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Effects of Television and Radio Distractions on Undergraduate Students Mathematics Test Performance

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Abstract: This study investigated the effects of television and radio distraction on cognition task performance. Participants included 46 mathematics education students. These students were exposed to 3 different conditions, being silence, a popular music on radio and a football match on television, while working on a test in mathematics. The results showed that though both music and television distractions had effect on performance; television had more negative effect on performance than music. Hence, Mathematics as a subject needs to be studied in a conducive environment.

Key words: Distractions, performance, television, mathematics

INTRODUCTION

Distraction during learning has become a common daily occurrence on university campuses across the nation. The distraction comes in various forms and intensity. Lectures, tests, assignments and even examinations routinely take place amidst a tumult of noise and visual distractions. It is usually presumed that learning takes place in quiet environment where concentration on task on hand can be ensured. Is it possible therefore that distraction may affect learning and academic achievement among students?

Several studies have focused on the effect of distraction on learning/academic achievement among students. While some studies found some negative effects of distraction on learning, others found no significant negative effect on learning and academic achievement. On a general level, distraction may affect learning because, according to capacity theory, attention can be divided when the brain is exposed to 2 separate tasks/events that both require focused attention (Tina and Melinda, 2007). When this happens Tina and Melinda (2007) went on to explain that one or both of the tasks is diminished'. Since distraction comes in various forms i.e. visual and auditory, it should be of interest to find out whether distractions have effects on performance and which form of distraction has more effect than the other. According to Cool *et al.* (1994), television affected the number of questions answered in a given time by students more than radio. In another study, Pool *et al.* (2003) showed that students faced with visual distraction needed more time to complete an assignment than those faced with audio distraction and no distraction at all.

A similar result was found in a study by Tina and Melinda (2007) when analysis of the results showed that the television group took longer to finish a given assignment than the non-television group. The possible explanation offered by Pool *et al.* (2003) was that the increased time spent due to television distraction was due to participants looking away from the assignment to look at the television. Wright and Adams (1999) specifically postulated that visual distractions can have a statistically significant effect on cognitive processes. Yet, Pool (2002) maintained that television distraction made no significant difference on students working on a homework assignment. Manthiaes and Kelly (1993) however, had maintained that the effect of background music on work performance depends on the person listening to it and on the activity that the listener is working upon. While, some credence had been lent to this by Graziano (1999) and Schoentals (2004) who reported that employees had argued that background music chosen by themselves make them more efficient and productive while working, contradictory results were found by Murphy *et al.* (2000) who maintained that noise indeed is distracting for younger adults.

It is clear that there is no agreement in the literature on the effects of distractions on learning and performance. While, some studies found negative effects of television and radio others failed to report any effect. It appears that various factors such as age of participants, the form of distraction and the level of difficulty of the task affect the results of these studies. Goldstein (2005) indeed maintained that if a task is difficult, divided attention is sometimes not possible. Is it possible that distractions (visual and audio) can be ignored while a task

that is considered important is on hand? For instance, if a television programme or radio music that is of no interest to the student is on, can performance still be affected or not? The purpose of this paper is to examine the effects of Television and Radio distractions on undergraduate students academic achievement in a test of Mathematics.

MATERIALS AND METHODS

Participants: Participants in this study consisted of a random sample of 68 undergraduate students currently in Part II in the University of Ado-Ekiti, Nigeria. These students are currently studying Mathematics Education in the Department of Curriculum Studies. Half of the participants are females. None of the participant had a pre-knowledge of the experiment.

Instrument: A class-test material containing 30 objective questions to be answered in one hour was prepared. Following this was a graph to be interpreted. Each participant was given the same set of materials. A recorded videotape of a football match between Nigeria and another country was made available plus a television set for viewing the match. A radio/cassette player was also provided.

Procedure: Participants were divided into 3 groups after completing the pre-test. Each group was sitted in separate lecture rooms not close to each other. Group A was the television group while group B was the radio group and group C served as control with neither radio nor television. With assistance from colleague, faculty members in the department, it was possible to supervise the experiment by ensuring that the 3 groups though working in different room locations started and stopped the tests at the same time, Group A worked while the television was on while group B worked with a background music of a popular (also recorded on tape) song.

Group C had no distractions. The participants were not allowed to talk to each other while the test lasted.

Design: This study was a causal-comparative study. This design involved 3 groups. Two experimental (Television and radio) and one control. Performance serves as dependent variable while television and radio serve as the independent variable. The scores from the pretest and post test of the students were compared using paired sample t-test and ANOVA with repeated measures. The repeated measure was the pretest and posttest at probability of 0.05 level of significance.

Hypotheses:

Ho_1: There is no significant difference between the students exposed to television distraction and those not exposed in Mathematics.

Ho_2: There is no significant difference between the students exposed to radio distraction and those not exposed in Mathematics.

Ho_3: There is no significant difference between the students exposed to television and radio distraction and those not exposed to in Mathematics.

Ho_4: There is no significant difference between gender exposed to television and radio distractions and those not exposed in Mathematics.

RESULTS

Ho_1: There is no significant difference between the students exposed to television distraction and those not exposed in Mathematics.

The result of the t-test in Table 1 revealed a significant difference in the performance of students exposed to television and those that were not i.e. t cal (2.529) is greater than t-table (2.021) at 0.05 level of significance. The null hypothesis is rejected. Therefore, there is significant difference in the academic achievement of students exposed to television distraction and those that were not.

Table 1: t-test Analysis of the performance of students exposed to television and control

Group	N	$\bar{X}$	SD	Df	t-cal	t-table
Television	22	14.23	3.69	44	2.529	2.021
Control	24	16.96	3.71			

p<0.0.5

Table 2: t-test Analysis of the performance of students exposed to radio and control

Group	N	$\bar{X}$	SD	Df	t-cal	t-table
Radio	22	15.27	3.59	44	1.563	2.021
Control	24	16.96	3.71			

p<0.0.5

Table 3a: Oneway ANOVA of undergraduates' academic achievement exposed to different treatments

Source	SS	Df	MSF	F-cal	F-table
Between groups	87.756	2	43.878	3.319	3.15
Within groups	859.186	65	13.218		
Total	946.941	67			

p<0.0.5

Table 3b: Scheffe post hoc analysis of students' academic achievement and treatment groups

	1	2	3	$\bar{X}$
Television			*	14.23
Radio				15.27
Control				16.96

*The mean difference is significant at 0.05 level

Table 4: ANCOVA summary of gender and treatment on academic achievement of undergraduates

Source	SS	Df	MS	F-cal	Sig. F	F-table
Corrected model	107.877	6	17.979	1.307	0.268	
Covariate (Pretest)	0.594	1	0.594	0.043	0.836	4.00
Sex	16.692	1	16.692	1.214	0.275	4.00
Treatment	90.109	2	45.054	3.275	0.045	3.15
Sex X treatment	3.053	2	1.527	0.111	0.895	3.15
Error	839.064	61	13.755			
Corrected total	946.941	67				
Total	17346.000	68				

$p<0.05$

Ho_2: There is no significant difference between the students exposed to radio distraction and those not exposed in Mathematics.

The result showed no significant difference in the performance of students exposed to radio distraction and those that were not (t cal (1.563) < t table (2.021); $p>0.05$). Therefore, the null hypothesis which state that here is no significant difference between the academic achievement of students exposed to radio distraction and those that were not is accepted (Table 2).

Ho_3: There is no significant difference between the students exposed to television and radio distraction and those not exposed to in Mathematics.

The Oneway ANOVA result in Table 3a revealed a significant effect of treatment on the performance of undergraduates {F(2,65)-3.319, $p<0.05$}. This implies that there is significant difference in academic achievement of undergraduates exposed to television distractions, radio distraction and those that were not.

The result of the Post hoc analysis showed that the students exposed to the television on distraction differ significantly in their post achievement mean scores from those that were not (Table 3b). In contrast, students exposed to radio distraction do not differ significantly in their post achievement mean scores from those that were not. Also, the mean difference in the Post test score of students exposed to television distraction and radio distraction is not significant.

Hence, the source of the significant difference earlier observed is due to the significant difference between the pair of the experiment group 1 and the control group. That is, the students exposed to television distraction and those not exposed. Figure 1 for the mean score of the academic score of academic achievement in pre and posttests.

Ho_4: There is no significant difference between gender exposed to television and radio distractions and those not exposed in Mathematics.

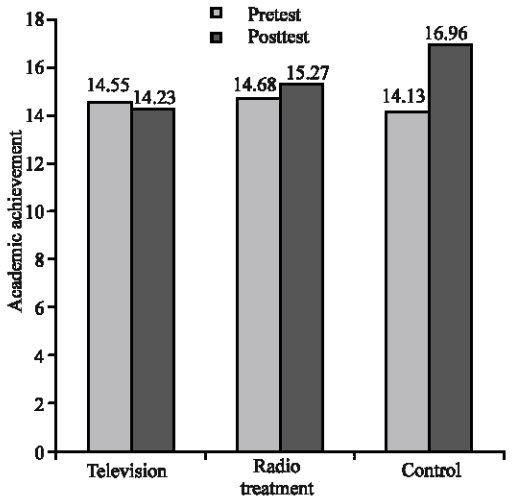

Fig. 1: Academic achievement of undergraduates exposed to diffrent treatment

The result in Table 4 revealed no significant main-effect of gender on the academic achievement of the undergraduates ($F(1.61) = 1.2314$; $p>0.05$). This means that the post achievement mean score of male undergraduates are not significantly different from that of the female undergraduates.

The result in the table also revealed that the difference in the post achievement scores of undergraduates exposed to television distraction, radio distraction and those that were not was statistically significant ($F(2,61)$; $p<0.05$).

The result of 2-way interaction further revealed no significant interactive effect of treatment and gender on the academic achievement of the undergraduates ($F(2,61)$; $p>0.05$). The result showed that the academic achievement of undergraduates exposed to different distraction strategies do not vary significantly between male and female students. Hence, the null hypothesis is not rejected.

DISCUSSION

The result of the study showed that television significantly affect the performance of students in a

mathematics test while radio distraction did not affect performance. The sex of student did not matter. This result is consistent with those in other studies done with respect to television and its effects on performance in academic tasks. It is important to note that while other studies looked at amount of time spent to complete an assignment Pool *et al.* (2003) and the number of questions answered, Cool *et al.* (1994) this study looked at performance. All students completed the test as enough time was allowed to complete all the test items, yet the result indicated that television sufficiently distracted the students. With this result, it can be argued that television can be a serious distraction.

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