EFFECTS OF PSYCHOLOGICAL THERAPIES ON MATHEMATICS SELF-CONCEPT OF STUDENTS ASSOCIATED WITH BIG-FISH-LITTLE-POND IN ACADEMICALLY SELECTIVE AND NON SELECTIVE JUNIOR SECONDARY SCHOOLS IN OYO STATE

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Abstract

Students have been found to suffer from the big fish little pond effect (BFLPE) because "potentially outstanding students" can be demoralised if he/she is no longer a "big fish" within a new but highly competitive school. There is the tendency that the students in this category may be demoralised and frustrated. In order to reduce this demoralising effect , this study therefore was designed to give a therapy to those students who have been identified as big fish in little pond. Appropriate therapy like Cognitive Behavioural Group Therapy was used as intervention for the students. Fifty-five schools stratified into academically selective (28) and academically non-selective (27) were used. Intact classes were used and a total of 3008 (1474 and 1534 from academically and non-academically selective schools respectively) Junior Secondary School one (JSS I) students made up the samples. ANOVA was used to collect data which were analysed using Post Horc: Bonferonni Estimated Marginal Mean.

Keywords: Big-fish-little-pond-effect (BFLPE), Mathematics self-concept, Mathematics achievement, Therapy, academically selective schools, academically non-selective schools.

Introduction

Mathematics is a fundamental branch of science that represents the study of basic concepts of numbers, space and quantity as well as application of these concepts in the fields of physics and engineering. Mathematical research demonstrates the interaction between various disciplines of theoretical and applied mathematics. It also combines the concept of statistics, computational science, population genetics, operations research, cryptology, econometrics, theoretical physics, and actuarial science. Mathematics can also be applied in a broad spectrum of fields ranging from agriculture, space research, medicine, and meteorology to biology and zoology (James Franklin 2016).

Applied mathematics underpins almost every part of our lives. Without applied mathematics, there would be no computer programs. The present age is one of skill-development and innovations. The more mathematical people are in their approach, the more successful they will be. Mathematics offers rationality to their thoughts. It is a tool in their hands to make their life simpler and easier, and a talent which must be compulsorily honed by all in every walk of life. Mathematics is one of the most important academic subjects. It infiltrates every field and profession. That is why it is necessary to have a good understanding of the subject. While the basics of mathematics starts from school, its usage continues till the students become adults. Therefore, it can be said that mathematics becomes an integral part of their lives to the extent that life without it is like a ship without a sailor (Alex Gerg, CEO, 2016)

Students' performance in mathematics decline when they get to secondary schools. Their self-evaluation for mathematics competence also decline in this period (Abarbanel, 2008). According to Mattawa (2013), a number of factors have been adduced for the low performance of students in mathematics at all levels of education, particularly at the secondary school level. These include, low academic self-concept (More 1973), academically selective schools and academically non-selective school, low class average or low school average, family socio-economic status, motivation, gender relationship, anxiety (Aiken, 1970, 1976,), self-confidence, shortage of qualified mathematics teachers, (Ohuche 1978, Ale, 1989), poor facilities, equipment and instructional materials for effective teaching (Oshibodu, 1984) students' career aspiration, students' self-regulation learning, level of students' anxiety, and other literacy factors that may influence comprehension of mathematics test. However, there are no clear cut reasons on why students' performance, students' career aspiration and self-concepts in mathematics, on the average, decline when they transit from primary schools to secondary schools.

When students move to a more academically challenging school, whether it is by choice or because of external conditions beyond their control, there is a significant negative impact on their academic performance (Brunner, Keller, Hornung, Reichert, & Martin, 2009; Marsh, Koller, & Baiimert, 2001). This movement can have an impact on their mathematics achievement as well (Marsh, 1987). When a student moves into a new school, there is the possibility that this new environment was "imposed" upon them, resulting in a feeling of lack of control for the student (Bandura 1989). As a result of this, students may "select" to act in either a negative or positive way. If a student reacts negatively, there is evidence to suggest that this transition into a new school will negatively impact his achievement in school subjects like mathematics (Cole, 2001, as cited in Marsh & O'Mara, 2008).

Students' transition from one academic environment, to a more competitive school setting will cause stress on them as they adjust to the new, likely more homogenous setting (Marsh, 1987). As students enrol in schools with a selective admission process,

they may be leaving a previous learning environment where they are recognized as the top-performing students. Upon entering the more competitive and selective school setting of an independent school, they may suffer from BFLPE because "potentially outstanding students can be demoralised by no longer being a "big fish" within a new, highly selective setting, in comparison with others of equal ability" (Marsh, Koller and Baumert, 2001)

What makes a student who was judged to be of high ability in primary school to become an average or even below average student when he or she gets to an academically selective school? The BFLPE hypothesises that students compare their own academic achievement with that of their peers and uses this social comparison impression as one basis for forming their own academic self-concept.

The Big-Fish-Little-Pond Effect is the negative effect on the academic achievement of a student resulting from transitioning to a more academically rigorous setting (Marsh, 1987). When a student transitions from primary school to secondary school, how well his academic and social needs are met will determine whether it is a positive or negative experience (Cauley & Jovanovich, 2006).

The self-concept of students, particularly academic self-concept, is an important construct that educators and researchers should understand, due to the ways in which it influences students' achievement and future goals. In general terms, self-concept is defined as the way an individual thinks, feels, acts, values and evaluates him or herself in relation to performance in school subjects.

It can be hypothesised that students with a high and positive self-concept will likely perform satisfactorily in Mathematics. On this premise, it could be assumed that students, who think positively about their mathematical abilities, feel highly delighted to solve mathematical problems and act promptly in learning mathematics concepts are likely to perform creditably in Mathematics.

The BFLPE theoretical model posits that students in academically selective schools will have lower career aspirations, lower achievements in mathematics and lower academic self-concept (a construct referred to as one's knowledge and perceptions about one's academic ability), than equally able students in academically non-selective schools.

It is assumed that students' mathematics self-concept tends to be low when they move from low competitive primary schools to high competitive schools. Therefore, there is the need to mount an intervention programme that can be used to raise the self-concept of pupils in the early years of junior secondary school.

What are the implications for educational interventions? Given that self-concept and school performance mutually influence each other, teachers and parents should aim at improving both academic achievement and self-concept in students. Efforts to enhance

self-concept or school performance alone can be expected to be transitory (Marsh & Craven, 2006). As students form self-concept through social comparison, educators can help avoid or diminish views of low self-concept by minimizing social comparisons. More affirmatively, educators can help adjust the frames of reference students use in evaluating their competence; for example, encouraging students to focus on the extent of their improvement over time rather than concentrating on how the other students are performing. Teachers can also minimize social comparison by avoiding competitions that acknowledge and praise only the "winners".

Increasingly, efforts to enhance student self-concepts are focusing on enhancing feelings of empowerment and confidence by creating a friendly and encouraging school environment that appreciates personal strengths and assets (Liem, McInerney & Yeung, 2015). Seaton (2004) explains that the positive nurturing of academic self-concept is an important educational aim. This is further supported by a study done by Ming (2003), who concludes that many students who lack motivation and have learning problems are those who have low level of self-concept. Thus, intervention programs and counselling such as cognitive behavioural group therapy (CBGT) that is focused on improving career aspiration, students' achievement in mathematics and self-concept are important to help students to overcome their learning problems and improve their lives. Cognitive behavioural group therapy (CBGT) is problem-solving.

More specifically; CBGT talk about the client's past: when/why does the problem occur? In current psychotherapy, CBGT is a method that helps clients to understand the thoughts and feelings that influence their behaviours. A wide range of disorders and problems can be treated with cognitive behavioural group therapy. Cognitive behavioural group therapy can be defined as those interventions with the core assumptions that what individuals think directly impacts how they feel and what they do (Graham, 2005).

The basic assumption of this therapy is that thoughts, feelings and behaviour influence each other. A negative thought leads to a negative emotion, which leads to negative behaviour. These negative thoughts are usually not based on the truth and are often irrational.. Such irrational thoughts often maintain or even strengthen a negative self-concept.

Cognitive behavioural group therapy is based on the assumption that irrational thoughts lead to dysfunctional behaviour. Cognitive behavioural therapists, therefore, try to change the content of these irrational thoughts by attempting to turn them, into 'helping thoughts'. Various techniques from behavioural therapy are employed in the attempt to change these negative thoughts. An important instrument in cognitive behavioural therapy is the ABC-model. Cognitive Behavioural Therapy (ABC Model) could be described as "as I think, so I feel (and do)!" Understanding it is as simple as **A B C:**

- **Activating Event** – the actual event and the client's immediate interpretations of the event.
- **Beliefs about the event** – this evaluation can be rational or irrational.
- **Consequences** – how you feel and what you do or other thoughts.

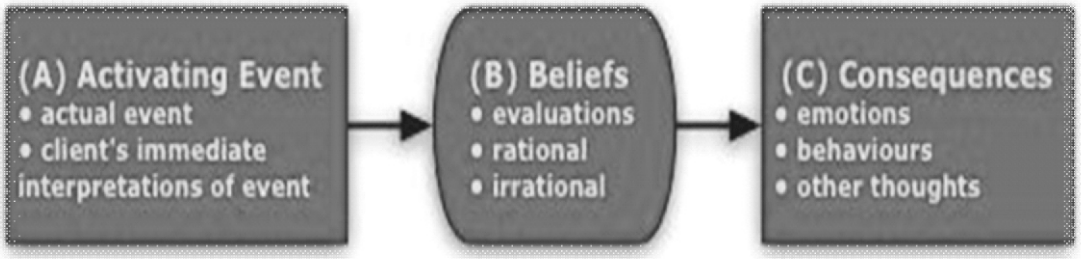

Fig. 1

Fig. 1 and Fig. 2 show that a negative event can be interpreted positively or negatively. How one interprets it affects how one feels, thinks and behaves.

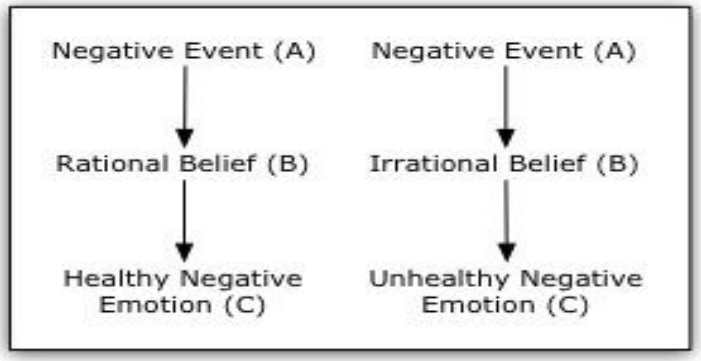

Fig. 2

The ABC-model helps to clarify the context of the circumstances. The 'A' stands for 'activating event'. This includes the event that leads to the inadequate feelings and behaviour. For example, the client has some disappointing grades in his/her mathematics score. This event leads directly to 'B'; the belief system. This system is a thinking process which takes place between 'A' and 'C'. Our belief system influences our point of view.

To start the intervention, the DEF-model in fig. 3 is used. The 'D' stands for *disputing* irrational beliefs. This consists of challenging (disputing) a client's irrational beliefs as directly as possible. 'E' stands for the *effects* of changing one's interpretation of a situation. This is a method through which a person loses their symptoms of anxiety or

distress and sees a situation differently (something other therapists call *cognitive restructuring*). Ideally, the client now takes practical action to solve the problem or has a less troublesome reaction to the situation, while the "F" stands for the new feelings of the clients, that is, the way the individual feels about the situation now.

The intervention starts with ('D') challenging the irrational thoughts. Subsequently, the client must be willing to actively use this new knowledge by practicing new, rational thinking ('E') and the new behaviour ('F').

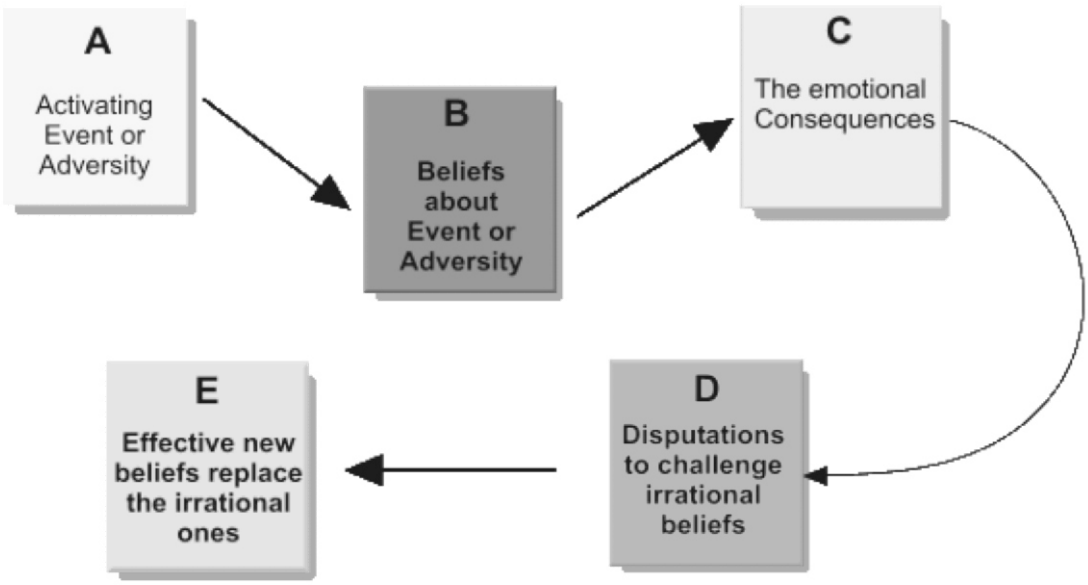

Fig. 3

Cognitive Behavioural Group Therapy intervention in schools would mainly be concerned with helping students realize three things: how their thought patterns affect their behaviour, how they can take control of these thought patterns, and how they can apply interventions to effect behaviour change and work towards their future goals (Hall & Hughes, 1989). Recently, school counsellors have been particularly aware of how their interventions contribute to the increase in student academic achievement (Brigman & Campbell, 2003; Brown & Trusty, 2005; Sink, 2005a; Sink, 2005b; Webb, Brigman, & Campbell, 2005). This is due, in part, to the increased focus on justifying school counselling itself through its impact on academic achievement in students and other evidence based practice called for by the American School Counsellor Association (ASCA) and National School Counselling Model (2005).

Brophy (1988) describes student motivation to learn as the students' tendency to find academic activities meaningful and worthwhile and to try to derive the intended

academic benefits from them. Motivation means working towards learning goals-understanding and improvement- not merely to perform well (i.e. pass the examinations). According to Woolfolk (1993) students who believe learning is interesting and satisfying, find it intrinsically rewarding, enjoy knowing more about values and expanding their store of information, show signs of being motivated to learn. Students who have negative self-concept and low self-esteem are usually not motivated to learn and are likely to drop out from school.

Intrinsic motivational stimulation strategies, such as motivational interviewing, objective and solution-oriented counselling, and extrinsic motivational stimulation, such as successive approximation of behaviour, behaviour contract and reinforcement strategies are also crucial to the effort to raise the students' self-concept. The motivational interview is a client-oriented, directive method for enhancing the intrinsic motivation towards change. The lack of motivation is interpreted as unresolved ambivalence. This is because, unlike other people who usually feel motivated for something, the ambivalent person experiences rival motivations due to the benefits and costs associated with getting/not getting involved in an endeavour.

Self-concept, students' school achievement and career aspiration are important elements in the motivation for change, and good predictors of treatment results. The successive approximation of behaviour takes into consideration the fact that people are not willing to radically change their behaviour from one counselling session to another.

Nowadays, most students do not take their studies seriously; they just learn to pass their examinations without showing much interest in school work. This raises a number of salient questions. Is it because the students are not motivated to learn, or is it because of their negative self-concept? Is it that their teachers and parents failed to motivate and encourage them to learn and excel in their academic work? These questions show the importance of the roles significant people play in developing the self-concept of students. Woolfolk (1993) describes student motivation to learn as a tendency to find academic activities meaningful and worthwhile and to try to derive the intended academic benefits from them. Students with positive self-concept, are more motivated to learn and be successful. On the other hand, students who have negative self-concept are usually not motivated to learn and are likely to drop out from school.

RESEARCH QUESTIONS

1. Is there any significant main effect of treatment (Cognitive Behavioural Group Therapy) on students' mathematics self-concept?
2. Is there any significant main effect of motivation on students' mathematics self-concept?

3. Is there any significant interaction effect of treatment (Cognitive Behavioural Therapy) and motivation on students' mathematics self- concept?

Methodology

One hundred and twenty-six Junior Secondary School one (JSS I) students randomly selected from twelve schools from both academically selective and academically non selective schools in Oyo state, participated in the study. The average age of the students ranged between 12 and 14 years

Sampling Technique and Sample

Phase two:

Research Design for Phase Two

This study used a non-randomized pre-test-post-test, control group design in a quasi-experimental setting for phase two.

Variables in the study

Independent Variable

Treatment:

i. Cognitive Behavioural Group Therapy (CBGT)

ii. Flyer (Control Group)

Moderating Variables

Students' Motivation for Learning

Dependent Variables

Mathematics Self- Concept.

Students' Achievement in Mathematics.

Table 1: Showing 2 x 2 Factorial Matrix for Phase 2

	Cognitive Behavioural Therapy/Counselling (CBT)		Control Group Flyer	
Motivation	High	Low	High	Low

The schematized layout of the design is as follows:

Experimental Group 1	0_1	X_1	0_2
Control Group 2	0_1	~x	0_2

0_1 - Represents pre-test scores for groups 1and 2
0_2 - Represents post test scores for groups 1 and 2
X_1 - Represents experimental group one that will receive Cognitive Behavioural Group Therapy (CBGT)
~x - Represents Flyer (Control group)

The design employed 2 X 2 factorial matrix which allowed for the determination of the effect of each independent variable and also provided an opportunity to determine the combined influence of independent and moderating variables on the dependent variable.

Sampling Technique and Sample

Phase two

Experimental Method

Eight schools which had between eight and twelve students scoring less than -5 were randomly selected. Schools that did not have at least eight students were deleted from the list. In a school where there were more than twelve students with less than -5, only twelve students were randomly selected.

Four academically selective schools were randomly assigned to each of the two treatments (Cognitive Behavioural Group Therapy and control). Four academically non-selective schools were also randomly assigned to each of the two treatments (Cognitive Behavioural Group Therapy and control).

Instrumentation

Phase two

Three response and two stimulus instruments were used in phase two:

Response Instruments

(1) Mathematics Self-concept Scale (MSCS)
(2) Mathematics Achievement Test (MAT)
(3) Students' Motivation Scale (SMS)

Stimulus Instruments

(1) Cognitive Behavioural Group Therapy (CBGT)

(2) Flyers

Mathematics Self-Concept Scale (MSCS)

Mathematics Self-Concept of the students was measured by the Mathematics Self-concept Scale (See Appendix I). This instrument was developed by the researcher because of the unavailability of instruments that measure the construct of her interest. Similar existing instruments from the literature that measure a similar construct by paying careful attention to the formulation of response options, instructions, and choosing an appropriate recall period were examined by the researcher. The instrument underwent some modifications in the process of its development. It was then tested among small groups of people in a pilot test. This was intended to evaluate the comprehensibility, relevance, acceptability and feasibility of the instrument's measurement.

This instrument was administered for students to measure the degree of their self-concept and to assess how confident they were in mathematics. The instrument consisted of two sections: A and B. Section A contained information about student's ***bio-data*** like name of school, location of school *(town),* local government area, gender, age and class. Section B consisted of 15 items rated under 4 point Likert response format of; Very True of Me (VTOM); True of Me (TOM); Not True of Me (NTOM) and Absolutely Not True of Me (ANTOM). Examples of the items that were contained in the test are: "I think I am one of the best students in Math", "I can follow the mathematics lessons easily", "and every question in Mathematics is answerable "The MSCS was administered during mathematics periods in all the classes that were sampled. Fifteen minutes were given to the students to complete the questionnaire.

Positively stated items were rated as 4, 3, 2, and 1, while scoring was reversed for negatively stated items. Hence, the possible range of scores was between 15 and 60 such that higher scores indicated higher confidence in mathematics and vice versa.

Cronbach alpha was used to obtain the internal consistency of the items. This was achieved by pilot testing the instrument on a sample of 120 J.S.S.1 students that were not part of the population selected for the actual study. The reliability coefficients obtained, using Cronbach alpha for the instrument, was 0.938.

3.7.2 *Mathematics Achievement Test (MAT)*

To validate the Mathematics Achievement Test (Instrument ii), a test blueprint was constructed for the development of the items. Due to the absence of instruments that measure the construct of the researcher's interest, a 20-item achievement test in Mathematics consisting of multiple choices lettered A to E that tasks student's knowledge in Mathematics known as *Mathematics Achievement Test (MAT)* (see appendix II) was developed. This was done by examining similar existing instruments from the literature that measure a similar construct by paying careful attention to the formulation of response options, instructions, and choosing an appropriate recall period.

This instrument also went through a series of adjustments in the course of its development. The instrument was tested among small groups of people in a pilot test. This was intended to verify the comprehensibility, relevance, and acceptability and feasibility of the measurement of the instrument.

Each correctly answered question attracts 1 mark such that possible range of scores on the test will be 0 to 20 marks. This instrument consisted of two sections, A and B. Section A contained the bio-data of the students which included name of school, location of school *(town),* local government area, gender, age and class. Section B consisted of 20 items constructed from JSS I curriculum and textbooks. Initially, 30 items were developed after administering to 120 students who were neither part of the study nor sampled from the local government used for the actual study. Items with low difficulty index less than 0.30 and questions that were too simple were removed to give the final 20 items.

Opinions of experts were sought concerning the appropriateness of the developed items. Its reliability was found after administering to a sample of 120 JSS 1 students using Kuder-Richardson Formula 20 (KR 20). The reliability coefficient obtained was 0.680 and difficulty indices of the items ranged between 0.400 and 0.600. The table of specification is as shown in Table 2.

Table 2 Table of specification for Mathematics Achievement Test (MAT) JSSI

S/N	Contents/Objectives	Levels Of Cognitive Domain			Total 100%
		Knowledge 40%	Comprehension 10%	Application 50%	
1	Basic Operations 45%	4(1,6,7,9)	0	5(2,4,12,14,15)	9
2	Number and Numeration 25%	2(5,18)	1(8)	2(3,11)	5
3.	Algebraic Processes 15%	1(13)	1(10)	1(17)	3
4.	Geometry and Mensuration 15%	1(16)	0	2(19,20)	3
5.	Total 100%	8	2	10	20

3.7.3 Students' Motivation Scale (SMS)

Students' Motivation Scale of the students was measured by the instrument tag Students' Motivation Scale (SMS) (see Appendix III). This instrument was developed by the researcher due to the unavailability of instruments that measure the construct of her interest. This instrument was developed through the same process already described in the previous sections. The instrument was also tested among small groups of people in a pilot test in order to verify its comprehensibility, relevance, and acceptability and

feasibility. This instrument was administered to students with a view to getting information on their motivation in learning mathematics. The instrument consisted of two sections A and B. Section A contained information about student's *bio-data* like name of school, location of school *(town),* local government area, gender, age and class. Section B consisted of 15 items rated under 4 point Likert response format of; Very True of Me (VTOM); True of Me (TOM); Not True of Me (NTOM) and Absolutely Not True of Me (ANTOM).

Examples of the items that were contained in the test are: I wish to learn mathematics because:"My mathematics teacher uses a variety of teaching methods", "I feel confident about the topics in a math class", "and I always win prices anytime I go for math competition". The SMS was administered during mathematics periods in all the sampled classes. Twenty minutes were given to the students to complete the questionnaire.

Positively stated items were rated as 4, 3, 2, and 1, while scoring was reversed for negatively stated items. Hence, the possible range of scores was between 15 and 60 such that higherscores indicated higher confidence in mathematics and vice versa.

Cronbach alpha was used to obtain the internal consistency of the items. This was achieved by pilot testing the instrument on a sample of 120 J.S.S. 1 students that were neither part of the study nor sampled from the local government used for the real study. The reliability coefficients obtained using Cronbach alpha for the instrument, was 0.922.

Stimulus instruments

Cognitive Behavioural Group Therapy (CBGT)

This manual is the result of an adaptation of the Cognitive-Behavioural model developed by Dr.Aaron T. Beck about fifty years ago for the treatment of self-concept which affects students' academic achievement and career aspiration. The main aim of this intervention is to decrease low self-concept symptoms in students.

Cognitive Behavioural Group Therapy (CBGT) aims to help students become aware of when they make negative interpretations, and of behavioural patterns which reinforce distorted thinking. Cognitive therapy helps people to develop alternative ways of thinking and behaving in order to reduce their psychological distress. The group format was adapted to an individual treatment modality. In this manner, the therapy focuses more on the adolescents' problems and uses their thoughts, experiences, actions, and relationships as examples of the material to be presented. The therapist meets the adolescents and their teachers before the therapeutic process begins. This creates an open session to establish rapport with the adolescents and explore their condition in detail.

Therapy sessions are usually divided into three topics or modules that consist of three sessions each. The first three sessions work on how thoughts influence mood. The next three sessions discuss daily activities that affect mood, and the last three sessions address how interactions with others affect our mood. A description of each module is usually provided. The group will work with the issue of peer groups and classmates, and how comparing their performances with their peer groups affect their academic performance. The adolescent learns to have confidence in themselves and believe in themselves as well.The group intervention develops processes that are inherent to group therapy such as encouraging modelling of appropriate behaviour among peers.

Flyers

The flyers were constructed by the researcher and given to the second group, which is the control group. The contents of the flyers were the same with the treatment given to the experimental group. Two types of flyers were given to the control group every week for 9 weeks. The researcher did not explain the contents of the flyers to the students in order to avoid unnecessary treatment for the control group. The purpose of the flyers was to create common relationships within the two groups, that, the experimental group and the control group. They were asked to read silently for 30 minutes.

Results and Discussion

Introduction

This section outlines and discusses the results of this study. The focus of the study was to investigate the effects of psychological therapies on mathematics self-concept, achievement and career aspiration of students associated with big-fish-little-pond condition, considering students' motivation and socio economic background as moderating variables. This section also discusses the results obtained from the statistical analysis of data according to the twelve research questions formulated for the study.

Research Question 1: Is there any significant main effect of treatment (Cognitive Behavioural Group Therapy) on students' mathematics self-concept?

Table 3 shows the main effect of treatment on students' mathematics self-concept

Table 3: Summary of 2x2 Analysis of Covariance (ANCOVA) of Students' mathematics self-concept by Treatment (Cognitive Behavioural Group Therapy)

Tests of Between-Subjects Effects

Dependent Variable: POST_SCS

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Squared	Eta
Corrected Model	9362.357[a]	12	780.196	49.561	.000	.840	
Intercept	3145.551	1	3145.551	199.818	.000	.639	
PRE_SCS	36.131	1	36.131	2.295	.133	.020	
TREATMENT	7259.118	2	3629.559	230.564	.000	.803	
MOT	17.669	1	17.669	1.122	.292	.010	
TREATMENT * MOT	21.875	2	10.938	.695	.501	.012	
Error	1778.857	113	15.742				
Total	241799.000	126					
Corrected Total	11141.214	125					

a. R Squared = .840 (Adjusted R Squared = .823)

1. *Significant at P<0.05*

Table 3 shows that the main effect of treatment is significant on students' mathematics self-concept $F_{(2,113)} = 230.564$; $P < 0.05$. The partial eta squared of 0.803 implies that treatment (cognitive behavioural group therapy and control) accounts for 80.3% of the observed variance in the post-test scores of students' mathematics self-concept.

Table 4: Estimated Marginal Means and Standard Error: Treatment Groups

TREATMENT	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
(1) COGNITIVE BEHAVIOURAL GROUP THERAPY	47.541	.863	45.831	49.252
(2) CONTROL	30.578	.637	29.315	31.841

Table 4 shows that the mean post test scores of students exposed therapy is the highest cognitive behavioural group therapy ($\bar{x} = 47.541$) followed by the control group ($\bar{x} = 30.578$). It could therefore be inferred that students exposed to cognitive behavioural group therapy exhibited high mathematics self-concept compared to their counterparts in the other group.

In order to examine the source(s) of differences between the treatment group (cognitive behavioural group therapy and control), Bonferroni Multiple Range test was used to determine the source of the significance.

Table 5: Pairwise Comparisons of Self-Concept by Treatments

(I)Treatment	(J) Treatment	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1 CBGT	2 CONTROL	16.964*	1.086	.000	14.326	19.602
2 CONTROL	1 CBGT	-16.964*	1.086	.000	-19.602	-14.326

The mean difference between cognitive behavioural therapy and control is 16.964, which shows that there was a significant difference between cognitive behavioural therapy and control.

Discussion

Table 3 shows that the main effect of treatment is significant on students' mathematics self-concept $F_{(2,113)} = 230.564$; $P < 0.05$. The partial eta squared of 0.803 implies that treatment (cognitive behavioural group therapy and control) accounts for 80.3% of the observed variance in the post-test scores of students' mathematics self-concept. This is because the treatments that the students underwent improved their mathematics self-concept. The result of this finding corroborates that of Kaminsky (2007) who examined the efficacy of an enrichment programme on educational self-perception in gifted students with low self-concept because when gifted students transit to a more rigorous school setting (highly selective schools), their self-concept becomes very low. The results indicated a positive effect of intervention as shown by the improvement of the students' feelings regarding their abilities in school and their mathematics self-concept. Therefore, it can be inferred from these studies that the cognitive-behavioural group therapy treatment/intervention which involved counselling students with low mathematics self-concept yielded positive results on the students' mathematics self-concept.

Table 4 also shows that the mean post test scores of students exposed to cognitive behavioural group therapy ($\bar{x} = 47.541$) is higher than the control group ($\bar{x} = 30.578$). It could therefore be inferred that students exposed to cognitive behavioural group therapy exhibited more mathematics self-concept compared to their counterparts in the other group. The result of this work agrees with Raeisi (2007), who in a survey studied the efficacy of cognitive-behavioural group therapy on mathematics problem solving performance in female fifth grade students with mathematics disorder in Yazdi. The findings showed a significant difference between the mean scores of mathematics problem solving in experimental and control groups, that is, those that received treatment and those that did not. Generally, cognitive-behavioural group therapy can be applied as an effective therapeutic method for students with mathematics disorder.

In the Pair Wise Comparisons of Self-Concept by Treatments in Table 5, it is also observed that students exposed to cognitive behavioural group therapy exhibited mathematics self-concept significantly better ($\bar{x}$ = 47.541) than students exposed to control ($\bar{x}$ = 30.578). This is because students in the Cognitive Behavioural Group Therapy group had received intervention. This result is in line with the A meta-analysis conducted by Lapan, Aoyagi, and Kayson (2007) which found that as far back as 1958, research has shown that students that receive guidance from a school counsellor in regards to career planning are more successful post-graduation. Additionally, Lapan, Aoyagi, and Kayson (2007) conducted a three-year longitudinal school-to-career study with twelfth grade students in a rural setting. Results of the study showed that aspirations to attend college or further educational training were related to six skills that are outlined in the Integrative/Contextual Model of Career Development. The six skills that were noted as effective are: (1) development of positive self-concept, (2) exploration of options and development of personally meaningful goals; (3) enhancement of the perceived fit between the individual and the world of work; (4) integration work readiness behaviours and pro social skills into everyday actions; (5) identification of career paths of interest; and (6) becoming successful students and self-regulated, lifelong learners. Students that used these six skills reported feeling satisfied with the educational experience and with their next steps beyond high school.

The role of the intervention support specialist impacts students' achievement on their unit assessments, as well as their attitudes toward mathematics in general. During intervention, teachers monitor at-risk students more frequently to evaluate the effectiveness of instructional changes which will improve students' achievement in mathematics.

Cognitive Behavioural Group Therapy interaction raised the students' mathematics self-concept. This may be because CBGT tried to change the students' negative thought in mathematics to positive thought unlike the control group that did not receive any treatment at all.

Research Question 2: Is there any significant main effect of motivation on students' mathematics self-concept?

Table 3 shows that the main effect of motivation on students' mathematics self-concept is not significant $F_{(1, 113)} = 1.122$; $P>0.05$. The partial eta squared of 0.01 implies that motivation accounts for 1% of the observed variance in the students' mathematics self-concept. This shows that motivation does not significantly influence students' mathematics self-concept. This may be due to the fact that most of the students may have extrinsic motivation, because intrinsically motivated students may not suffer the negative effects of the BFLPE. If they find academic tasks rewarding in and out of themselves, intrinsically motivated students may regard themselves as more capable

and may not find the accomplishments of others as threatening, or even relevant, to their self-views. Although Lepper (2005) demonstrated that extrinsic motivation is associated with negative educational outcomes, Otis (2005); Ryan & Deci (2000) have shown it to be related with positive educational results. Perhaps, if extrinsically motivated students are able to receive the rewards that may motivate them, such as high grades or the praise of teachers and parents, or if they feel a level of autonomy in their behaviour, they may not suffer the negative effects of the BFLPE.

However, in the absence of external rewards, the BFLPE may be greater for extrinsically motivated students. This present finding negates the work that argues in favour of correlation between academic achievement and motivation (Sikwari 2014) and that motivation has impact on academic achievement of secondary school students in mathematics (Tella 2007). Highly motivated students performed better academically than lowly motivated students (Tella 2007). Despite the importance of motivation on the academic of students in mathematics self-concept, this view does not hold in this present work. Therefore, for motivation to have positive effects on students' performances, additional variables such as counselling may need to be put in place.

Table 6: Pairwise Comparison of self-concept by Motivation

MOT	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1 LOW	42.046	.683	40.692	43.399
2 HIGH	42.944	.495	41.963	43.924

Table 6 shows that the mean of students with high motivation is slightly higher ($\bar{x}$ = 42.944), followed by student with low motivation ($\bar{x}$ = 42.046). In other words, high motivated students are greater than low motivated students. It could therefore be inferred that students exposed to high motivation exhibited more mathematics self-concept compare to their counterpart with low motivation.

Research Question 3: Is there any significant interaction effect of treatment (Cognitive Behavioural Group Therapy and Solution Focused Brief Therapy) and motivation on students' mathematics self- concept?

Table 3 shows that there was insignificant interaction effect of treatment (Cognitive Behavioural Therapy and Solution Focused Brief Therapy) and motivation on students' mathematics self- concept $F_{(2,113)} = 0.695$, $P>0.05$. The partial eta squared of 0.012 implies that interaction effect of treatment (Cognitive Behavioural Therapy and Solution Focused Brief Therapy) and motivation accounts for 1.2% of the variance observed in the post-test scores of students' mathematics self- concept.

Discussion

There was insignificant interaction effect of treatment (Cognitive Behavioural Therapy and Solution Focused Brief Therapy) and motivation on students' mathematics self-concept $F_{(2,113)} = 0.695$, $P>0.05$. The partial eta squared of 0.012 implies that interaction effect of treatment (Cognitive Behavioural Therapy and Solution Focused Brief Therapy) and motivation accounts for 1.2% of the variance observed in the post-test scores of students' mathematics self- concept. The reason may be that the reward the students expect from their parents or their teachers are not strong enough to motivate them. Another possible reason is that thestudents are not ready to work in order to meet the objective of the motivation. The result of this work negates the work of Lewinsohn (1981) who studied a group of participants and discovered that the interaction effect of treatment (Cognitive Behavioural Therapy and Solution Focused Brief Therapy) and motivation on students' mathematics self-concept was positive, significant, and enabled the students to perform very well in their studies.

Conclusion

Based on the result of the study, it could be concluded that students' mathematics self-concept, students' achievement in mathematics and students' motivation could be significantly improved by the intervention Cognitive Behavioural Group Therapy Therefore, it is important that intervention mode could be selected for use under the conditions when it is the most effective or highly effective. This study also established that the mean scores of students' mathematics self-concept, students' achievement in mathematics and students' career aspiration of students from academically selective schools were lower than the mean scores of their counterparts from academically non selective schools after some time in their various schools. Students from academically selective schools should be counselled from time to time so that they do not suffer from the effect of big-fish-little-pond.

This study therefore suggests that since the issue of low performance of students in mathematics is a state and national problem, it must be addressed by the whole society. It requires resources that go beyond school and solutions require a team approach – the combined efforts of students, parents, teachers and administrators, community-based organisation (NGOs) as well as International Bodies in collaboration with the Federal, State and Local governments.

Recommendations of the study

Based on the findings and conclusion of this study, the following recommendations were made:

1. Due to the fact that students' mathematics self-concept, students' achievement in mathematics and students' motivation could be significantly improved by the intervention Cognitive Behavioural Group Therapy, it is, therefore, recommended that this intervention should be used in schools.
2. This study established that the mean scores of students' mathematics self-concept from academically selective schools were a bit lower than the mean scores of their counterpart from academically non selective schools after some time in their various schools. Therefore, students from academically selective schools should be counselled from time to time so that they do not suffer from the effect of big-fish-little-pond.
3. Students should be encouraged to match positive self-concept towards mathematics with high performance in mathematics.
4. Mathematics teachers should develop their students' positive self-concept towards the subject so as to pay more attention to problem solving skills for better performance.
5. Schools should expand targeted students' personal views of their career and education potential and opportunities.

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