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EFFECTIVENESS OF NEUROFEEDBACK TRAINING ON BEHAVIOR AND ATTENTION LEVEL OF CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD): A CASE STUDY

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Abstract: Neurofeedback, also known as EEG (electroencephalogram) biofeedback, is a therapeutic intervention that provides immediate feedback from a computer-based program that assesses brainwave activity. This qualitative study involved pre-test and post-test aimed to investigate the effectiveness of Neurofeedback training in improving the attention level among children with ADHD as well as decreasing their behavior problems. This study involved two children with ADHD, aged 7 and 10 years old, selected through purposive sampling method. The respondents undergone a four months of Neurofeedback training as the intervention in this study. Two instruments involved in this study: the ADHD-T which was used to identify the behavior of the children with ADHD and the Neurofeedback attention level assessment report to measure the attention level of the children with ADHD. The NeuroSky software has been used to analyse the attention level of children with ADHD. The findings showed that the Neurofeedback training managed to improve the attention level of the children with ADHD. The findings also showed that the children with ADHD showed several decreases in their ADHD behavior after the Neurofeedback intervention training. The findings from this study are expected to help the community to have a better understanding of the efficiency of implementing Neurofeedback training with children who have ADHD. The findings from this study also would help parents and teachers to lead, guide or handle the children with ADHD's behavior in correct way and can improve their attention level. Therefore, future study is highly recommended to improve the content by increasing the sample size, different background and involving different gender.

Keyword: Neurofeedback, Attention Deficit Hyperactivity Disorder (ADHD), Behavior Level, Attention Level

INTRODUCTION

ADHD stands for attention deficit hyperactivity disorder, one of the most common childhood disorders. Attention Deficit/ Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental psychiatric disorders of childhood (Roy et al., 2022). Children with ADHD will show behavior of inattentiveness, impulsivity, and hyperactivity. However this behaviour differ from person to person. ADHD was formerly called ADD, or attention deficit disorder. Both children and adults can have ADHD, but behaviour always begin in childhood. According to Centers for Disease Control and Prevention (2023), children with ADHD may have trouble paying attention, controlling impulsive behaviors (acting without thinking about what the result will be), or be overly active. According to Centers for Disease Control and Prevention, ADHD is one of the most common neurodevelopmental disorders of childhood and often diagnosed in childhood and often lasting into adulthood.

Children with attention-deficit hyperactivity disorder (ADHD) often having the problems of social interactions with peers, signs of inattention, impulsive and hyperactive. ADHD child always forget things, hard to concentrate, gets bored in an activity unless it is very enjoyable, struggle to complete a task, very impatient to wait for a turn, interrupts people, move nonstop even when sitting down, or having a meal, moves from place to place quickly and frequently (Shah et al. 2019). Children with ADHD is also facing the problem of behaviour too. Sometimes the child will create a big problem such as quick to lash out, throw tantrum, in anger or shouting out loud when asked to do or complete a task that they not willing to do. They will express their anger and frustration at their inability to control their own environment. There are behaviour and

attention problem that face by ADHD child in the daily life and affect their education. Therefore, the researcher decided to use neurofeedback to help ADHD child to improve their positive behaviour and attention level.

Neurofeedback, a type of biofeedback, has been found to be useful in ADHD. It helps patients to control their brain waves consciously (Roy et al., 2022). Neurofeedback is a therapeutic technique that seeks to modulate and retrain brain function to address neurological and/or psychological symptoms of concern (Arns et al. 2020). Neurofeedback, also known as EEG (electroencephalogram) biofeedback, is a therapeutic intervention that provides immediate feedback from a computer-based program that assesses a child's brainwave activity. Neurofeedback training is an alternative therapy that uses real-time EEG data to help children train their brains to improve focus, impulse control, and executive function. Since the 1970s, children with ADHD and other neurological disorders have used neurofeedback in hopes of training their brains (Rabiner, 2019). It is said through continues practice brainwave improvements may lead to behavior improvements most notably, sustained focus, diminished impulsivity, and reduced distractibility beyond the study environment. Neurofeedback training may help the children to learn how to regulate their brain activity, which help the children to concentrate better at school or work. In most people, concentrating on a task helps to speed up brain activity (Legg, 2016). Thus, it proves the concept that the brain is malleable and that with frequent, intense practice, children may transform their brainwave activity. Over time, Neurofeedback training is aimed to help patients increase the ratio of high-frequency brain waves, leading to 3 stronger attention and self-control (Rabiner, 2019). Neurofeedback may also be used as an adjunct intervention with other forms of therapy (Kubik, 2016).

In a person with ADHD, the brain may display characteristic patterns of behavior, particularly in the frontal lobe. This area is linked with personality, behavior, and learning. The functioning of the brain and a person's behavior are connected. Changes in behavior can change the brain, and changes in the brain can change behavior. Neurofeedback aims to change a person's behavior by changing their brain. The brain produces measurable electrical signals, or waves. A specialist of Neurofeedback measures these waves, usually with a device called an electroencephalograph (EEG). There are five types of brain wave: alpha, beta, gamma, delta, and theta. Each has a different frequency, which an EEG can measure. Some research suggests that people with ADHD have more theta waves and fewer beta waves than people without the disorder. In theory, Neurofeedback aims to correct this difference (Villines, 2018).

Nevertheless, Neurofeedback is used to treat many conditions such as ADHD and ADD, stress disorders, anxiety, panic attacks, autism, Asperger, depression, headaches, migraines, concussions, and sleep issues (Nadir et al. 2023). Therefore, this paper has taken a step forward to explore the effectiveness of Neurofeedback and its effect on children with ADHD as in particular, good outcomes can be generated from this intervention to help children with ADHD. Therefore, the purpose of this study is to identify the effectiveness of Neurofeedback training in improving the behaviour and attention level of children with ADHD.

LITERATURE REVIEW

Attention deficit hyperactivity disorder (ADHD) is a type of developmental delay and it is the most common neurological dysfunction presenting for treatment in children and is considered primarily genetic or congenital (Shah et al., 2019; Roy et al., 2022). According to Shah et al. (2019), attention-deficit/hyperactivity disorder (ADHD) is one of the most common neurodevelopmental psychiatric disorders of childhood affecting about 5–7% of school-aged children. It might be the cause of environmental conditions. Children with ADHD might be having behaviour problems such as hyperactive, 16 inattentive, and get distracted easily. ADHD children also might be forgetful and having trouble on controlling own impulses. In their research also mentioned that this behaviour is a challenging to the teacher, parents, and even to the children. This behaviour can happen across a range of situations for example at school, at home or at play, an ADHD diagnosis might apply (Centre for Disease Control and Prevention, 2023).

One of the main times for diagnosing children is when they are at the age of seven to nine years old. At this age, parents and teachers may start to notice problems with the child's homework and friendships. Many children with ADHD may also have further difficulties than their friends with learning to read, spell or do math. But even without any precise learning difficulty (such as dyslexia), ADHD can restrict with a child's ability to learn, follow classroom routines and complete their homework (Heinonen, 2016).

Furthermore, they may face the trouble of understanding how the classroom works and might find it hard to pay attention or concentrate, the order of answers to a teacher's questions. Homework can also be a challenge, as ADHD may make it difficult for a child to write down or complete their homework by themselves, remember their belongings such as books or homework. In terms of emotions, children with ADHD may having sudden mood swings, which may look as over-reactions to small issues or becoming frustrated very quickly because they are facing the problem of difficulty reading social

cues, for example failing to read facial expressions, problems with conversation skills, problemsolving, in trouble of controlling their behaviour, such as interrupting or not taking turns, which may irritate other children, difficulty controlling their emotions, for example reacting angrily or inappropriately when they are upset (Heinonen, 2016).

Neurofeedback

Neurofeedback is a therapeutic technique that seeks to modulate and retrain brain function to address neurological and/or psychological symptoms of concern (Arns et al. 2020). Neurofeedback is a computer-aided training method in which selected parameters of the patient´s own brain activity. Neurofeedback can normally not be perceived, are made visible to the children. The computer aided information is displayed to assist and monitor the development of the patient (Enriquez-Geppert et al., 2019). Neurofeedback involves a variation of biofeedback. The system learned to self-regulate using an individual's own brain activity. The brain will produce measurable electrical signals and Neurofeedback measures these electrical waves, with a device called an electroencephalograph (EEG). Neurofeedback treatment improved the subjected area of focus to produce the desired result. In this study, the researcher will be using Neurofeedback to identify its validity by focusing on children with ADHD to help them decrease the undesired behaviour and improve their attention span. Neurofeedback adapts the mental strategies by trial and error where the brain function could train to react to the stimulus by producing desired results. Therefore, changes in the brain can stimulate good attention level and assist in overcoming the behaviour of ADHD children. Children attention will be improved by its consequences. Neurofeedback training aims to decrease the children's ADHD behaviour and improve their attention level by changing the brainwave (Shereena et al., 2019). During the Neurofeedback training sessions, the expert begins by attaching electrodes to the forehead of the ADHD children in order to measure their brain activity through an ongoing screen printout of brain waves based on the brain wave feedback, the Neurofeedback expert will instruct the ADHD 21 children to perform specific tasks to train their brain activity, which eventually produce the desired result (Shereena et al., 2019).

In this regard, L'evesque and colleagues (2006) believed that children with ADHD, Neurofeedback training is able to help to normalize the brain waves of these children leading to an improvement in their behaviour. In their study, the Neurofeedback training was conducted with the selected children for 13 ½ weeks (3 sessions per week). The training sessions were divided into 2 parts with 20 sessions each. In the first 20 sessions the group will be trained to increase the activity of beta bands and in the second part of 20 sessions the group will be trained to decrease the activity of theta waves. After the training sessions, the differences between pre-test and post test scores on the effects of Neurofeedback on the brainwaves (decrease and increase in theta bands) will be analysed. In a study conducted by Wangler et al. (2011) on 94 children with ADHD disorder, results showed that the children obtained the desired result as remuneration from continues treatment.

Neurofeedback training for children with attention deficit disorder (ADHD), the "right" kind of brain activity is the type they produce when they are still, focused, and looking at or listening to something with a purpose. It is the kind of concentration that happen when the child is reading a book, listening to a parent or teacher, or participating in athletic, musical, or other organized activities (Monastra, 2019). Brain activity assessed by electroencephalography (EEG) has been demonstrated to respond to conditioning techniques. The concept of modulating this activity has been called EEG biofeedback, more recently Neurofeedback. When a child is in that "active brain, still body" frame of mind, the brain regions responsible for attention and concentration produce an electrical signal or "brain wave" that is pulsing at about 13-21 cycles per second (Hz). These are called beta waves (Leslie, 2011).

According to Monastra (2019), Neurofeedback training is more like a good fitness workout, while it is true that the developers of gaming systems have created some impressive video screens, the difference between video games and 24 Neurofeedback training is that the children's fingers do not move the characters to do Neurofeedback. The brain does, when it produces the "right" kind of brain activity and when it is not producing the desired activity, the images that the children is trying to control will stop moving.

Neurofeedback involves an interaction between a child, a therapist, or "trainer," and EEG equipment that monitors the amplitude ("height") of theta and beta waves, as well as muscle activity (facial movements, body movements). After the neurotherapies evaluates the amplitude of theta and beta waves being produced during an eyes-open "resting" or "baseline" period, he or she sets the initial training goals (called thresholds). Neurofeedback training videogames are also becoming popular to stimulate meditation and relaxation states via sensing oscillatory rhythms, specifically theta and beta recorded from the frontal lobe. In order for the children to be encouraged (reinforced) during training, they need to keep the amplitude (height) of their theta waves below the "threshold" while keeping beta waves above the threshold (Bland´on, 2016).

In this study, during the neurofeedback training, the ADHD children have to boost up their attention level so that they are able to complete the level and gets the rewards. In the other hand, to reduce the undesired behaviour of ADHD

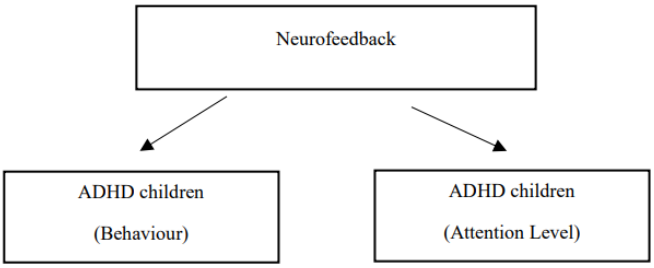
children, they need to reduce their movement into minimum level so that they are able to pay attention and complete the level.

Conceptual Framework

In this study, during the Neurofeedback training sessions, the researcher will train and guide the ADHD children using different types of game. With the help of Neurofeedback training, it decreases of the negative behaviour problems and increase the attention level of the ADHD child. The ADHD children need to minimum their movement in order to having a high attention to complete the level and get rewards. Besides, the researcher also uses a tool call "reward chart". When the children complete the given task, the children are able to claim a star on their reward chart. After the chart had filled with 10 stars, the children might be able to choose a small present as a reward. If happen that the children unable to complete the task given, the children might will not get any star. Above and beyond, Neurofeedback training applications may improve a child's attention, behaviour, emotion control, decrease the anxiety and so on.

Figure 1

Conceptual Framework



METHODS

This study is case study that uses a qualitative research method, which include pre-test and post-test. This qualitative research method also use the quasi-experimental study designs. Quasi-experimental study designs often described as nonrandomized and involves pre-post intervention studies, are common in the medical informatics literature. Qualitative research helps to understand the values, feelings, and perceptions that motivate and influence behaviour. The researchers used the qualitative data collected from the children's parents to validate the results. The data was collected in pre-test and post-test. The intervention was carried out for the duration of 4 months.

The respondents involve in this study were five children who have been identified with possibility of having ADHD. In this study, the researchers used observation checklist throughout the intervention period. Besides that, the observation checklist was also passed to the parents to fill in during the intervention period. This is to help the researchers to understand more details about the progress of the children. The researchers worked closely with the children's parents to observed and filled up the data to assist them in this study. The data was collected on monthly basis and at every Neurofeedback training session. The observation checklist was filled by the parent when the children attend to the 1st, 8th, 16th, 24th and 32nd session of Neurofeedback training.

Population and sampling

The researchers used purposive sampling technique to select the sample for this study. After gathering forms from the parents of 100 children who were suspected to have ADHD. From the forms, the researchers calculate the score and choose only 5 children out of 100 children as the samples for this study. The selection was done by considering to the criteria that have set by the researchers. For the children to be selected as sample in this study, the children must have the score above the average level which indicated that the children having possibility of having ADHD. The above average level score also indicated that the children are also having the problem of attention on their daily task as well.

Table 1 shows the interpretation of the ADHD test result. The symptoms' average scores have different level. If the score at the range of 1 – 3, it means that the children is having possibility of having ADHD is very low. However, if the children identified to have symptoms' average scores at the range of 17 – 19, it means that there was a very high possibility the child is having ADHD.

Table 1

Interpretation of the ADHD Test Result

Interpretation			
Symptoms' Average Scores	**ADHD Quotient**	**Severity**	**Possibility of Having ADHD**
17 – 19	≥181	High	Very High
15 – 16	121 – 180	↓	High
13 – 14	111 – 120	↓	Above Average
8 – 12	90 – 110	↓	Average
6 – 7	80 – 89	↓	Below Average
4 – 5	70 – 79	↓	Low
1 – 3	≤69	Low	Very Low

Instruments

In this research, two instruments were used for data collections. The first instrument was a checklist of attention deficit hyperactivity disorder test (ADHD-T). ADHD-T was used to identify the behaviour of the ADHD children. The researchers used this instrument because ADHD-T is a behaviour checklist that has been proven successful to identify children with ADHD. Besides, ADHD-T has 36 items comprising three subscales which are hyperactivity, impulsivity and inattentiveness. This checklist was filled-up for five times which were during the pre-test on the first time before the Neurofeedback training sessions and during the post-test which was the last time after the Neurofeedback training session. Another three times to fill the form were during the Neurofeedback training session which was on the 8th, 16th, and 24th session of the Neurofeedback training session. In addition to this, semi-structured interview sessions were also conducted with the parents regarding the observation of behaviour during the first and last session of the intervention.

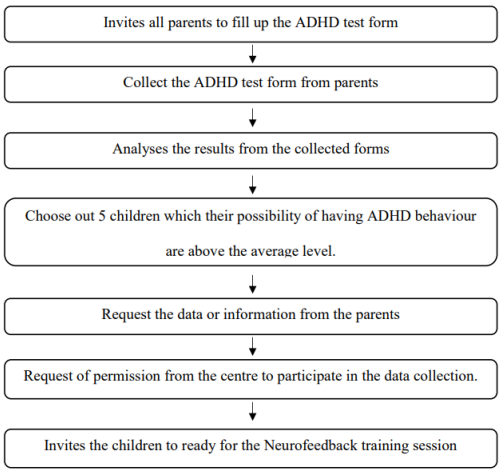
The second instrument used was the data analysis with using the NeuroSky online software. NeuroSky online software is a program that analyse the data online. NeuroSky online software also involved pre-test before the Neurofeedback training sessions start and post-test after four months of the Neurofeedback training sessions. The researchers also used the game application from NeuroSky in the Neurofeedback training as its intervention. The games that were chosen by the researchers were Burn the Barrel, Jack Adventures, The Mindty Ant and Zombie Pop.

Procedure of collecting data

The researchers prepared and distributed the ADHD-T checklist for parents. The researchers followed up with the parents for a period of 4 months until the children had completed the Neurofeedback training sessions. The researchers worked together with the parents to collect for the data. Besides that, the researchers also collected the observation data from the parents on the 1st, 8th, 16th, 24th and 32nd of the Neurofeedback training sessions**.** Figure 2 below described the procedure of data collection form this study.

Figure 2

Procedure of data collection



Neurofeedback training sessions

In the neurofeedback training sessions, while playing the games, the samples need to put on the Neurofeedback training device on their head like a hairband and there is a sensor on his forehead that may detect his brainwave at their prefrontal cortex. Besides, there is another point with a small clip that will put on the samples' earlobe. In this training sessions researchers introduced four computer application games which were Burn the Barrel, Jack Adventures, The Mindty Ant, and Zombie Pop.

Burn the Barrel Game

In this game, there is a meter under the barrel (Figure 3). When the meter reach to a higher place and maintain, the barrel would be burn (Figure 4). Thus, the child needs to pay attention and focus on the barrel to burst it. When the barrel is on fire, the child still needs to focus and maintain his level of attention so that it may burst the barrel (Figure 5).

Figure 3

Burn the barrel – there is an attention meter under the barrel.

Figure 4

Burn the barrel – the barrel is on fire when the meter reaches higher place and maintains.

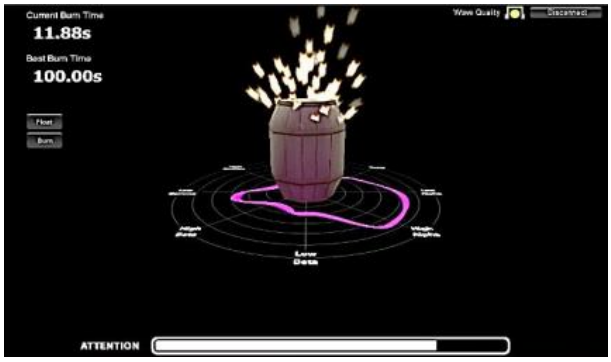
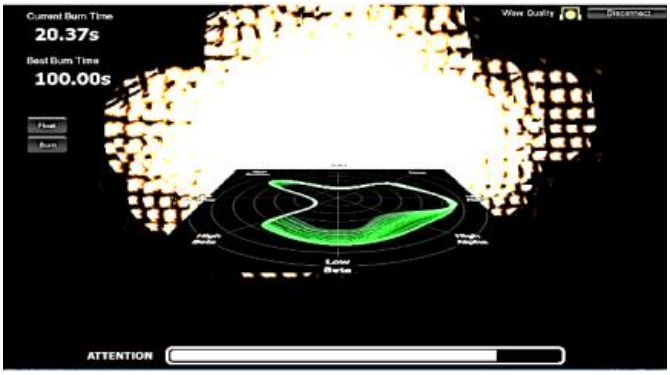


Figure 5

Burn the barrel – the barrel will be burst when the meter reaches higher place and maintains.



Jack Adventures Game

This game has a meter with a small triangle on it to show the target level. Each level will have different target level. The target level will go higher and higher. This will help the child to improve their attention level from different levels of the game. There are 3 planets in this game. In every planet there are three different levels. When the attention level reaches to the target, the spaceship will shoot out seeds, water, and sunlight to grow trees (Figure 6, 7, & 8). Each level requires different element such as first level require one seed, three drops of water and three sunlight. Where else, the higher level requires three seeds, five drops of water and six sunlight.

Figure 6

Jack adventures – the spaceship shoots out seed when the attention level reach to the target

Figure 7

Jack adventures –the spaceship shoots out water on the plant when the attention level reach to the target

Figure 8

Jack adventures – the spaceship shoots out sunlight on the tree when the attention level reach to the target

The Mindty Ant Game

The Mindty Ant is a game to train ADHD child to stop and think. There is also an attention meter on top of the game (Figure 9) and the child needs to wear the Neurofeedback training device on his head during the game. It is same as Jack Adventures game that there is also different target on each level and have a triangle target on the meter as well. When the attention level reaches to the target, the ant will push its food towards to the "GOAL". In order to complete the level, the ant needs to push the food into the goal. On the way pushing the food, there are different obstacles such as falling coconuts, crabs on beach, moving bridge, hot water and so on. When facing the obstacle, the child needs to press space bar key to stop the ant and wait until the obstacle go off, the child might continue the journey until "GOAL". There are five different worlds in this game. In each world, there are three different levels as well. The child needs to complete on each level then only the next level can unlock. In addition, in the game when the child able to complete the level, for each different world there will be a superpower reward to help in the game such as Mindty Ant Sense, Super Push, Magic Shield and Ultimate Challenge. At the last of this game, the child will get rewarded an ant with a crown on it.

Figure 9

The Mindty Ant – to pass the level, the ant needs to push down the food into the goal

Zombie Pop Game

Zombie Pop is also a game to train ADHD child to sit on chair. During this game, the child needs to put the Neurofeedback device as usual and stay focus to control the zombie to stop on the blowing machine. According to the attention level, the higher the attention, the faster the machine blow and burst the zombie's head. Some zombies will have a pill in its head and some not. The zombies will walk away if the child did not pay his attention or having vast movement. To complete the game, the child needs to collect pills according to the level. For example, Level 1 and 2 will need to collect only five pills, whereas Level 3,4 and 5 may needs six pills, for Level 7 and 8, it needs seven pills, and for Level 8 onwards it needs eight pills to complete the game. The higher level of the game, the higher attention needed. If all the zombies had finished drop and there are not enough pills that require at the level, so the child will need to retry the same level again.

Figure 10

Zombie Pop – the zombie stops at the blowing machine

FINDINGS

Samples' profile

Two children were selected as samples for this study. Their profiles are presented in Table 2 below.

Table 2

Samples' Profiles

	Sample 1	Sample 2
Age	8	7
Gender	Male	Male
Diagnosis	Inattention	Impulsive

As shown in the Table 2, according to the parents, both samples were identified as having the problem in their schoolwork and completing task. As reported by their parents, they always create problem at the after-school care centre such as cannot sit still during class, disturb others in the class and poor in completing their given task. Their parents also reported that their children did not attend to any special class or any having any other additional training or treatment during the Neurofeedback training.

The attention level of ADHD children before and after the intervention

The researcher uses Neurofeedback device to measure the attention level of ADHD children on their first session which is before the intervention start. The data was analysed using an online software from NeuroSky.

Sample 1

The attention level of Sample 1 before the intervention is at the score of 36%. Which is at the range of below average. On the first time, he cannot pass and complete the attention level game. He fails to burn and burst the barrel and during the game of Jack Adventure. However, he is able to pass on the first level with difficult. He is unable to complete and continue the second level due to his attention level is not reaching to the specific target in the game.

The attention levels of Sample 1 after the intervention is at the score of 77%. Which is at the range of high attention. After the intervention, Sample 1 is able to complete the attention level game with ease. In Jack adventure game, Sample 1 is able to complete all the level however sometimes he is unable to complete it in one short. He needs a little longer time to complete the game. For the game of burn the barrel, he is able to complete it fast and easily.

According to his parent observations, at home, her child always has trouble of packing his toys, books and school bag even his parent had taught him how to organise it. During the interview session, his parent comment that: "*No, my son always left his things around after played or used*" Besides, his parent notice that he always forgot to bring back his books or belongings from school or after school care. In addition, he is unable to stay still at his place and wiggle their body with uneasiness during his eating. Sometimes, he also talks a lot and disturb or interrupts other peoples' activities, conversations and games. His parent also received complaint from after school care centre that his child is unable to complete the homework or task given. He often absent minded during his task and having very limited concentration. In this session, the parent says: "*He likes to move from place to place and no focus. Always disturb other. Teacher from after school care always complaint. Almost every day*". The researcher also observe that he seemed unable to think before his act. He is difficult to follow instructions and rules as he tries to climb on the door grill, touching everything he saw and having problems of remaining seated even when needed to complete a task.

According to his parent observations, after the intervention, in the interview session, his parent says that: "*Yes, he improves a lot. Especially in the section of packing his stuff. Sometimes, he reminds me to take message book from his teacher. Nowadays, I very seldom to remind him*". She notices that his behaviour shows great improvement. She also observes that her child is able to pack his own belongings independently with one-time reminder. It is different from last four month that needs repeated reminders. Sometimes, he is able to remind his parent to take his books from teacher at after school care centre. If compared to last four months, he needs parent or teacher to chase after him to remind him to pack his belongings. Parents also seldom receive complaint from the after-school care centre. In addition, he is able to complete his homework given in time. During the last intervention session, the researchers observed that he is able to sit still on his own place and complete the task given. He is able to wait for his turn while other people are talking or busy. Furthermore, he is able to follow simple instructions given such as sit on your chair, pack your belongings, queue up for your turns and others.

Sample 2

The attention level of Sample 2 before the intervention is at the score of 45%. Which is at the range of average and he has a little higher score than Sample 1. On the first intervention, Sample 2 is able to pass and complete the first 3 level of the attention level game. He is also able to burn and burst for two barrels. However, he is unable to continue to burn and burst the third barrel.

The attention levels of Sample 2 after the intervention is at the score of 98%. Which is at the range of very high attention. After the intervention, he is able to complete all the attention level game with ease. In Jack adventure game, he is able to complete all the level in one short without repeating or retry. In the game of burn the barrel, he is able to complete it with ease. During the last session, he is able to replay all the attention level game again from the beginning without retrying.

According to his parent observations, at home, Sample 2 always talks a lot and in a disturbing manner. He will disturb other people's activities and games. Besides, he also cannot play quietly, he shouts and yell whenever he wants. Tang also facing the problem of unable to stay still and restlessness until late night. During the interview, his parent says: "*Everyday he can't control himself. He always gets complaint from the centre and school that he always disturbs other people*." Besides, the parent also says: "*He likes to scream during play. He will scream no matter where he goes*." His parent claim that she always received complaint from school that her child always absent-minded during lesson, unable to take instructions from teachers, interrupt others during game and blurt out answers to questions before the questions are fully asked. From the observations of the researchers, the researchers observed that Sample 2 always running around at the after-school care centre. He seems to unable to wait for his turns and impatient to wait in line such as queuing to canteen for lunch and waiting for his turns to take shower.

According to his parent observations, after the intervention, Sample 2 also shows a good improvement on his behaviours. In the past four months, Tang is unable to control himself from disturbing others. After the intervention, he is able to play together with others without disturbing others. During his play, he is able to play in a soft tone rather than shouting and yelling. In the interview, his parent says proudly: "*Yea, he can sit in one place to finish his food and homework. Especially in the section of packing his stuff. Sometimes, he reminds me to take message book from his teacher. Nowadays, I very seldom to remind him*." In addition to this, the feedback from his school are also positive. The feedback are such as he is able to sit at his own place during the lesson without running out from the class. Besides, he is able to pay attention during the class and seldom blurt out answers to questions before the questions are fully asked. However, at times, he still needs reminder to guide him on following rules. The researchers also observed that Sample 2 showed great improvement on his patient. He is able to wait for his turns and sometimes, he will sit quietly while waiting for his turns to play game or taking shower.

CONCLUSION

As conclusion, from the findings from this study shows that, the intervention of Neurofeedback training sessions really helped children with ADHD to decrease their behaviour of ADHD and improve their attention level. This study also have been found to support other studies that Neurofeedback training is effective on improving the behaviour and attention level among the children with ADHD. This study would be a guideline for the teachers, educators or parents to implement Neurofeedback training sessions in their school, home and private sector. Besides, this may help children from others category as well, because this Neurofeedback training is fun, and children shows eagerly and willing to train and improve themselves. Neurofeedback training allowed children to have fun and they feel just playing games and did not feel the stress during training.

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