to the more abundance of brain gentle waves in the EEG of these children, the less activity of rapid beta waves is also significant in them. This is a sign of low arousal of brain cortex in these individuals.

Drug treatments (especially stimulant medications) and behavioral therapies (self-guided and parent trainings) are the most commonly used treatments for patients with hyperactivity and attention deficit disorders (Razjouyan *et al.*, 2017). Drug therapy has long been accepted and used as an effective method to treat this disorder, but there are still many debates in this area. In addition, medications have a lot of side effects (Lakhan SE and Kirchgessner, 2012). Medications have a positive effect for only a few hours, and then the symptoms of ADHD will return. While behavioral therapies have some limitations, about half of them are successful (Lubar and Lubar, 1999).

Studies have shown that the use of cognitive-behavioral approach has been effective in reducing hyperactivity symptoms, impulsivity, increasing community-friendly behaviors and social cognition, and improving relationships with peers (Knouse and Safren, 2010). Self-instruction training is one of the models of this approach that has been expanded by Meacham Baum and conceptualized according to the writings of Russian psychologists such as Luria and Vygotsky (Ramalho *et al.*, 2011). According to Laura, children learn to control their behavior through

the internalization of adult guidance and guidance (self-directed speech), in other words, self-control is regulated by vague or internal speeches that achieving this control is a developmental process, and if these developmental stages do not occur in children, we should expect behaviors such as hyperactivity, impulsivity and so on and repeat the normal growth sequences to reduce these undesirable behaviors. In fact, self-instruction training is a kind of cognitive therapy that assumes that the abnormal behavior of ADHD children is the result of a lack or deficit in cognitive processes such as attention and inhibition (Miranda and Jesús Presentación, 2000). Hence, the goal is to enable ADHD children to plan and think before act. Some studies have shown the positive relationships between self-instruction strategy and the reduction of hyperactivity symptoms (Rivera Flores, 2015; Ramalho *et al.*, 2011; Furlong, 1998).

The purpose of this study is to determine the efficacy of verbal self-instruction program and to assess which component of the program is predictive of decreasing the symptoms of ADHD among children. As an indicator of perceived symptoms of ADHD, we used the variables Attention-Deficit/Hyperactivity Disorder Inattention (ADHD-In), Attention-Deficit/Hyperactivity Disorder Impulsive (ADHD-Im) and Attention-Deficit/Hyperactivity Disorder Combined (ADHD-C) (Swanson *et al.*, 2006). Furthermore, we included perceived behavioral control as an important behavior-related outcome variable (Tangney *et al.*, 2004).

Research Hypotheses

- 1- The verbal self-instruction program protects ADHD children from an increase of ADHD-In, ADHD-Im and ADHD-C at the cognitive processes.
- 2- The verbal self-instruction program has a positive impact on perceived behavioral control.

Methods

Study design

A randomized controlled clinical trial design was utilized with 2 weeks pre and 2 weeks post data used. While participants in the control group received no intervention, participants of the experimental group received a 12-sessions verbal self-instruction program.

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Sample

The sample of this study consisted of 53 children with ADHD in March 2016 in the above mentioned centers. We selected a sample size of 33 children with ADHD. The critical value was set at 0.05. We equally divided the sample into groups based on five criteria: gender, age, economic class, educational level, and moderate IQ level (using Wechsler Intelligence Scale). Participants were randomly assigned to an experimental group ($n = 17$, mean age = 11.3, male children about 63% and female children 37%) and a control group ($n = 16$, mean age = 11.1, male children about 59% and female children 41%). There were no differences concerning socio-economic class, educational level, and IQ level between groups.

Verbal self-instruction program

According to Micken Boom and Goodman (1971; quoted from Shapiro and Cole, 1994), verbal self-instruction is conducted from apparent mood to whisper mood and finally internal speech. The training sequence involves the following steps that were taught during the intervention:

The first step, cognitive modeling, is to describe or model homework that the related levels were expressed aloud. The second step, obvious or outward guidance, the trainer provided the self-instructions with a loud voice, and the children did them. This means that at this stage, the children did a behavior appropriate to long speech. The third step, obvious self-guidance, the children loudly repeated the self-instructions learned in the first and second steps during the assignment. The fourth step, disappeared self-guidance, at first the trainer did a proportionate behavior and simultaneous whispered the related remarks, and then the same act was performed by the children. The fifth step, hidden verbal self-instruction (inner speech), the trainer did an hidden order with symptoms of behavior and thinking such as raising eyes, touching chin, etc., and then the children used internal language during their homework. The skills taught to children in each step are as follows: 1) Definition of the problem, such as what should I do? or what is my problem, 2) approach the problem, such as I have to more pay attention to this issue or I have to be regular, 3) focus and attention, finding the

right solutions, such as I have to put my books on the shelf, 4) raiders cope with yourself, such as this is not the right approach, it's false, I have to find another solution, 5) self-reinforcing, such as okay, I really did my work well (Shapiro and Cole, 1974).

Data Collection

ADHD-In, ADHD-Im and ADHD-C

As an indicator of perceived symptoms of ADHD, we used the variables ADHD-In, ADHD-Im and ADHD-C of the Swanson, Nolan & Pelham Scale-Fourth (SNAP-IV) (Swanson *et al.*, 2006). The scale consists of a single form for teachers and parents with an eighteen items in the original version, which has been made to describe the behavioral ADHD. Some previous studies supported the reliability and validity of the scale (Swanson *et al.*, 2012; Hommersen *et al.*, 2006).

Perceived behavioral control

Perceived behavioral control was measured of the Tangney Self-Control Scale (Tangney, Baumeister & Boone, 2004), which consists of 36 items in the original version. The scale examines the relationship between high self-control and interpersonal success (Unger *et al.*, 2016). Some previous studies supported the reliability and validity of the scale (Mathews *et al.*, 2007; Ozaki *et al.*, 2016; Unger *et al.*, 2016).

Intelligence quotient (IQ)

We used the scale IQ of the Wechsler Adult Intelligence Scale for Children-Fourth Edition (WAIS-IV), which has been provided for three age groups including preschool, children and adults (Gomez, Vance & Watson, 2016). The scale is run for children aged 6-16 years. Some previous studies supported the reliability and validity of the scale (Suwartono *et al.*, 2014; Uno *et al.*, 2014).

Ethical Considerations

The study was approved by a Psychology and Counseling Services Center in Hefei (China). The researcher asked the ADHD children to provide verbal consent to be examined.

Data Analysis

We entered the data in SPSS 24. We also described the sample in a univariate analysis. A two-way MANOVA was used to examine the effects of Time (before-after the verbal self-instruction program) and Group (experimental-control group) on the



dependent variables ADHD-In, ADHD-Im, ADHD-C, and perceived behavioral control.

Results

Descriptive Statistics of the Study Variables

The number of ADHD children initially was 53; 4 have a physical illness that would limit the study and 6 refused to participate. Table 2 shows the characteristics of the 33 ADHD children. The

children were mainly male (about 60.6%), with a mean age of 11.2 years (SD = 1.84). of those assessed as educational level, 63.6% were from elementary school and 36.4% from middle school. The majority of them have a middle economic class (72.7%, n = 24) based on parents annual household income.

Table 1. Characteristics of participants N = 33

		n	%	Mean (SD)
Gender	Male	20	60.6	
	Female	13	39.4	
Age				11.2 (1.84)
Educational level	Elementary school	21	63.6	
	Middle school	12	36.4	
Units	Medical-Surgical	13	39.4	
	Oncology	5	15.1	
	Pediatrics	6	18.2	
	ICUs	9	27.3	
Economic class	Low	3	9.1	
	Middle	24	72.7	
	High	6	18.2	

Table 2. Mean and SD of the study variables

Variable	Experimental group (n=17)		Control group (n=16)	
	Before the program	After the program	Before the program	After the program
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
ADHD-In	1.34(0.35)	1.03(0.61)	1.38(0.28)	1.67(0.44)
ADHD-Im	1.45(0.94)	1.12(0.48)	1.42(0.37)	1.70(0.24)
ADHD-C	1.63(0.47)	1.42(0.27)	1.59(0.45)	1.88(0.35)
Perceived behavioral control	3.11(1.16)	3.29(0.44)	3.17(0.71)	3.16(0.63)

Hypothesis 1: The verbal self-instruction program protects ADHD children from an increase of ADHD-In, ADHD-Im and ADHD-C at the cognitive processes.

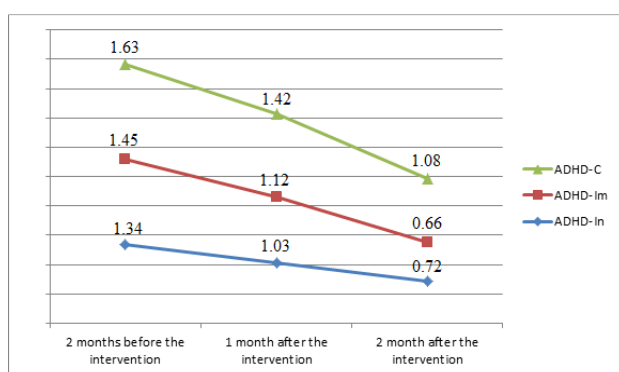


Figure 1. Symptoms of ADHD-In, ADHD-Im and ADHD-C over 3 quarters

From March 2016 to April 2016 prior to the implementation of the verbal self-instruction program, the average rates of the variables were low (ADHD-In = 1.34, ADHD-Im = 1.45, ADHD-C =

1.63) while in September and October 2016 after the verbal self-instruction program, the rates were reduced. Fig. 1 shows the reduction from two months before the program till two months after the program.

Hypothesis 2: The verbal self-instruction program has a positive impact on perceived behavioral control.

Perceived behavioral control increased in the experimental group (M = 3.11, SD = 1.16 at before the program, and M = 3.29, SD = 0.44 at after the program) and remained stable in the control group (M = 3.17, SD = 0.71 at before the program, and M = 3.16, SD = 0.63 at after the program) (Table 2).

Discussion

The results indicate that the verbal self-instruction program has been able to significantly improve symptoms of ADHD in the sample, which is consistent with the studies Rivera Flores (2015) and Thyagarajan (2016). Most of these studies



have shown that children with ADHD improved after receiving verbal self-instruction training, which indicates the effectiveness of this treatment in reducing symptoms of ADHD.

Improvement in disorder symptoms can be explained based on improvement in cognitive and neuropsychological functions. According to the Barkley Executive Function Theory (1998), disorder symptoms are malfunction manifestations in executive functions, including inhibition and internal speech, and the children suffer from delayed growth in inhibition and so don't have a verbal representation of environmental events. In fact, the verbal self-instruction program primarily affects cognitive functions of ADHD children and makes them more effective, and as a result, the symptoms of the disorder are reduced. The verbal self-instruction program enables ADHD children to control their emotions, stimulate through internal motivation, normal react to immediate stimuli and events, increase expected reactions to upcoming events, and turn to targeted behaviors.

According to the theoretical foundations of this treatment, normal children with language mediation achieve cognitive processes, and since these developmental stages have not been taken in ADHD children, these children take these steps appropriately during the treatment sessions and arrive at the stage of inner speech that is the same thinking. Since the core of verbal self-instruction is an improvement in inner speech, this training, by step-by-step internalization, helps children to direct behaviors through internal speech, to inhibit impulsive behaviors and actively keep reaching the late amplifications. In other words, this method leads to the formation of verbal thinking, in which the child can target his own behavior, predict the future and maximize long-term outcomes. Accordingly, children who benefit from such training act more successfully in controlling behavior, regulating interpersonal relationships and improving communicative communication.

Limitations

While this study had the strengths, there were some limitations. The most important limitation was the generalization of the results. This study was conducted in Hefei, and social factors and variables may somewhat eclipse the cognitive functions. Thus the generalization of the results should be done with caution.

Conclusion

The symptoms of ADHD are an important parent concern for ADHD children. Consistent with previous studies, our study applied a verbal self-instruction program which was based on the latest evidence in the literature to reduce the symptoms of ADHD. The point to consider is that most of these interventions were implemented in a clinical setting, but it is necessary to test the symptoms of ADHD using randomized clinical trials.

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