

## Effect of weapon focus on recognition: Implications for eyewitness testimony

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### Abstract

*This study examined the effect of weapon focus on recognition memory. The objective of the study is to determine whether participants in the no-weapon condition would recognize more information about the target stimulus than participants in the weapon condition. Data source was based on 80 senior secondary school students (Mean age = 15.23 years; SD = 2.72) who took the recognition test. One-way independent ANOVA was used in the analysis and the result substantially supported the research hypothesis: participants in the no-weapon condition recognized more information about the stimulus material than participants in the weapon condition ( $p < .001$ ). The effect size value ( $\eta^2 = 0.27$ ) demonstrated that the result was not due to chance. The finding was discussed and its implication to errors of later recognition (i.e., eyewitness memory) was stated. The paper concluded with a call for future studies to work towards increasing the generalizability of their findings.*

**Keywords:** Eyewitness testimony; Recall memory; Recognition memory; Reconstructive memory framework; Weapon focus effect.

## INTRODUCTION

The human memory is a fascinating process. Researchers probing the workings of human memory (e.g., Firestone, 2008; Klatzky, 1980; Maylor & Logie, 2010; Schacter, 1999; Westerman & Payne, 2005) have grappled with three important questions: how does information get into memory; how is information maintained in memory; and how is information pulled back out of memory? These challenges correspond to the three key processes involved in human memory, namely: encoding (i.e., putting information into memory), storage (i.e., maintaining information in memory), and retrieval (i.e., getting information out of memory). The recognition phenomenon provides important insights into understanding the retrieval process or the art of getting information out of memory. In recognition task, a participant is given items from a list of words he/she has studied and is asked to indicate whether or not he/she recognizes them as having been part of the list. Haist, Shimamura, and Squire (1992) defined recognition as tasks in which a participant is asked to reproduce information without the benefit of external cues. Recognition and recall are usually defined in terms of each other. In recognition, the participant must choose from among elements present, detecting which ones have already been encoded and stored. In recall on the other hand, these cues are not present, instead the individual is responsible for (perhaps) producing his or her own cues internally

(Eysenck & Keane, 2005; Guild, 2015). The advantage of recognition over recall is that in recognition more cues are available at the time of retrieval, resulting in more effective memory search. The differences between recall and recognition can be sensed in statements such as, "I have problem with names" (statement depicting recall task), or "I never forget a face" (statement depicting recognition task).

There is a commonly held belief that when someone witnessed a crime, the individual would most probably recognize the criminal's face or the criminal act itself. Eyewitness expressions like, "I know what I saw!" or "I will never forget that face!" often overwhelms other types of evidence in courtrooms. However, though most people seem to put their faith in people who saw an event with their own eyes, reconstructing an event can sometimes be seriously misrepresented (Loftus, 1979). Loftus and Palmer (1974) demonstrated in a classical experiment that what goes into memory is not always the same as what comes out. There are possibilities that some innocent people might have been found guilty of crimes they never committed and may have been sent to prison on account of mistaken eyewitness memory. Wells and Olsen (2003) for example, claim that seventy-five percent of more than one hundred convicted persons in the United States were found guilty on the basis of mistaken eyewitness identification. Although there are no official records in Nigeria, casual observation

suggests that errors made by eyewitnesses were the single most pervasive element leading to false conviction. One way in which eyewitness testimony can be distorted is by weapon focus. Weapon focus signifies a witness to a crime diverting his or her attention to the weapon the perpetrator is holding, thus leaving less attention for other details in the scene and leading to memory impairments later for those other detail (Loftus, 1979; Makhubela, 2015; Narter, Jameson, & Lenhardt, 2008).

Support for the role of weapon focus effect in recognition can be found in several experimental studies (e.g., Cronin, 2009; Fawcett, Russell, Peace, & John, 2013; Johnson & Scott, 1976; Loftus, Loftus, and Messo, 1987; Lorrain & Daniel, 2007; Saunders, 2009). Loftus, Loftus, and Messo (1987), for instance, asked participants to watch one of two sequences: a person pointing a gun at a cashier and receiving some cash; and a person handing a cheque to the cashier and receiving some cash. Specialized equipment tracked the participant's gaze as they viewed the video to determine with what frequency (and for how long) they fixated upon the item of interest (the cheque or the gun). Relative to the control condition, participants in the weapon condition looked at the item the man was holding more frequently and for greater duration. When tested for details of the event, performance was better for the control condition relative to the weapon condition. Thus, the presence of a weapon at

a crime scene is likely to impair an eyewitness's ability to accurately identify the perpetrator's face. Other recent research (e.g., Davis, Smith, & Blincoe, 2008; Fawcett, et. al., 2013; Pickel, French, & Betts, 2003; Pickel, Ross, & Truelove, 2006; Valentine, Pickering, & Darling, 2003) show that there is reliable evidence that weapon presence impairs eyewitness memory. Baddeley (1999) maintains that fear puts a crucial feature of a situation into sharp focus, and may reduce the reliability of the witness's account of peripheral features. Attention on a weapon could be so concentrated that it causes the exclusion of every other thing. As Loftus (1979) maintained, the weapon appears to capture a good deal of the victim's attention, resulting in among other things a reduced ability to recall other details from the environment, to recall other details about the assailant, and to recognize the assailant at a later time. Although some research has suggested that the reason why attention is concentrated on a weapon is due to the unusualness of the situation (e.g., Johnson & Scott, 1976), most research in this area implicate cognitive arousal as the reason for the weapon focus.

Overall, the evidence from weapon focus research suggest that memory is poorer in the weapon condition. How does misleading post-event information distort what eyewitnesses report? The reconstructive memory framework (Loftus, 1979) presents useful explanations for

understanding how people who witnessed events with their own eyes might construct memories that are misleading. Loftus maintains that after people have observed an event, that later information about the event (whether it is true or not) becomes integrated into the fabric of their memory. In a classic study to demonstrate this, Loftus and Palmer (1974) show a film depicting a traffic accident and had the participants answer the question. "About how fast were the cars going when they hit each other?" Other participants heard the same question, except the verb "hit" was replaced by "smashed", "collided with", "bumped into" or "contacted". Even though all the participants watched the same film, the wording of the question biased their reports. Participants asked the "smashed" question estimated the fastest speed; those asked the "contacted" question estimated the slowest. The reconstruction framework argues that people's constructive process can raise serious questions about the accuracy of eyewitness testimony. Bartlett (1932) had earlier proposed a similar theory (the schema theory), in which retrieval (i.e., recognition) involves a process of reconstruction. On that account, new information relevant to a previously experienced event can affect recollection of the event by providing a different basis for reconstruction. Such reconstructive processes may be involved in eyewitness studies on post-event information (Eysenck & Keane, 2005; Guild, 2015). Thus, one important characteristic that makes an

eyewitness account inaccurate is the ability to construct memories.

The present study sought to determine if participants in the no-weapon condition would outperform participants in the weapon condition on the recognition test. Thus, the hypothesis tested in this research is that there would be statistically significant difference in recognition memory between participants exposed to the weapon condition and those in the no-weapon condition. The justification for the research hypothesis is based in the large body of evidence which demonstrated that the presence of a weapon impairs eyewitness's ability to accurately recollect and/or recognize details of other events.

## **METHOD**

### *Participants*

The sample for this study composed of 80 senior secondary school students of University Secondary School, Nsukka. The students were randomly selected with the aid of table of random numbers from a population of 134 senior secondary school students who volunteered to participate in the experiment. The participants' ages ranged from 14–17 years (Mean age = 15.23 years; SD = 2.72). All the students who participated in the study are Christians in terms of their religious orientation. Ninety-two percent (92%) of the entire sample were of Igbo extraction, while the remaining eight percent (8%) were non-Igbo.

### **Materials**

The study followed a study-test paradigm. The studied or the stimulus material used in this study consists of two photographs, photo 1 and photo 2. Photo 1 was a photograph of a young man who was seen holding a short-gun in a restaurant; photo 2 was another photograph of the same young man in the same restaurant. However, rather than holding a short-gun, the young man was seen holding a newspaper instead. That is, apart from the short-gun versus newspaper difference, the two photographs look alike. The test material was a yes/no recognition test developed by the researchers. The test asked participants to answer some simple questions about the scene in the two photographs. Sample of the items on the recognition test includes: “the man you saw in the photograph was wearing a red t-shirt?” (item number 1), “is the man on the photograph wearing an eye glass?” (item number 3), there were three cartons of beer beside the young man?” (item number 9), etc. The participants were to respond with only 'yes' or 'no' to these questions. Prior to using the test to measure recognition, the test was shown to four judges to rate the difficulty level of the items. Their assessment led to the removal of two items from the test that were regarded ambiguous, thus reducing the items on the test to 10 items. A pilot study with 35 secondary students (not part of those who participated in the main study) yielded a Cronbach's alpha of 0.67, indicating that the test is somewhat reliable

to measure recognition. Other miscellaneous materials used in the study includes: 2 DLP projectors (specification: RD-JT 90), which were used to display photos 1 and 2 to the participants; 2 countdown timers/stopwatches (model: YGH 112), which were used to maintain accurate study and test intervals in the two weapon conditions; and A4 size paper on which respondents were asked to write down their answers of the recognition test.

### **Procedure for Data Collection**

Prior to the start of the study, participants were told that the test was not for examination, and that participation was voluntary. All the participants viewed one of two photographs. The photographs – photo 1 and photo 2, were displayed on the DLP projectors. Forty participants were randomly assigned to each of the two weapon focus conditions: weapon versus no-weapon conditions, using the table of random numbers. Participants in the weapon condition saw photo 1, a photo of a young man holding a short-gun in a restaurant, while participants in the no-weapon condition were shown photo 2, a photo of the same young man holding a newspaper (instead of a short-gun) in the restaurant. When the participants were seated and ready, they were given the final instructions as follows.

*“A photograph will be projected for you to see on the screen. The display will remain on the screen for 60 seconds, before it would be removed*

*from view. Your task is to look at the photograph very well so as to answer some questions that would follow later”.*

All the participants received the same instruction. After the instruction has been very well understood by all the participants, the photographs were then shown to the two groups of participants. At the expiration of the 60 seconds duration, the photographs were withdrawn from participants' view. An interval of five minutes elapsed before participants were shown the recognition test. Participants were to write down their answers on the A4 plain papers that were provided. Every correct answer gets one mark, while any wrong answer is scored zero. The test interval lasted for five minutes.

#### ***Design/Statistics***

The design of this study is a two group independent-subjects design. The F-statistics (One-way Analysis of Variance, ANOVA) was employed to analyze the data. The SPSS statistical package, version 20 was used for the data analysis.

#### **RESULTS**

Data for analysis was based on the scores obtained from 80 senior secondary school students who took the recognition test. The descriptive statistics indicate that participants in the no-weapon condition performed better on the recognition test than participants in the weapon condition.

The mean scores and standard deviations for the participants' in the weapon and no-weapon conditions were 7.55 (SD =1.87) and 4.72 (SD =1.15) respectively, indicating that recognition performance was better for the no-weapon condition relative to the weapon condition. A salient observation however was that participants in the weapon condition were more likely to recognize what object the young man was holding (i.e., a gun). Figure 1 shows the schematic illustration of the means scores of the two independent conditions of weapon focus.

#### **Place Figure 1 here**

The test of significance on the mean scores obtained by participants in the no-weapon condition versus participants in the weapon condition on the recognition test showed that the differences in mean scores were statistically significant,  $F(1, 78) = 5.62, p < .001, \eta^2 = 0.27$ ). This result showed that participants in the no-weapon condition outperformed participants in the weapon condition on the recognition test. That is, the hypothesis was not rejected. Again, the effect size ( $\eta^2 = 0.27$ ) demonstrates that this result is unlikely to have arisen by chance. Although the effect size value of 0.27 belongs to the effect size category Cohen (1992) classified in the range of small effect size, the effect is not trivial as not to be useful (Kirk, 2005). The result shows that over 80% of the variance was explained by the weapon focus effect.

## **DISCUSSION**

The study examined the effect of weapon focus effect on recognition memory. Data source was based on the data obtained from eighty senior secondary school students who voluntarily agreed to answer a recognition test. Analysis of data shows that even though the two photos used in the study were similar, participants in the no-weapon condition recognized more information about the man in the photograph than participants in the weapon condition. In view of the hypothesis investigated in the study, which is to determine if participants in the no-weapon condition would recognize more information than participants in the weapon condition, the finding show that the hypothesis was not rejected. The finding of this study is consistent with previous studies about weapon focus effect (Cronin, 2009; Fawcett, et. al., 2013; Lorrain & Daniel, 2007; Saunders, 2009). Most past studies seem to be united in observing that relative to the weapon absent condition, participants in the weapon condition tend to concentrate attention on the presence of a weapon such as, the barrel of gun or the blade of a knife during a crime, leaving less attention available for viewing other item (Johnson & Scott, 1976; Loftus & Palmer, 1974). These studies argue that participants in the weapon condition recognized significantly less information than participants in the no-weapon condition. In the present study, careful observation during the retention interval reveal that

participants in the weapon condition paid selective attention to the gun the man in the photograph was holding and discussed more about it during the retention interval than participants in the no-weapon condition did about the man with a folded newspaper. Thus, the implication of the present study is in showing that recognition is not immune to interference. It is obvious then that the selective attention to the gun and possible inferences about the motive of the young man in the photograph led to attenuated recognition in the weapon condition. Faced with conflicting or ambiguous testimony, lawyers, police, and other law enforcement officers tend to put their faith in people who saw events with their own eyes. The present research has shown through its finding that the faith in eyewitnesses may be misplaced. It is necessary therefore to recognize the possibility that recognition memory, such as is evident in eyewitness testimony can be fraught by errors and/or mistakes. Lawyers, police, and other related professionals who depend largely on eyewitness memory (i.e., later recognition) should be weary of the fact that eyewitness testimony has some limitations. They should be skeptical about eyewitness accounts and need to evaluate it critically.

### ***Limitations of the Study and Suggestions for future Research***

Although the weapon focus effect was shown to interfere with recognition in the present study, there are a number of

limitations to consider in generalizing the present finding to eyewitness memory. First, the target stimulus in the present research was a vignette which is not representative of the typical crime scene that is common in today's environment. Thus, the responses generated by the stimulus material may not be consistent with true life event. Second, the choice of secondary school students as sole participants for this study presents a methodological problem in that age may be confounded with weapon focus effect. The effect might have been different if older participants were sampled. In view of these limitations, future research should consider employing real stage-managed scenes so that data from the study can be generalized with greater confidence. More importantly, future studies in this area should sample participants from across age groups so that statements about errors in recognition memory can be made across the life span.

### **Conclusion**

This research examined the effect of weapon focus on recognition memory. The objective of the study is to determine whether participants in the no-weapon condition would outperform participants in the weapon condition on the recognition memory task. Data were obtained from eighty senior secondary school students who were participants in the study. Results substantially supported the proposed hypothesis: participants exposed to the weapon condition recognized less

information than participants who were not so exposed. The finding of the study was discussed and its implications to eyewitness memory were stated. The limitations of the study were stated and suggestions for future research were provided.

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**Figure 1**

Bar chart illustration showing the mean scores on recognition ability of participants in the two independent conditions prior to the recognition test (i.e., a hypothetical mean score) and the mean score obtained at the end of the recognition test.

