

Effectiveness of Vicarious Reinforcement and Contingency Contracting Techniques in Enhancing Academic Achievement of Impulsive Junior Secondary School Students in Lagos, Nigeria

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Abstract: The study investigated the effectiveness of two interventions-vicarious reinforcement and contingency contracting in the enhancement of academic achievement of 120 impulsive Junior Secondary School (JSS) Students purposively sampled using a randomized process from 3 public schools in Lagos State, Nigeria. The study utilised a quasi experimental design and made use of the Impulsivity Assessment Scales for Students (IMASS) and validated achievement tests in English language and Mathematics. The results showed that participants in the experimental conditions performed better than their counterparts in the control group on the measure of academic achievement. Similarly, vicarious reinforcement was found to be more effective than contingency contracting in enhancing academic achievement of impulsive participants. The implications of these findings were highlighted in the study.

Key words: Vicarious reinforcement, contingency contracting, impulsivity, academic achievement

INTRODUCTION

Good performance in learning institutions has always been of interest to educational and counselling psychologists, as well as other stakeholders (parents, guardians, teachers, education policy makers). This is borne out of the desire to make the end product of teaching-learning, academic performance more qualitative. This becomes more pertinent in a success-driven society where academic achievement is a significant measure of success in life. Within the frame of this assertion, researchers and educational psychologists have defined, theorised and conceptualised academic achievement with a view to improving performance.

Academic achievement can be high, average or low, good or bad. According to Adeyoju (1989) poor academic achievement leads to problems such as frustration, dropping out of school, truancy, examination malpractices, unemployment, maladjustment and a lot of other ills prevalent in the society. Finn and Boyd observe that poor academic achievement throughout the school year is related to students leaving school without graduating. Relatedly, the National Research Council identifies the history of poor academic performance as one of three leading school-related characteristics associated with dropping out of school. Other factors have been identified as causes of poor

academic performance. These include: Parental influence (Stenberg, 1996; Wolbert, 2004; Akinwumi, 2003), school environment (Sarason, 1996; Olson, 1997; Aremu and Ogbuagu, 2005), learners' interest (Kagan, 1992; Anderson, 1985) and Self-efficacy (Baudura, 1993; Aremu and Ogbuagu, 2005). While these factors appear to have been well researched, little or no attention has been paid to the impact of impulsivity on academic achievement particularly in Nigeria.

Elliot *et al.* (2000) define impulsivity as a child's lack of gratification or self-control. It is a generalised state of high arousal, characterised by hasty responsiveness, carefreeness, impatience and low impulse control (Block and Peter, 1974; Ensenck and Eysenck, 1977). Spinella (2003) conceptualizes impulsivity as a tendency to act hastily on salient issues or on certain environmental demands. From these definitions, it is safe to conclude that it is a personality problem. Heerigan (2001) affirms this by submitting that it is a common feature of many psychiatric conditions, including bipolar disorder, suicide and Attention Deficit Hyperactive Disorder (ADHD).

Studies have shown that there is a well established relationship between impulsivity and academic achievement (Vigil-Colet and Morales-Vives, 2005; Merrell and Tymms, 2001; Fink and McCocon, 1993). In line with earlier definitions made on impulsivity in this study, Merrell and Tymms (2001) reported that impulsivity is

positively correlated with intelligence test scores when the test consists of relatively easy questions that must be answered rapidly. Further, Helmers *et al.* (1995) find that individuals with high impulsivity and high academic ability tend to have lower grades than individuals with high academic ability and low impulsivity. This means that impulsivity, being a personality problem could inhibit good academic performance. The onus of this does not only rest directly on the learners, the indirect effect of it could be borne by significant others (e.g., parents and guardians). As rightly observed by McMuran *et al.* (2002) impulsivity could be a veritable obstacle to desire and expected academic performance. From this standpoint, as long as learners are impulsive, academic achievement will be low. To achieve its primary objective, this study utilised two behavioural interventions- vicarious reinforcement and contingency contracting techniques as pertinent mechanisms to enhance the academic achievement of impulsive learners in junior secondary schools.

Reinforcement is a central concept in human acquisition of skills and performance competencies (Akinboye, 1992). It is central to the success of school learning. It is defined as any factor which when made to follow a response immediately will increase the probability of the reoccurrence of the response to a conditioned stimulus or events (Akinboye, 1992). The reinforcement principle refers to an increase in the frequency of a response when certain consequences immediately follow it. Generally and expectedly, the consequence that follows a given behaviour must be contingent upon the said behaviour (Elliot *et al.*, 2000). In line with this contention, Kadzin (1989) submits that a contingent event that increases the frequency of behaviour is a reinforcer. Elliot *et al.* (2000) again stress that a reinforcer as a stimulus that occurs in the proper temporal relation with a response, tends to increase or maintain the strength of a response.

Reinforcement could be positive or negative depending on the reinforcer(s) and the behaviours being reinforced. Positive reinforcement strengthens the desired behaviour and this is done by presenting a positive stimulus after the emission of the behaviour (Lysakowski and Wilberg, 1981). Negative reinforcement on the other hand, occurs when reinforcement is removed after the emission of the desired behaviour (Kadzin, 1989). Either way, reinforcement could positively influence academic performance (Lysakowski and Walberg, 1981).

In this study, the effect of contingency contracting on academic performance of impulsive students was also investigated. Contingency contracting is an effective way of increasing academic performance and social behaviours

of children with impulsivity (Pfiffer and Barkley, 1998). Pfiffer and Barkley (1998) posit that contingency contracting involves a written agreement where a student agrees to perform a given task and the teacher provides something the child desires. The basic principle in contingency contracting is getting the student ready for earning by establishing a “contract” which he/she must fulfil. The essence is to reinforce the learner.

The aim of this study is to investigate the effectiveness of the two behavioural interventions- vicarious reinforcement and contingency contracting in the enhancement of academic achievement of impulsive students. With this, two research hypotheses were formulated and tested at 0.05 margin of error. They are:

- There is no statistical significant difference in the academic achievement of impulsive participants exposed to the two interventions (vicarious reinforcement and contingency contracting) and the control group.
- There is no statistical significant difference in the academic achievement of impulsive participants exposed to vicarious reinforcement and contingency contracting.

From these hypotheses, we rationalised that academic impulsivity can be reduced by exposing participants to vicarious reinforcement and contingency contracting. This assumption necessitated the one week separate trainings given to the two groups of participants in the study.

Design: The study utilised a pretest-posttest, control group quasi experimental design of which a 3×2 factorial matrix was adopted. On the rows, there were two treatment conditions- the contingency contracting and vicarious reinforcement as well as the and control group. The columns consisted of participants classified on gender basis, the male and female.

Participants: Total 120 Junior Secondary School (JSS) impulsive students (male = 60, female = 60) from the population of JSS students in Lagos State, Nigeria participated in the study. These participants who were conveniently sampled from a cluster population of students met the diagnostic criteria (e.g., suffering from impulsivity, willing and interested in all sessions and parental consent) for inclusion into the two experimental conditions and the control group through ballot randomisation. There were 40 participants each in the three experimental conditions and the control group. The participants ranged from 10-15 years (mean = 13.4 years, SD = 2.3).

Table 1: A Post-Treatment comparison of vicarious reinforcement, contingency contracting and the control group using analysis of covariance

Source of variation	DF	Sum of square	Mean square	F	P
Rows	2	2687.77	1343.88	53.01	<0.005S
Columns	2	92.88	46.44	1.83	>0.05 NS
Interaction	4	100.20	25.05	0.99	>0.05 NS
Within	111	18191.68	25.35		

Measures: The assessment batteries used to collect data in this study included one self-report scale and teacher report scale. The self-report scale is Impulsivity Assessment Scale for Students (IMASS) while the teacher report scale is NICHQ Vanderbilt Assessment Scale-Teacher Informant (NVAS-TI). Achievement tests in Mathematics and English Language were also administered to the participants. The impulsivity assessment scale for students was developed by the researchers to assess the presence of impulsivity. The instrument has test retest reliability coefficient of 0.77. The NICHQ Vanderbilt Assessment Scale-Teacher Informant was developed by National Initiative for Children's Healthcare Quality and America Academic of Pediatrics. The scale has a reliability coefficient of 0.82. To establish the psychometric property of the scale in the Nigeria setting, a pilot test was carried out using 30 teachers as respondents. The coefficient obtained was 0.76. The median coefficient is 0.79. The achievement tests in Mathematics and English Language were designed by experts in Mathematics and English Language. Each of the tests comprised 40 items each. The tests comprised multiple choice items with four options.

Psychotherapeutic procedure: Generally, there were eight week of one and half hours (90 min) therapeutic sessions given to experimental group 1 (contingency contracting) who were 40 in number, experimental group 2 (vicarious reinforcement) who were also 40 in number. The control group was 40 in number and the researchers had one and half hour interaction with them during the pre and post therapeutic sessions. The treatment sessions were used to equip participants with effective methods of controlling impulsivity, enhance self-control and problem solving capacity of participants and with specific academic skills that would enhance self control and improve academic achievement.

Data: The Analysis of Covariance (ANCOVA) and the student t-test were used to determine if there were any differential effects. The hypotheses were tested at 0.05 level of significance.

RESULTS

Hypothesis 1: In the first hypothesis, it was stated that there will be no significant difference in the academic

Table 2: Rows and columns of adjusted Y-Means

Treatment groups (Rows)	Low	Medium	Columns high
Vicarious reinforcement	108.62 (a)	107.89 (b)	108.99(c)
Contingency contracting	79.42 (d)	91.73 (e)	76.37 (f)
Control	69.88 (g)	69.58 (h)	60.24 (i)

achievement of impulsive participants exposed to vicarious reinforcement, contingency contracting and the control group. The result is presented in Table 1-3.

The tabular details as shown in Table 1-3 were obtained through the analysis of covariance and t-test statistics. The results indicate that there was a significant difference between the experimental participants and control group participants on the measure of academic achievement. Further, insight into the first hypothesis is provided by the results displayed in Table 2 and 3.

Hypothesis 2: Table 4-7 clearly show the effect of vicarious reinforcement and contingency contracting on the academic achievement of impulsive participants.

DISCUSSION

This study attempted to extend research frontier on academic achievement of individuals (students) afflicted with impulsivity. The results of the study have relevance with the existing findings in Europe and America. The results obtained from the first hypothesis clearly reveal that vicarious reinforcement and contingency contracting could enhance academic achievement of impulsive students. The participants in the control group did not significantly improve in their academic achievement like their counterparts treated with vicarious reinforcement and contingency contracting. The two behaviour strategies were thus effective in enhancing academic achievement of impulsive students. These results were in consonance with the ones reported by Aniegbuna (1984), Stewart and Lughlin (1992) and Pffifer and Barkley (1998). From this finding, it is imperative to contend that if the academic problems of impulsive students are addressed using the two interventions-vicarious reinforcement and contingency contracting, the level of academic waste in the society could be reduced.

As good as these two interventions proved to be in enhancing academic achievement of impulsive students, there relative efficacy was also investigated in this study.

Table 3: Pair comparison of the y-means using t-test on academic achievement

Source of variation	N	DF	LMS	SE	t-obs	P	Remark
A vs b	36	34	25.05	4.18	0.17	>0.05	NS
A vs c	13	11	25.05	6.94	0.05	>0.05	NS
A vs d	19	17	25.05	5.75	5.08	<0.05	S
A vs e	35	33	25.05	4.23	3.99	<0.05	S
A vs f	13	11	25.05	6.94	4.65	<0.05	S
A vs g	27	25	25.05	4.82	8.04	<0.05	S
A vs h	29	27	25.05	4.65	8.39	<0.05	S
a vs i	11	9	25.05	7.55	6.41	<0.05	S
b vs c	31	29	25.05	4.50	0.24	<0.05	NS
b vs d	37	35	25.05	4.12	6.91	<0.05	S
b vs e	53	51	25.05	3.44	4.70	<0.05	S
b vs f	31	29	25.05	4.50	7.00	<0.05	S
b vs g	45	43	25.05	3.73	10.19	<0.05	S
b vs h	47	45	25.05	3.73	10.27	<0.05	S
b vs i	29	27	25.05	4.65	10.25	<0.05	S
c vs d	14	12	25.05	6.70	4.41	<0.05	S
c vs e	30	28	25.05	4.57	3.78	<0.05	S
c vs f	8	6	25.05	8.85	3.69	<0.05	S
c vs g	22	20	25.05	5.34	7.32	<0.05	S
c vs h	24	22	25.05	5.11	7.71	<0.05	S
c vs i	6	4	25.05	10.22	4.77	<0.05	S
d vs d	36	34	25.05	4.18	2.94	<0.05	S
d vs f	14	12	25.05	6.70	2.73	<0.05	S
d vs g	28	26	25.05	4.74	2.08	<0.05	S
d vs h	30	28	25.05	4.57	4.20	<0.05	S
d vs i	12	10	25.05	7.24	2.12	<0.05	S
e vs f	30	28	25.05	4.57	4.85	<0.05	S
e vs g	44	42	25.05	3.78	8.33	<0.05	S
e vs h	46	44	25.05	3.69	2.67	<0.05	S
e vs i	28	26	25.05	4.74	4.05	<0.05	S
f vs g	22	20	25.05	5.34	2.88	<0.05	S
f vs h	24	22	25.05	5.11	4.33	<0.05	S
f vs i	6	4	25.05	10.22	3.08	<0.05	S
g vs h	36	36	25.05	4.07	1.67	>0.05	NS
g vs l	20	18	25.05	5.60	2.88	<0.05	S
g vs i	22	20	25.05	5.34	1.75	<0.05	NS

Table 4: Adjusted Y-means on academic achievement

		Columns Academic achievement					
		Low		-Medium		High	
Rows	No	X-X	Y-X	X-X	Y-X	X-X	Y-X
Vicarious	40	58.78	109.08	62.37	108.07	61.50	109.24
Contingency contracting	40	65.40	79.36	61.15	92.01	55.00	77.13

Table 5: Analysis of covariance on academic achievement

Source of variation	DF	Sum of square	Mean square	F	P	Remarks
Rows	1	1011.211	1011.21	36.12	<0.05	S
Columns	2	54.61	27.30	0.98	<0.05	NS
Interaction	2	75.04	37.52	1.34	<0.05	NS
Within	74	15801.39	27.99			

The results of the investigation reveal that participants treated with vicarious reinforcement performed better using the Mathematics and English language tests than their counterparts treated with contingency contacting. The inferences on the superiority of participants exposed to vicarious reinforcement over those exposed to

Table 6: Adjusted y-means for comparison and summary of academic achievement data

Treatment groups (Rows)	Low	Columns medium	High
Vicarious reinforcement	109.08	108.07	109.24
Contingency Contracting (CONCO)	79.36	92.01	77.13

Table 7: The t-test computed from the adjusted Y-means

Source of variation	N	DF	LMS	SE	t-obs	P	Remark
a vs b	36	34	27.30	4.55	0.22	>0.05	NS
a vs c	13	11	27.30	7.56	0.02	>0.05	NS
a vs d	19	17	27.30	6.26	4.75	<0.05	S
a vs e	35	33	27.30	4.61	3.70	<0.05	S
a vs f	13	11	27.30	7.56	4.23	<0.05	S
b vs c	31	29	27.30	4.90	0.24	>0.05	NS
b vs d	37	35	27.30	4.49	6.39	<0.05	S
b vs e	53	51	27.30	3.75	4.28	<0.05	S
b vs f	31	29	27.30	4.90	6.31	<0.05	S
c vs d	14	12	27.30	7.30	4.69	<0.05	S
c vs e	30	28	27.30	4.98	3.46	<0.05	S
c vs f	6	34	27.30	4.55	2.78	<0.05	S
d vs f	14	12	27.30	7.30	0.31	>0.05	NS
e vs f	30	28	27.30	4.98	2.99	<0.05	S

contingency contracting are among others, the ability of the behavioural strategy to influence the attention and retention spans of the students and how what is learnt is retained and translated to make recall ability much easier.

Another explanation on the superiority of vicarious reinforcement over contingency contracting could be as a result of the direct effect reinforcement (intervention) had on the participants. Unlike the contingency contracting programme, participants exposed to vicarious reinforcement felt the impact of the intervention. This impact had direct bearing on their academic pursuit. Regardless of the level of effectiveness or which is more effective, the two interventions could be used to enhance academic performance of impulsive students. This in itself is a positive development in literature in Nigeria.

IMPLICATIONS AND LIMITATIONS

Given the import of these findings, there are certain implications emerging from the study. First, is on the challenge that academic performance of impulsive students can be improved upon if necessary interventions (most especially, vicarious reinforcement and contingency contracting) are put in place. Thus, educational and counselling psychologists should develop therapeutic measures to address academic problems of impulsive students. Besides, teachers should note that impulsive students could also benefit from teaching-learning encounter like the normal students. They should therefore be treated accordingly. Similarly, parents (most especially of impulsive students) should not write off their wards. After all, studies have shown that if they are properly managed they can benefit optimally from teaching-learning.

Significant as the findings of this study, are to research in education, they are not without some limitations. It then means that researchers and other stakeholders interested in better academic performance of

students suffering from impulsivity should exercise caution in generalising the findings. As a matter of fact, the findings in spite of their potentials of being generalized were limited to junior secondary school students. This should be duly reckoned with in the course of discussing or making reference to this study.

CONCLUSION

The findings portend the fact that students with impulsivity could perform well academically. Therefore, counselling and educational psychologists should explore this possibility to address the challenges posed to students suffering from impulsivity.

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