Benchmark Journals

INTERNATIONAL JOURNAL OF EDUCATIONAL BENCHMARK (IJEB),
eISSN: 2489-0170 pISSN:2489-4162 University of Uyo

Mindfulness and Cognitive Training in Enhancing Attention Regulatory among Junior Secondary School Students Performance in Mathematics in Ibadan Land, Nigeria

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Abstract
The present study examined the effects of mindfulness and cognitive training on concentration regulatory among junior secondary school 11 students. In a non-randomized trial with pre- and post-assessments, n = 104of JSS2 students were allocated to mindfulness and cognitive training (experimental groups) and no training (passive control group). Mindfulness and cognitive were taught by the researcher for the period of eight weeks. Concentration regulatory was operationalizing via behavioural indicators, namely sustained attention, cognitive flexibility, cognitive inhibition, and data-driven information processing. Three major instruments were used for this study, they are Concentration Regulatory scale with 25items and reliability coefficient of 0.75, mathematics achievement test and the third instrument is Socio-economic Status Scale developed by the researcher has reliability coefficient of 0.83. The results indicated that there is significant treatment effect in enhancing concentration regulatory among the participants and that mindfulness training is more effective than cognitive training regarding the concentration regulatory. There were significant effects of gender and socio-economic status of the participants on concentration regulatory. The researcher concludes that mindfulness and cognitive training are effective in enhancing concentration regulatory among the participants and that gender and socio-economic status of the participants' moderated concentration regulatory of the participants. Therefore, recommendations were made that mindfulness and cognitive training should be used to assist any student that is suffering from lack of concentration in his/her studies to avoid resources wastages and to enhance academic performance.

Keywords: Mindfulness Training, Cognitive Training, Concentration Regulatory, Academic Abilities, Students**.**

Introduction

Concentration has been defined as "the ability to direct one's thinking in whatever direction one would intend". Every person has the ability to concentrate some of the time. But at other times one's thoughts can be scattered, and ones minds race from one thing to another. To deal with such times, one need to learn and practice concentration skills and strategies. To concentrate, one has to learn a skill, and as with any skill this means practice repeated day after day until one achieve enough improvement to feel that one can concentrate when one needs to. The ability to concentrate depends on commitment, enthusiasm for the task, skill at doing the task, the emotional and physical state, psychological state and someone's environment.

The need to make a personal commitment to put in the effort needed to do the task in the way which one realistically plans to do it. If individual just play at it in a half-hearted manner then it is much more difficult to take the task and ourselves seriously. If we are

interested in the task and enjoy doing it, then we find it easy to motivate ourselves to start. Once started, our feelings of involvement in the activity keep us going through out what one wants to do it. Knowing how to do something gives confidence that our efforts will be successful, so one does not have to deal with anxiety about will this work or not. Anxiety tends to impair concentration. When individuals are in good physical condition, that is feeling rested, relaxed and comfortable - and our emotions are calm and benevolent, then we tend to be positive about things. This in turn raises self-esteem, which makes us more able to concentrate, if only because we do not have to worry about how awful we are or life is. Our psychological state for example, if one is in an obsessed or distracted state; our thoughts are pre-occupied, leaving little mental space to think about anything else. It is much more difficult to concentrate if our surroundings keep intruding on our awareness, perhaps because it is noisy, too hot or too cold, the furniture is uncomfortable or the people around us are stressing out or the teacher dresses somehow.

People sometimes refer to a concentration span as the time individual can concentrate on a specific task before our thoughts wander. According to Morgan and Morgan (2005) in learning concentration skills, we aim to extend our concentration span - bearing in mind that we will have a different span for different tasks. They said it cannot be expanded to infinity! Most people find their level for most tasks is about an hour; but for some people and some tasks, it will just be a few minutes, while for others it might be two or three hours. The main barriers to concentrating are boredom, anxiety and day-dreaming (Brown and Ryan, 2004). Thus in improving our concentration skills, we need to counteract these barriers. The following three skills are basic to concentration, that is, if one wants to improve concentration, it should start by practicing them. They will be followed by further strategies which will allow you to build onto the basic skills. This sounds very simple, but it works. When you notice your thoughts wandering, say to yourself stop and then gently bring your attention back to where you want it to be. Each time it wanders bring it back. To begin with, this could be several times a minute. But each time, say stop and then re-focus. Don't waste energy trying to keep thoughts out of your mind, just put the effort into stop and re-focus. To begin with you will do this hundreds of times a week. But you will find that the period of time between your straying thoughts gets a little longer each day, so be patient and keep at it. This is about maintaining concentration and not giving in to distractions. It could be described as a sort of tunnel-vision, or as being focused: you keep your concentration on what is in front of you. Fulton (2005) opined that, if one is distracted, the use of stop technique can be use to regain concentration. You can practice attending in many situations: for example, in a lecture, if people move or cough, ignore them, don't look at them, one can exclude them from the link or tunnel formed between someone and the lecturer. For example, in a social situation, keep your attention solely on one person, on what they say, how they look etc. - and ignore what is going on roundabout.

According to Stein, Skaog and Norteon (2000) and Fehintola (2011) everyone has their own distinct learning style. Some learn by reading and then asking themselves questions, others learn by making condensed notes and memorizing them, others learn by the associations they make to the material, and yet others retain a pictorial image of the material. Once you know your learning style, organize the material to suit it; if you do not, learning will be more of a struggle than it needs to be, and your concentration will suffer. Having your own learning style involves having your own internal 'language'; briefly, this means the words you use to translate and understand the material so that it has meaning for you. If you

do not know how you learn best, try to analyze your experience either with someone who knows how you work, or with someone with expertise in this area (Kendler and Gardner, 2014).

Once you know what your concentration span is for a specific activity, decide whether it is acceptable or whether you need to train yourself to expand it, for example a listening concentration span of 10 minutes and a lecture of 50 minutes is a mismatch. Practice with something that does not matter in terms of the task, you could expand your lecture concentration span by practicing listening to the news on the radio. In between periods of concentration, do things to change your physical and mental activity. You could move around to boost your circulation if you have been sitting, or you could think about something completely different - and fun - to give your brain a new focus (Kabat-Zinn, 2003). One can give self-incentives and rewards appropriate to the level of concentration one has had to maintain. If you dream of sitting out in the sun when you are in a library trying to study, make your reward a period of sun-worship. Use a hierarchy of questions to help you focus when reading reference material or listening to a lecture, rather than passively reading through it or listening and hoping that something will stick - and then write brief notes about the answers to your questions. Ask yourself how you will use the material, where it fits into what you already know, what new questions it triggers. Ensure that your environment aids concentration - reduce distractions but do not be so comfortable that you nod off. Do tasks that need most concentration at times when you are mentally and physically fresh, concentration is harder to maintain when you are tired. This means you need to know the times of day when you work best; people vary as to when is their best time. Experiment and see whether working with another person helps you keep focused on the task. It can often refresh interest in the subject by sparking off new trains of thought which then re-involve you in the task. Check if you feel stuck whether the problem is one of poor concentration rather than lack of the necessary knowledge or understanding, and if it is the latter, do something about it. Don't look for an easy answer in stimulants such as caffeine (Kendler and Gardner, 2014). They only have a short-term effect of making you feel alert, and too much or too long an exposure can have serious effects on your physical and mental health. When you have been concentrating well but your brain now feels saturated. Take a short break and then recharge your mental batteries by reviewing what you have done so far, considering whether it might help to switch to a new topic now (Fulton, 2005 and Lazar, 2005). If you feel too tired to restart after a short break, review what you have done and where it fits into the overall task, and define where you need to pick it up again. If necessary make a note of this. Then decide, before you stop, when you will restart the task. How to concentrate on a topic which you hate or which bores you. Actively search in the material for aspects of the subject that can be turned into useful information, you could do this by focusing on finding five central, important ideas to think about. Use mind-maps to record the search, and write test questions to summarize your learning after each study session. Focus on the personal rewards of completing the topic satisfactorily and build in treats to reward yourself as you progress through the task.

Loss of concentration can lead to negative thoughts about yourself. Deal with them as with other distractions, and banish them into your worry time, when you can check out their reality. If you are not quite sure what you are supposed to be doing or why you are doing it, it will be difficult to maintain concentration (Ma &Teasdale, 2004). You could try to define the task in terms of its content and purpose, and then to make a realistic estimate of how much

time and effort will be required to do it. Sometimes what we have to do is just too much for us to get our heads around. When we think about it, it is too huge a task to contemplate and our feelings of inadequacy take over (Linehan, Tutek, Heard, &Armstrong, 2004). Both contribute to losing concentration because it all feels impossible. In such circumstances, look for ways of breaking the task up into smaller discreet parts that feel manageable. Treat them as individual tasks, summoning up your concentration for each of them separately. It then does not need so much effort to fix them all together later on to make a complete whole.

In view of these observations and submissions, intervention programmes are required to help concentration diistortive individual to become well-adjusted in the learning forum. Intellectual activity takes place mainly in the brain and is thus not shared without making a special effort. If we don't discuss what we are doing with others, it is very easy to wonder whether what we are doing is alright. This can lead us to feel ineffective and fragile, which in turn can become self-doubt. However, this concentration regulatory among students in elementary and tertiary institutions of learning in Nigeria can be enhanced and different psychological intervention can be employed. In this study, cognitive and mindfulness training were used.

Recently, researchers and clinicians have applied the techniques of mindfulness to the treatment of such physical and mental health issues as chronic pain (Ma &Teasdale, 2004), borderline personality disorder (Linehan, Tutek, Heard, &Armstrong, 2004), and generalized concentration distortive (Semple, Reid, & Miller, 2005) with significant results. In addition to client training in mindfulness, a number of scholars have suggested that learners mindfulness may be an essential ingredient of clinical practice that cuts across all theoretical orientations and that mindfulness training and practice may be an untapped resource for developing attention regulatory skills as well as the person of the learner (Germer, 2005; Fulton, 2005; Morgan & Morgan; 2005; Walsh & Shapiro, 2006).

Further, mindfulness practices provide opportunities to gain insight into the nature of thoughts and feelings as passing events in the mind rather than inherent aspects of the self or valid reflections on reality (Segal, Williams & Teasdale, 2002). Mindfulness is considered a capacity available to everyone, although individuals differ in their propensity or willingness to be mindful (Brown & Ryan, 2003; Kabat-Zinn, 2003). Both conceptual and empirical literature suggests that mindfulness practice helps to increase attentive presence, acceptance, empathy, and self-awareness, as well as reduce concentration distortive (Brown & Ryan, 2004, Fulton, 2005, Lazar, 2005).

Although current mindfulness research suggests some links between mindfulness and academic performance (Shapiro, Astin, Bishop, & Cordova, 2005), there is little research specifically on students mindfulness. In a state of mindfulness, the emphasis is simply on noticing either internal or external experience without making judgements, reacting in habitual ways to the stimulus, or elaborating on the meaning of the event (Kabat-Zinn, 2003). As these are all skills that are considered fundamental for effective concentration, the use of mindfulness training in counselor education holds promise as an important tool for facilitating the development of attention regulatory.

Some other psychological training that can be applied to enhance attention regulatory behaviour is cognitive training. Cognitive training (CT) is a form of psychological treatment

that explores the interaction between the thoughts, feelings and behaviour of an individual. This form of psychotherapy helps individuals take a critical look at their existential situations with a view to helping such individuals to understand their thoughts, emotion and behaviours. CT was developed by Aaron Becks in the 1960s as structured, short-term, present-oriented psychotherapy for treating attention distortive. It is directed towards solving current problems and modifying dysfunctional thinking and behaviour (Freitas & Higgins; 2002). CT aims to change the thought patterns and conscious and unconscious beliefs, attitudes and behaviours of people in order to help them face challenges and more importantly strive towards achieving their goals. One of the key assumptions of CT is that people do not think of a situation exactly the way it is, instead, individuals' feelings or perception of an existential situation influence the way they think about the situation. Thus, it is not the situation that an individual finds him/herself that cause emotional distress; but the individual's interpretation of that situation (Freitas & Higgins, 2002). He therefore proposed that through CT, patients can learn to identify, question and change the thoughts, attitudes, beliefs and assumptions related to their distressing emotions and behavioural reactions to issues. Thus, by monitoring their thoughts during situations that lead to emotional disturbance, they can learn that the way they think can contribute to emotional problems such as depression and anxiety (Cuijpers, Berking, Anderson, Quigley, Kleiboer & Dobson,2013).

Further, Freitas and Higgins (2002) pointed out that the perception and interpretation of events by people suffering from depression are usually distorted. Hence, depressed individuals mostly engage in dysfunctional and distortive thinking such as self-blaming, filtering, jumping to conclusions, thinking in the black and white only, and catastrophizing, According to him, these errors in thinking were automate thoughts that occur naturally which individuals accept as the truth instead of seeing them as distortions of the true situation. CT therefore, focuses on modifying the negative automatic thoughts by challenging the credibility of the thoughts with reality. He therefore pointed out that once an individual is able to confront the automatic negative thoughts with positive thinking, their emotional distress could reduce and they would be able to function normally. In essence, CT ultimately teaches clients to be their own therapists by helping them to understand their current ways of thinking and behaviour as well as equipping them with the right tools to change their dysfunctional thinking and behavioural patterns.

Previous studies have reported the effectiveness of CT in the treatment of a wide range of mental disorders such as depression, anxiety, attention deficit (Villabe, Narayanan, Compton, Kendail and Neumer, 2018), bipolar disorder (Chiang, Tasai, Liu, Lin, Chiu, & Chou, 2017), substance use disorders (Jalali, Hashemi and Hasani, 2018) and attention regulatory symptoms associated with failure. From information available in the literature gender is a moderating variable in this study. Previous studies have reported that attention distortive is twice as common in women compared with men (Steifens, Skaog and Norteon, 2000) further, the triggers for attention regulatory disorders seem to differ between women and men with women usually presenting with internalizing symptoms and men presenting with externalizing symptoms (Bartels, Cacloppo, van Beiksterveldt & Boomsma, 2013) for instance, a study of dizygotic twins have found out that while women displayed more sensitivity to interpersonal factors, men and more sensitive to external career and goal-factors

(Kendler and Gardner, 2014). Consequently, due to female hormonal fluctuations, women are more likely to develop attention regulatory disorders.

Another secondary independent variable used in this study is socio-economic status. Socio-economic status (SES) refers to an individual's social standing and class in the society in terms of income, occupation and education. According to a previous study, socio-economic status is one of the strong factors that determine the level of commitment of individual to what it is doing (Joy, Druyt, Brandson, Lima, rustad, McPhil and Hogg. 2008). The aforementioned study reported that individuals of low socio-economic status are more likely to delay treatment initiation as well as commitment to instruction given in the class compared to those of high socio-economic status, thereby reducing their chances of successes. According to Fehintola (2020), anybody in the low socio-economic class battle with serious financial challenges and that makes it almost impossible for them to concentrate and listen attentively to any given instruction. Thus, such individual continually perform poorly academically. Concentration and memory are considered important in academic endearvour. Without classroom concentration, students may not be able to perform well because he/she may not be able to recall what he/she has learnt due to less concentration on the subject matter. Even a student has a good concentration, but concentration distortive while in the classroom it may not be useful. The present study was carried out to enhance attention regulatory of junior secondary school II students. And gender and socio-economic status were used as moderating variable.

Purpose of the Study

The general purpose of this study is to investigate the effectiveness of mindfulness and cognitive training in enhancing attention regulatory among junior secondary school students in mathematics in Ibadan, Oyo State, Nigeria. The specific purposes of the study are: to

1. Examine the main effect of treatment on attention regulation among junior secondary school students performance in mathematics.
2. Determine the main effect of moderating variables (gender and socio-economic status) on attention regulation among junior secondary school students performance in mathematics.

Null Hypotheses

The following null hypotheses were tested at $\alpha = 0.05$ level of significance.

1 There is no significant main effect of treatment on attention regulatory among junior secondary school students performance in mathematics.
2 There is no significant main effect of gender on attention regulatory among junior secondary school students performance in mathematics.
3. There is no significant main effect of socio-economic status on attention regulatory among junior secondary school students performance in mathematics.

Methodology

A 3 x 2 x 3 pretest-posttest and control group experimental design was used for this study. There were two treatment groups (mindfulness and cognitive training) and one control group. The two experimental groups and the control group make the three rows i.e. A_1, A_2, and A_3 while the columns contain the moderating variables which are gender varying at two levels (Male B_1 and Female B_2) and socio-economic status subsumed under gender and

varying at three levels (high C_1, moderate C_2, and low C_3). The effect of such on dependent variable (attention regulation among junior secondary school students performance in mathematics) was also determined.

The population for this study consisted of Junior Secondary School Two Students (JSS II) in Ibadan, Oyo State, Nigeria. The students were selected from public Junior Secondary Schools. It was believed that students in private secondary schools would not be true representatives of students in the city because of difference in school ownership and the kind of orientation given to students in private schools. One Local Government selected in Ibadan less city and three schools selected for the study are Awotan Grammar School, Ijokodo Junior High School and Akufo Community High School. They have JSSII students' population of 104, 172 and 91 respectively; totaling 367 students.

Simple random sampling technique was used in this study and three schools were randomly selected from the thirty-three local government areas of Oyo state. From each of the selected school, participants were selected based on attention regulation inventory prepared by the researcher and cumulative academic performance records in mathematics on junior class mathematics curriculum. These constituted the first stage of the screening process adopted to determine underachievers in junior mathematics in JSSII students in Oyo State. Those students who scored less than the norm in the screening test and at the same time had poor cumulative academic performance records in mathematics were used for the study. Using this technique, 33, 35 and 36 students were randomly selected among students in this category. The total sample size consisted of 104 students for the study. The mean age of the students used is 13.45 years with $\sigma = 1.75$. These students are mixture of learners from rural, semi-urban and the urban areas of Oyo state. Oyo state is the largest state of Southwest geopolitical zone of Nigeria. Therefore, the results obtained from this study can be generalised to the whole south-west geopolitical zone and the rest five geopolitical zones we have in the country. This study is conceptualized here in Oyo state since the researcher lives and sees what is operating in terms of how attention deficit regulation can affect performance in mathematical education in the state and the Southwest geopolitical zone.

This study utilizes three instruments for data collection. These are: Attention Regulatory Scale: This scale was prepared by the researcher to examine the level of concentration of learners in the class and how it affects the rate of understanding mathematics lesson in the class. This instrument is made up of 25 items with reliability coefficient of 0.73 and typical examples of the items are: I always thinking of my condition and how I will make it in life, I always thinking concerning how my mother suffers over me and the way my father is treating her, etc. The instrument had 25items and was structured in the modified Likert scale that is Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). The scoring pattern of the instrument ranges from 1 to 4 points as follows: SA = 1, A = 2, D = 3 and SD = 4 respectively.

Mathematics Achievement Test (MAT-BECE Prepared by NECO, 2018) for measuring the dependent variable. Mathematics Achievement Test (MAT) was constructed by National Examination Council (NECCO) and it is made up of 60items covering the junior secondary school mathematics curriculum. The items have 4 options response format of A, B, C & D out of which only one option is the correct option. The administration of the test lasts for 90minutes. MAT is a standardized test since it was developed by National Examination Council(NECO) a public examination body, it is believed that the psychometric properties of

it had been established. The Basic Certificate Examination paper for 2018 was used for measuring the criterion variable.

Socio-economic Status Scale (SESS) SES scale was developed by Fehintola (2020). The SESS was used to measure the Socio-economic Status of the participants. The instrument consists of seven sections; the first section is made up of demographic variables of the participants, while other sections were made up of 45 items related to socio-economic status issues. The sub-scale of the instrument are categorised into six-factor which are educational history, Housing tenure, Occupation history, Income pattern, Travelling experiences, and Possession of property and Professional affiliates that one belong. The SES items rated on a 4-point likert scale (ranging from strongly Disagree to strongly agree). Example of items include ‘’educational history’’ ‘’Indicate the type of house live’’ ‘’kind of occupation’’ ‘’how many personal house help do you have’’. To establish the reliability of the scale, it was reported the overall reliability coefficient of all the factors of SESS by Cronbach alpha is 0.859.

Procedure for Data Collection

Experimental Group 1: Cognitive Training (CT)

Objective of the training: The goal of CT is to assist participants identify dysfunctional thoughts, challenge and then replace them with more healthy or positive thoughts.

Session1: General orientation and administration of instrument to obtain pre-test scores

Session2: Discussion of depressive disorder, its causes, symptoms, its effects on emotions and behaviours and CT and its effects on Students with attention deficit.

Session3: Discussion on various types of cognitive distortions

Session 4: Training of participants on how to identify and evaluate distortive thinking as well as negative automatic thoughts.

Session5: Training of participants on how to record negative thoughts using thought records or journalizing technique

Session6: Training of participants on how to change maladaptive thoughts through cognitive restructuring.

Session7: Discussion on pleasant activity scheduling with participants.

Session8: Training on mindfulness meditation

Session9: Revision of all activities in the previous session and administration of instrument for post-treatment measures and conclusion.

Experimental Group 2: Mindfulness Training (MT)

Objective of the training: the goal of MT is to assist participants identify dysfunctional thought, challenge and then replace them with more healthy or positive thought.

Session 1: General orientation and administration of instrument to obtain pre-test scores.

Session 2: Introduction to mindfulness techniques

Session 3: Mindfulness and meditation

Session 4: Mindfulness training and the counselling process

Session 5: Mindfulness practice and concentration building

Session 6: Overcoming concentration barrier and mindfulness

Session 7: Mindfulness and personal fulfillment

Session 8: Overall review post testing and conclusion

Control Group

The participants in this group will receive the pre-test and post-test assessments within an eight weeks interval. This group is not to be treated with any of the intervention strategies. However, the group could be engaged with talks on concentration and academic performance.

Data Analysis

Analysis of Covariance (ANCOVA) was adopted to analyse data that was generated from the responses of the participants at $\alpha = 0.05$ level of significance in order to determine the main effects of the independent and moderating variables on the dependent variable. Magnitude of the mean scores of the participants in each of the treatment groups and control were also subjected to Scheffee Post-hoc analysis.

Results

Null Hypothesis 1: There is no significant main effect of treatment on attention regulatory among junior secondary school students performance in mathematics.

Null Hypothesis 2: There is no significant main effect of gender on attention regulatory among junior secondary school students performance in mathematics

Null Hypothesis 3: There is no significant main effect of socio-economic status on attention regulatory among junior secondary school students performance in mathematics

Table 1: Analysis of Covariance (ANCOVA) of Pre-post Test Interactive Effects of Junior Mathematics Performance of Participants in the Treatment Groups, Gender, and Parental Support

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	61266.67	15	4084.45	46.41	.000	.967
Intercept	1985.06	1	1985.06	22.56	.005	.487
Post-score	5983.11	1	5983.11	6.80	.000	.741
Treatment group	13618.83	2	6809.41	77.38	.000	.867
Gender	396.46	1	396.46	4.51	.003	.280
SES	751.52	2	375.76	4.27	.017	.160
Treatment group * gender	203.07	2	101.54	1.15	.402	.166
Treatment group * SES	43.72	4	10.93	0.12	.568	.090
Gender * SES	7.80	2	3.90	0.04	.132	.149
trtgroup * Gender * SES	98.52	4	24.64	0.28	.433	.051
Error	2088.70	88				
Total	239247.00	104				
Corrected Total	63355.38	103				

a. R Squared = .657 (Adjusted R Squared = .570)

Table 1 reveal that there was significant main effect of treatment on participants' attention regulatory among junior secondary school students performance in mathematics ($F_{2,88}$ = 77.38; P < 0.05, $\tilde{\eta}$ = 0.867).This denotes that the treatment were effective in enhancing attention regulatory among junior secondary school students performance in mathematics. Hence hypothesis one was not rejected. To find the degree of significance among the treatment groups. Table2 is presented showing the Scheffee Post-Hoc test in enhancing attention regulatory among junior secondary school students performance in mathematics, gender and socio-economic status.

Table2: Scheffee Post-hoc Analysis Showing the Direction of the Difference among the Treatment Groups Grand Mean = 61.73

Treatment group	N	Subset for alpha = 0.05		
		1	2	3
Cognitive Training	33	67.9722		
Mindfulness Training	35		53.1429	
Control	36			20.3030
Sig.		1.000	1.000	1.000

Table 2 above reveals that the control group obtained the lowest adjusted post-test mean score in attention regulatory and student academic performance in mathematics ($\bar{x}$ = 20.3030). This is followed by mindfulness training ($\bar{x}$ = 53.1429) while the highest score was obtained by the cognitive training group ($\bar{x}$ = 67.9722). To this end, the cognitive training

was most effective in enhancing attention regulatory in students' performance in mathematics than the mindfulness Training and the control group respectively.

Null hypothesis 2: There is no significant main effect of gender on attention regulatory among junior secondary school students performance in mathematics.

Table 1 shows that gender has significant effect in enhancing attention regulatory among junior secondary school students performance in mathematics ($F_{1,88}$=4.51; P < 0.050, ñ = 0.280. This means that there is significant main effect of gender in enhancing attention regulatory among junior secondary school students performance in mathematics. Hence hypothesis two was statistically not confirmed. Further, Table 2 shows that male participants benefited more from the treatment (X = 64.64, SD = 0.60) than the female participants with (x= 62.63, SD= 0.69)

Null Hypothesis 3: There is no significant main effect of socio-economic status on attention regulatory among junior secondary school students performance in mathematics.

The results from Table 1 showed that there is significant main effect of socio-economic status in enhancing among junior secondary school students performance in mathematics ($F_{2,88}$= 4.27; P < 0.05, ñ = 0.160). This means that socio-economic status is effective in moderating attention regulatory among junior secondary school students performance in mathematics with high, moderate and those with low socio-economic status differ significantly. Hence hypothesis three was rejected. Further, the results showed that high socio-economic status benefited most from the treatment ($\bar{x}$ = 46.58), followed by the moderate socio-economic status participants with ($\bar{x}$= 36.61) and finally followed by the low socio-economic status with ($\bar{x}$ =24.80).

Discussion of Findings

This study investigated the effect of cognitive and mindfulness training on attention regulatory of junior secondary school students performance in mathematics. Data collected were analyzed using ANCOVA. The results are discussed below. The result obtained from hypothesis one revealed that there was significant difference among the treatment groups CT, MT and control. That is, both cognitive training and mindfulness training were effective in enhancing attention regulatory of junior secondary school students' performance in mathematics. The post test score on attention regulatory of junior secondary school students performance in mathematics of the participant in the experimental groups showed that there was treatment gain .That is, the treatment CT and MT were effective .Therefore, the null hypothesis were rejected . The participant is cognitive training display high attention regulatory than those in the Mindfulness training.

On the other hand, the low attention regulatory of junior secondary school students performance in mathematics observed in participants is in the control group could be aligned to the fact that they were not exposed to any psychological treatment. The outcome of this result denotes that if attention distortive persons are exposed to psychological intervention such as cognitive and mindfulness training, they could from attention regulatory useful for healthy academic performance. Therefore, if this is achieved junior secondary school students who are formerly attention distortive will become well-adjusted individuals in the society and can contribute their quota to the development of Nigeria as a nation.

This finding substantiates the study of Li and Wang 2013 Ge , Ge Xu Zhang, Zhao and Kong[[(2011);Du, Jiang and Vance (2007); Hall and Parsons (2001) and Fehintola,

(2019) .In all these studies ,cognitive training was effective in the enhancing attention regulation among students . Li and Wang 2013 found that those in CT demonstrated significantly high post treatment score than those in the control group. The clients reported that CT counselling was effective at ameliorating the common symptoms of attention regulatory of junior secondary school students' performance in mathematics, motivation to be quiet, time management, social isolation sexual dysfunction, and abstinence from problematic online applications. These are based on the fact that cognitive training for attention regulatory of junior secondary school students performance in mathematics development by Young (1998) integrate component of cognitive behavioural principals with harms reduction techniques into a unified and empirically testable model.

Mindfulness training was also effective in enhancing attention regulatory of junior secondary school students' performance in mathematics. This finding in the study was supported by earlier researcher project Germer (2005) and Walsh and Shapiro (2006).The effectiveness of mindfulness training in enhancing attention regulatory of junior secondary school students' performance in mathematics could be traced to the fact that mindfulness to change is elicited from the client and not imposed. Hence, the desired result is achieved when client is motivated towards change MT relies upon identifying and mobilizing the client intrinsic values and goal to stimulate behaviour change Rollnick, Mille, and Butler 2008. MT treatment sessions consist of four phases. The four phases includes building motivation for change, strengthening commitment to change, fellow through strategy for reviewing progress and redoing commitment. To achieve the desired change, mindfulness principals such as express empathy, develop discrepancy, avoid argumentation, roll with resistances and support self efficacy are often used.

Past research suggests that males and females differ in memory associated with gender stereotyped objects. Specific findings, however, have been inconclusive with regards to the specifics of these differences. Brown and Ryan (2003) found that females recalled more items overall and performed better at recalling gender neutral and female stereotyped items. Gabriel and Sridevi (2016) revealed that short term memory showed statistically significant increase in females compared to males. A profile of normal variations in patterns of memory test performance across gender revealing relative strengths for females on verbal tasks and males on spatial tasks (Li and Wang, 2013).

Research indicates that children from low- socio-economic status households and communities develop academic skills slower than children from higher socio-economic status groups (Fehintola, 2011). For instance, low socio-economic status in childhood is related to poor cognitive development, language, memory, socio emotional processing, and consequently poor income and health in adulthood. The school systems in low- socio-economic status communities are often under resourced, negatively affecting students' academic progress and outcomes (Aikens & Barbarin, 2008). Inadequate education and increased dropout rates affect children's academic achievement, perpetuating the low- socio-economic statusof the community. Improving school systems and early intervention programs may help to reduce some of these risk factors; therefore, increased research on the correlation between socio-economic status and education is essential.

Conclusion

The findings showed that mindfulness and cognitive training were effective in enhancing attention regulatory among Junior Secondary School students performance in mathematics in Ibadan Oyo State, Nigeria. This is evidenced from the findings; cognitive training was more effective than mindfulness training in enhancing attention regulatory among Junior Secondary School students performance in mathematics. As such, if the principles were adequately applied and the gains of the training sustained, the application of these treatment packages will help in improving attention regulatory among Junior Secondary School students performance in mathematics.

The study also found that attention regulatory among Junior Secondary School students performance in mathematics does not differ along gender line which obviously means that gender is one of the variables that determines attention regulatory among junior secondary school students performance in mathematics. Socio-economic status was established as essential variable that affect attention regulatory among Junior Secondary School students performance in mathematics as individual with high socio-economic status students tend to be more attention regulatory among Junior Secondary School students performance in mathematics than those with moderate and low socio-economic status respectively.

Based on the findings of this study, it was concluded that since the major aim of the school and academia is the attainment of sound academic standard which is not achievable without adequate attention regulatory among Junior Secondary School students performance in mathematics, the two interventions used in the study had therefore demonstrated the effectiveness and relevance in enhancing attention regulatory among Junior Secondary School students performance in mathematics in Ibadan Oyo State, Nigeria and the need for the full integration of psychological counselling service into the secondary school system.

Recommendations

Based on the findings in this study, the following recommendations were highlighted for considerations;

1. Since mindfulness and cognitive training were effective in enhancing attention regulatory among Junior Secondary School students performance in mathematics, it is therefore recommended that concerted effort should be provided by counselling psychologists, educational counsellors and other related professionals to adopt these two interventions when handling issues related with attention regulatory among Junior Secondary School students
   performance in mathematics.
2. Mindfulness and cognitive training should be part of curricular in all our national institution of learning to enhance academic performance of the learners.
3. Public and private schools should endeavour to provide enabling environment for the students. This will help in enhancing their attention regulatory among Junior Secondary School students performance in mathematics and invariably improve students' academic achievement generally.
4. It was recommended that the school should employ the service of at least a practicing counselling/educational psychologist who will be saddled with the responsibility of using the psychological principles and therapies in attending to several psychological challenges that students might be facing in the school system.

5. The home (parents/guardians) and school (school management) should work as a team to collaboratively look for ways by which attention regulatory among Junior Secondary School students performance in mathematics could be enhanced and improved.
6. Experts in the field of Counseling/Educational psychologists should intensify their effort to organize seminars/conferences on the implications of these moderating variables (that is gender and socio-economic among others) as they interact with students' attention regulatory among Junior Secondary School students performance in mathematics.
7. The curriculum planners and policy makers in education should integrate programmes designed to improve the quality of education, attention regulatory, emphasis should be placed on student-centered trainings such as mindfulness and cognitive training among others, and these will help in efficient management of various psychological challenges faced by students.
8. The policy makers and general public should be made aware of both the scourge (attention regulatory among Junior Secondary School students performance in mathematics) and the interventions (mindfulness and cognitive training) and work towards better effective usage of the treatment to improve attention regulatory among Junior Secondary School students performance in mathematics.

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