

**ENVIRONMENTAL CHANGE: EFFECTS OF CONTEXT AND MOOD
ON RECALL OF LEARNING MATERIALS AMONG
UNDERGRADUATES**

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Abstract

Global warming is a serious problem that has confronted the world in recent time. It is due to environmental change. This study explored environmental change: effects of the context and mood on recall of learning materials among undergraduates in Nsukka. The study used a between –subject design to investigate the effects of context and mood on recall of learning materials among undergraduate students. A total of 60 participants 27(45 %) males and 33(55 %) females were randomly selected from the department of psychology, university of Nigeria Nsukka. Their ages ranged from 19-29 with the mean age of 19.79 years. The stimulus material used was a learning passage of 120 words drawn from “the games that dons play” (Nwangwu, 2006).A between subject analysis of variance was used for the data analysis. The result indicted that participants who studied under the low noise condition performed significantly better than the participants who studied under the noise condition on recall, $F(1,54)=5.26,p<0.05$.The result also indicated that there was no mood difference of performance on recall. The implications and limitations of the study were discussed and recommendations made for further research.

Key words: Environmental Change, Context, Mood, Recall, Learning Materials.

INTRODUCTION

There is a serious challenge facing the world on the issue of global warming. Johnson, Ambrose, Bassett, Bowen, and Crummey (1997) posit that, Environmental Changes result from many human activities which in turn have implication on behaviour. According to Clayton and Brook (2005), it is the collective impact of human behaviours that are contributing to climate change in the long run. They emphasized that adapting to and coping with climate change is an ongoing and ever-changing process that involves many intrapsychic processes that influence reactions to and preparations for adverse impacts of climate change, including chronic events and disasters. Psychological processes include sense making; causal and responsibility attributions for adverse climate change impacts; appraisals of impacts, resources, and possible coping responses; affective responses; and motivational processes related to needs for security, stability, coherence, and control.

On daily basis, a lot of human activities abound that cannot be avoided in order to survive in this industrial and computer era. Stated earlier, the environment and behaviour are inter-related in that each influenced the other. Changes in environment either natural or artificial result in change in human behaviour. Human behaviour on the other hand cause change(s) in the environment. Thus, the current global warming had become a concern for all nations and professionals of the world in which Psychology is not left out in the understanding of human behavioural contributions and responses to global climate changes (APA task force report on psychology and climate change; Clayton & Brook, 2005; Gifford, 2007; Uzzell & Moser, 2009). These issues gave impetus to the present study which seeks to manipulate some aspect of the environment in order to examine the effects on learning.

Recall had been identified as the ability of an individual to produce required information by searching the memory (Wood, Wood & Boyd, 2005). The spontaneous retrieval of information from memory means that individuals at any time recall information from the past for the present situations consciously or unconsciously. Cognitive psychologists describe recall as one of the core processes of human memory (Gazzaniga, 2000). Therefore, humans need memory for their daily functioning and more especially students. They need to recall or remember a lot of information for examinations, daily schedules, and names of people, phone numbers, and directions to offices and so on. Not only students but other people from different walks of life such as business executives, leaders, construction workers, nurses, home makers , footballers teachers, military all

need to recall information necessary for their proper functioning (Goldstein, 2003). A number of factors ranging from environmental, psychological and physiological sources had been known to affect the retrieval of information from the memory. Tulving and Thomson (1973) suggested that many elements of the physical setting in which a person learns information are encoded along with the information and become part of the memory. If part or the entire original context is reinstated, it may serve as a retrieval cue. This happens when you are in the sitting room and thought of something from the bedroom only to forget what it was until you get to the bedroom to remember it. Smith, Glenberg and Bjork (1978) mused that just visualizing yourself in the living room might do the trick. To support this prediction, Godden and Baddeley (1975) presented participants with a list of words when they were either under water or on land. Later, they were tested for recall on the words in the same environment or in different environment. Words learnt under water were best recalled under water and those learnt on land were better recalled on land. The researchers' prediction was in line with the encoding specificity principle (Tulving & Thomson, 1973) that the success of retrieval depends on the degree to which conditions present at retrieval are similar to the conditions during encoding. In other words, information is learnt together with its context.

Many studies have been conducted on context dependency effects on recall (Abernathy, 1940; Godden & Baddeley, 1975; Smith, 1988; Smith, Standing & De-man, 1992). They found that context dependency effects are typically interpreted as showing that the characteristics of the environment are encoded as part of the memory trace and be used to enhance retrieval of the other information in the trace (Eich, 1980; Smith, 1988). Similar studies had been reported using different contexts. Grant, Bredahl, Clay, Ferrie and Dark (1998) gave an article to undergraduate students who studied under noisy and silent conditions. Earlier, Morgan (1996) made participants to recall words studied under isolated cubicles when Odour was induced. Bjorklund, Cassel, Brown, Park, Ernest and Owen (2000) made participants to view a video tape while different interviewers questioned them on recall. Those who were questioned by the same interviewer performed better than those questioned by different interviewers. Several of such studies continued unabated. Smith and Vela, (2001) recorded similar results on the same prediction. In contrast, negative findings have been demonstrated by Fernandez and Glenberg (1985), Eich (1985), whose classroom field experiment failed to support the idea of context dependent memory. Thus, Smith (1988) concluded that the extent to which environmental context affects retrieval of meaningful materials is unresolved and inconclusive.

In considering another factor, Mood which is an internal state has also influenced memory tasks just like the external environmental context. People tend to recall information better if they are in the same internal (psychological or pharmacological) state when such information is encoded. Eich (1980) conducted a study with participants who studied materials while sober or intoxicated with alcohol and were tested in either the sober or intoxicated state. Other researchers had argued that the retrieval cues from the recognition task serves as retrieval cues and had been influenced by outshining hypothesis. Therefore, the question as whether cues serving as retrieval cue rather than from either the external or internal environment remained unresolved. However, some researches were conducted that goes consistent with previous findings. Eich and Metcalf (1989) found that positive and negative moods have influence on recall. As people who are happy did better when on recall and those who were negative did better when they were sad during testing. One method they used in mood induction was a continuous self-report produce with listening to affectively valence music.

Evidence has shown that adults who are clinically depressed tend to recall more negative life experiences (Clark & Isen, 1982).Burt, Zembar and Niederehe (1995), demonstrated that there is significant relationship between depression and memory impairment. And recognition and recall were more impaired in younger patients than older ones.

As earlier as 1917, researchers such as Bousfield (1950) and Baney (1986) had shown that a person's mood at any given time has a strong influence on which aspects of the environment that seem most salient, on what is remembered about the past and what is encoded about the present episode. Two memory effects relevant to these observations are mood congruence and mood dependent memories. Most research findings according to Passer and Smith (2007), reported that mood dependent memory is an unreliable phenomenon in which emotional materials are remembered more reliably in moods that match the emotional content of the memories. Instead, there is more consistent evidence of mood –congruent recall in which one recalls information or events that are congruent with one's current mood. Fiedler, Muehlfriedel, Nickel and Unkelbach (2007) observed that when an individual is happy, tends to remember positive events and remember negative events when sad. In line with the effects of both internal and external environment on recall, in university of Nigeria Nsukka the wide spread of generators by business people around the offices and the classrooms when the school had no organized market became a problem and created a lot of noise which assume to affect teaching and learning. This study aimed at manipulating

Environmental Change: Effects of Context and Mood on Recall of Learning Materials among Undergraduates in Nsukka, Enugu State.

The present study has three objectives. The first is to examine the effects of two contexts (noise and low noise conditions) on recall of learning materials among undergraduate students in Nsukka.

The second goal seeks to investigate whether the physical context alone or the internal context or the interaction of both will enhance recall among the undergraduates in Nsukka.

The third goal is to agree or disagree the claim that disturbances in the environment have implication on human behaviour among the undergraduates in Nsukka.

Would there be any relationship between the participants who studied under the noise condition with those that were studied and tested under the low noise condition? It is hypothesized that there would be statistically significant difference between the performance on recall of participants who studied under noise condition and the performance on recall of participants who studied under low noise condition. This is predicted on the encoding specificity principle (Tulving & Thomson, 1973) and the contemporary retrieval hypothesis (Anderson & Bower, 1974). Both principles maintained that memory performance is determined on the assumptions that the features present at learning are also relevant during retrieval or recall and the memory performance is a function of the interaction of the context in which learning takes place.

Also, it is predicted that there would be significant difference between the performances on recall of participants who studied under happy mood and the performance of those who studied under unhappy mood. This prediction is still based on the encoding specificity principle and the contemporary retrieval hypothesis that emotional materials are remembered more reliably in moods that match the emotional content of the memories.

METHOD

Design

The study adopts a between- subject factorial design with two factors (context and mood). Context was labeled Noise and low noise while mood was labeled as

happy, unhappy and neutral.

Participants

This study employed a simple random sampling technique to select 60 undergraduates of University of Nigeria, Nsukka (UNN), Enugu State who participated in the study. 33 women and 27 men were randomly selected from a population of 118 first year students of the department of psychology, UNN. Their ages ranged from 19 to 29 years with a mean age of 19.7 years. All the participants were assigned into two experimental conditions with thirty participants in each of the two conditions. And 10 of the participants were each arranged into 3 sub-conditions for the mood induction. All the participants started and completed the study. It was their first time of participating in an experiment in psychology and they all volunteered to participate in the study.

Materials / Instruments

The stimulus material for the study was a learning passage of 120 words (Nwangwu, 2006). A Recall Assessment Test (RAT) was developed by the researchers as an instrument for measuring recall. The (RAT) was administered to 25 students (other than those who participated in the study). A cronbach's alpha of .70 was yielded from the pilot study. In inducing the different mood patterns, the Autobiographic Mood Induction procedure modified by Krauth-Gruber and Ric (2000) was used.

Other materials used in the study were two laptops, two projectors and two stop watches. Kenwood amplifier (501), Samsung CD deck 3 loader, Densine mixer and two wharfedele speakers'.wind and sea noise was created for 28 minutes using cubes'Sx sound programmed at 15db/second.

Procedure for Data Collection

The participants were split into control and experimental groups through the simple random sampling technique by writing "A" and "B" "Typed on the paper and then cut into pieces of papers folded to conceal the alphabet each of the papers bore. Sixty (60) of such papers were prepared for equal size of 60 participants for the study. Thus, all the participants who picked the letter B belonged to the control group while those that picked letters A were then distributed into the experimental group. Also, participants were arranged to sit two each on row of five benches making 10 participants in each condition to be induced with different moods. Both the participants in the noise and low noise conditions were induced with happy, unhappy and neutral mood using the autobiographic method. Those in the happy

mood were asked to recall and write any event that makes them really happy. Those in unhappy mood were asked to recall and write any event that makes them sad and those in the neutral mood were told to write states and capitals in Nigeria. Participants in the experimental condition were induced with the wind and sea noise as they were recalling those events. Then after five minutes of recalling the events had elapsed and the answers were collected, the passage was then projected on the screen on a power point slide for another five minutes. The instruction read as follows:

“As you read, pay attention to the underlined words”. After reading the passage for 20 seconds on the screen at the same time frame, the participants were then given a 2 minutes retention interval and the items were distributed to them to write down the underlined words as much as they could remember in any order. After the experiment, the participants were debriefed on what happened.

Data Analysis

The researcher used descriptive statistics to find the mean and standard deviation of the effects of context and mood on recall and analysis of variance (ANOVA) was the inferential statistics used for the test of significance on the effects of context and mood on recall.

RESULTS

Table1: Showing the Mean and Standard Deviation of Effects of Context and Mood on Recall.

Variables	levels	mean	SD	N
Context	Noise	10.40	3.80	12
	Low noise	12.63	3.61	12
Mood	Happy	12.00	3.42	12
	Unhappy	11.00	4.10	12
	Neutral	12.00	4.12	12

The descriptive statistics presented show that participants who studied under the low noise condition obtained higher mean score (M=12.63, SD=3.61) on the recall performance than those who studied in the noise condition (M=10.40, SD=3.80). In relation to mood, participants in the happy and neutral mood conditions obtained the same mean scores (M=12.00, SD=3.42) slightly higher than those in unhappy mood (M=11.00, SD=4.10).The means scores were then

subjected to a 2-way analysis of variance (ANOVA) for the test of significance.

Table 2: Summary of ANOVA Table Showing the Difference in Performance on Recall.

Variable	sum of squares	DF	mean square	F	sig
Context	74.82	1	74.82	5.26	.026 *
Mood	13.43	2	6.72	0.47	.626 #
Context*mood	16.63	2	8.32	0.59	.561 #
Error	768.10	54	14.22		
Total	8831.00	60			
Corrected total	872.98	59			

*= $p < 0.05$. #=Not significant

The result of the ANOVA presented above indicated that participants who studied under the low noise condition performed significantly better than participants who studied under the noise condition $F(1, 54) = 5.26, p < 0.05$. In contrast, the second hypothesis was confirmed and there was no interaction effect between context and mood.

DISCUSSION

The study manipulated context and mood on recall of learning materials among undergraduates. The results of the study indicate that participants who studied and were tested under the low noise condition performed significantly better than participants who studied under the noise condition. Consequently, the first hypothesis that there would be difference between the performances of the participants who studied under noise and the performance on recall of those who studied under low noise condition was accepted. Thus, there is a significant difference on the performances on recall between the participants in the two conditions under which the learning and testing takes place.

Specifically, participants who studied and were tested on recall in the low noise condition performed better than their counterparts who studied and were tested under the noise condition. This finding shows that environmental context has great influence on cognitive performance. This finding is in accordance with the findings of Grant, Bredahl, Clay, Ferrie, Goves, McDorman and Dark (1998) who observed that information is learned together with its context. And the context whether noise or silent has significant effect on cognitive performance especially recall. Also, the findings agree with the work of Smith and Vela (2001), who

obtained similar results on memory performance when the most salient features of the environment were present at the time of learning and testing. This means that noisy environment affects cognitive performance especially recall, negatively. Also, in line with the encoding specificity is learned together with its context and can be useful for retrieval agrees with this result. This means that conducive and testing environment can enhance cognitive performance better than a noisy environment.

The study of klatte, Wegner and Hellbruck (2005), stated that noise exposure in schools and kindergartens adversely affect children's learning and impede poor speech intelligibility. Thus, young children's speech perception is more affected by noise and reverberation than that of older children and adults. Accordingly, noisy environment in learning and testing has no respect for age as well as any class of person.

The result fails to accept the second hypothesis, which stated that there would be significant difference between the performances on recall of participants who studied under happy mood and the performance of those who studied under unhappy mood. This finding was in agreement with the study done by Passer and Smith, (2007) that mood dependent memory is an unreliable phenomenon and that inducing mood may have little or no effects on cognitive performance. And those participants who were induced before the exercise have already overcome those events before the study. Inducing mood to participants is also subjective in that the procedures involved are external rather than internal.

Implication of the Study

According to Smith and Jones (1992), that noise do not only decrease performance on cognitive tasks but also affect the health and morale of both workers and students, no one is however free from the effects of noise in any setting be it home, workplace, school or hospital. The findings of this present study have shed light on the removal of noise around libraries where students read in school. The library in any school environment is known to be a noiseless area as compare to other places of learning and students as well as teachers do make use of the library for intensive reading. It means then that noise affects concentration thereby reducing attention which is one method used in proper encoding of information that might be required for retrieval. Therefore, students should know that reading under noisy conditions affect storage and retrieval of information in the long-run. Also, reading with music through the earphones may affect recall during examinations because the law of reinstatement is being

violated. The features that are present during learning are needed during testing to some extent for quick access to stored information.

The current global warming also is gradual having effects on the lives of people around the world and more especially third world countries where little or no efforts is intended to cushion the effects this is posing to humanity. Hash environmental conditions are not healthy for human lives. Deforestation should be discouraged completely while tree planting should be order of the day.

Limitations of the Study

The present study encountered some setbacks. Among them is that; involving two strong variables in an experiment makes it difficult to control for extraneous variables. It means that the most noticeable variable has more effect on the participants than the less noticeable variable. In this study, mood was suppressed by the amount of noise induced in the experimental group. Participants who were induced with happy mood complained of the noise while those that were induced with negative mood saw the noise as a therapy thereby neutralizing the effect of the mood induction. Also, being a laboratory experiment, the context effect needs to be observed and assessed under real life conditions. Also, the individual difference in the ability of information processing, storage and retrieval was not accounted for, as the students do not have the same intelligent quotient.

Recommendations for Further Research

Following the limitations of the study therefore, the following recommendations are necessary. First, it would be proper to involve only one independent variable in the study as already observed in other studies for proper manipulation. By using only a single variable will give room for counterbalancing to actually account for the effect of the context alone. And mood alone for the study can also account better for results.

Secondly, a field experiment is needed to observe the effect as well as the ecological validity. However, it would be important to use brain scan during the study to ascertain the level of information processing.

Finally, time of the day should be considered in subsequent studies for more facts about the effect time might have on recall.

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