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City University of New York

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THE EFFECTS OF WEAPON FOCUS AND AROUSAL ON EYEWITNESS RECALL

by

THOMAS HARDY KRAMER

A dissertation submitted to the Graduate Faculty in Psychology, in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

1984

This manuscript has been read and accepted for the Graduate Faculty in Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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Abstract

THE EFFECTS OF WEAPON FOCUS AND AROUSAL ON EYEWITNESS RECALL

by

Thomas H. Kramer

Advisor: Professor Robert Buckhout

Eyewitnesses to crimes frequently confront a perpetrator with a weapon, leading some investigators to label a less complete (or error-laden) recall of the perpetrator's features as "Weapon Focus." This research tested the hypothesis that the mere presence of a weapon in a mock crime scene is the principal explanation for poorer recall. In a series of studies involving the manipulation of weapon type, timing of onset and total exposure time, evidence was produced which significantly confirmed this hypothesis. The weapon focus effect on recall also occurred in the absence of arousal although arousal often accompanies a witness' response to the sight of a weapon in a crime situation. It was concluded that the weapon, a highly salient stimulus, competes with the features of the perpetrator for the total amount of viewing time and leads to the "Weapon Focus" decrement in feature accuracy recall. Investigation of the effect of arousal itself was done with a paradigm in which a highly shocking stimulus, a gruesome autopsy picture labeled as a police photo, was placed in a series of neutral pictures presented in

a fixed order. In the control condition, the arousing effect of the same autopsy picture was reduced by attributing the source of the photo to a movie studio (M.G.M.). Contrary to previous research by Loftus and Burns (1983) showing a retrograde amnesia effect for stimuli preceeding the high-shock stimulus, the present studies produced an anterograde amnesia effect. The high arousal appears to disrupt the processing of the neutral stimuli which follow it.

Dedication and Acknowledgements

I would like to dedicate this effort to:

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McCloskey and Egeth (1983) question the validity of claims made by forensic psychologists who testify as expert witnesses. The phenomenon of "weapon focus" came under specific attack because its rationale lies in the everyday experiences of police investigators who interview witnesses, rather than in research literature. Meehl (1967) has noted in his discussions of "fireside inductions" that conclusions of this sort cannot be dismissed simply because they do not show up in a search of the Psychological Abstracts. However, the available research on weapon focus and the broader problem of the effects of stress on memory should be examined empirically in order to obviate the objections.

Eyewitnesses to crimes are usually asked to recall the details of actions, appearances and physical characteristics of individuals, objects in the environment (such as car make or license plate number) as well as many other factors. Is that memory reliable? In the context of subtle or direct pressure to supply information, can we trust a witness to be accurate?

Some police investigators, and others (Reiser, 1980) have viewed memory as a conscious and/or unconscious perception of any and all events that take place in an individual's environment. Under hypnosis witnesses to crimes have been asked to "zoom in," "brighten the picture" and "replay it in slow motion," as if they were viewing the event on a video screen during hypnosis. Neisser (1982) has commented

on this tape recorder analogy of the human brain. The investigator, he states:

> "...is drawing on a definite theory of memory; one that he expects the witness to share.... The mental videotape is only the latest in a series of trendy metaphors; it does not fit any aspect of human memory or experience.... A witness who is put in this situation (by a hypnotist) must fake it: he must think and talk as if he were looking at a videotape.... When he subsequently testifies to his confabulation in court, he becomes an accessory to the misuse of metaphor.... Bad metaphors make for bad legal practice as well as bad psychology."

A more likely explanation of memory has been supplied by Tulving and Thomson (1973 p. 369): "Specific encoding operations performed on what is perceived determine what is stored, and what is stored determines what retrieval cues are effective in providing access to what is stored." The key words here are "what is perceived" not what is merely present in the field of vision. There are factors that may affect a witness's perception, memory consolidation, and memory storage in a crime situation that would not normally be present in a non-crime occurence (Ellison and Buckhout, 1981; Loftus, 1979; Yarmey, 1979; Clifford and Bull, 1978). This paper will look at two of these factors: stress on a witness produced by a crime, and competing stimuli (e.g., the presence of a weapon) in a crime episode.

Theoretical Roots

The Yerkes-Dodson Law (Yerkes & Dodson, 1908) was proposed to explain the effect of arousal on learning and performance. The law states that for every task there is an optimal arousal level. Once that physiological level is reached, any higher degree of arousal will have a detrimental effect on performance. In other words, an arousal state such as high stress affects the individual's performance level in an inverted U shaped function. Low levels of arousal cause an individual to perform poorly; then, as stress increases, so does performance. Seriousness of a crime was found to increase identification accuracy. Leippe, Wells & Ostrom (1978) showed that accuracy was greater in the theft of a $50.00 calculator than of a pack of cigarettes. Performance will increase with arousal until the maximum of the U function is reached for that task. If arousal continues to increase without a comparable decrease in task complexity, then performance will begin to drop (Hebb, 1955; Malmo, 1959). The turning point will differ from person to person and task to task, as will the acceleration of the curve (Corcoran, 1965).

Hammerton and Tickner's (1967) study involving parachutists showed that there is a capacity to adapt to a dangerous or stressful situation, when there has been considerable prior experience in such situations. The ability to develop coping strategies for an expected and repeated situation such as parachute jumping is very far removed from the factors that can come into play for a witness to a crime. Expectancy at the start is not focused, events may happen in an unpredictable manner, and the episode itself may evoke a schema which

could be called instantly alarming.

Empirical Research on memory for Violent Episodes

The victim of crime is usually not experienced at being a victim, and is under too great a stress in certain crimes to perform any task including that of maintaining optimal levels of reliable perception. The crime situation is usually surprising, unpredictable, and not under the witness's control, factors which are known to increase stress. In a study of police crime reports, Kuehn (1974), found that in cases such as rape or assault the victims gave a less complete description of the perpetrator than did victims of less stressful crimes such as non-violent robbery. This finding has been demonstrated empirically in a laboratory study by Clifford and Scott (1978), who found that memory for details of a violent incident was significantly worse than for a nonviolent incident, at least among female witnesses to a staged episode involving the sight of blood. Clifford and Hollin (1981) manipulated the violent content of videotaped episodes while measuring galvanic skin responses as a manipulation check on achieved levels of arousal. Subjects showed no significant difference in photo recognition rate between conditions but did show greater arousal to the more violent episode. Subjects scored significantly lower in recalling personal characteristic descriptions in the violent incident condition. In an earlier study (Clifford and Hollin, 1978), high intensity white noise was used to produce arousal during the viewing of a crime episode, while a control group received non-arousing white noise. The results showed a decrease in the aroused group's ability for both recall and recognition of the target individuals. Arousal

produced by shock has been tested and found to have a detrimental effect on facial recognition for female subjects (Brigham, Maass, Martinez and Whillenberger, 1983). Buckhout et al. (1974), although not manipulating arousal, did measure it on a self report seven-point scale immediately following a purse-snatching incident. After a three week delay it was found that the subjects who experienced less stress at the time of the incident were more likely to make a correct lineup choice.

Research on Attention

One effect of being in an unfamiliar, stressful situation appears to be the tunneling of attention to central relevant features. As arousal increases, peripheral stimuli in the environment are more likely to be ignored (Tolman, 1948; Easterbrook, 1959; Eysenck & Willett, 1962; Teichner, 1968). Hockey (1970), studying the effects of loud noises on performance, had subjects perform a central tracking task in conjunction with monitoring six peripheral lights placed at varying distances from the central task. The effect of noise improved performance for the central task while detracting from subjects' ability to monitor the peripheral lights. If no central task was required, noise caused improvement in peripheral light monitoring (Hockey, 1969). These two studies dealt with location rather than the relevance of the stimuli, but it has been suggested that this narrowing of attention occurs for stimuli to which the subject attributes the most importance (Bahrick, Fitts and Rankin, 1952; Baddeley, 1972; Reeves and Bergum, 1972). When confronted with a set of stimuli, one does not give equal attention to all cues. Once one

stimulus or a set of stimuli receives heightened attention, it is usually at the expense of others (Kahneman, 1973). Hagen, Meacham and Mesibov (1970) have also shown this negative correlation between performance on central vs. peripheral tasks. If stimuli are relevant to the task, performance of that task will be enhanced. If not relevant to the task, performance will be impaired (Weltman and Egstrom, 1967; Weltman, Smith and Egstrom, 1971).

These studies give some insight into the plight of many witnesses to a crime. A crime can be a novel, stressful situation that triggers this "tunneling of attention" phenomenon. Often a witness cannot give an accurate description of the perpetrator, even when he or she has been within close range for a substantial period of time. But that same witness can often give an accurate and highly detailed description of the weapon involved in the crime, according to anecdotal evidence supplied by experienced police investigators. To the witness, a face may well have become a peripheral cue, a cue which has lost its potency to grasp the witness's attention in light of the high importance of the central cue, the weapon (and, possibly, avenues of escape). This phenomenon has been labeled "Weapon Focus" by Elizabeth Loftus (1979).

The Johnson and Scott Study

Loftus cited only one experiment in defending the concept of weapon focus in her book EYEWITNESS TESTIMONY, provoking much of the criticism by Egeth & McCloskey (1983). That study (Johnson and Scott, 1976) tested subjects on eyewitness perception and memory for both a

neutral and a stressful event. In the neutral condition, a scene was staged in which a man entered a waiting room complaining about a broken machine and holding a pen in his greasy hands. In the emotion-arousing condition, a man clutching a letter opener in a bloodstained hand entered the waiting room after a heated arguement replete with bottles and chairs crashing in the next room. The ability of the subjects to supply a description of the individual was decreased, at least for the female subjects, in the high emotion condition. It was further reported that the witnesses tended to fixate on the bloody hand and the weapon, giving a better description of these than of the face of the perpetrator.

The subject, already in an aroused state brought on by the entrance of the perpetrator, may have been visually scanning for clues to the nature of the argument and may have become more aware of the presence of the weapon, not only because of its intrinsic attraction but also because the environment as a whole was receiving a heightened degree of visual scrutiny. Then, once the weapon was perceived, it may have become the focus of attention, while the face became a peripheral cue. This initial heightened scanning in the high arousal condition may be responsible for the fact that only 3 out of 24 subjects reported the presence of the fountain pen in the neutral scene, while 23 out of 24 reported the letter opener in the high arousal condition. Johnson and Scott might have found more reports of the fountain pen in the neutral condition had the entrance been preceded by a similar emotion-arousing situation. From many points of view, this study was confounded. It was a barely adequate foundation for defending the existence of weapon focus.

Wells and Leippe (1981) reported on an experiment in which eyewitnesses to a staged crime made identifications from a photo spread and were also tested for recall of peripheral details relating to the crime. Witnesses were videotaped while being cross examined on their memories for peripheral details. Those witnesses who made accurate identifications averaged fewer correct responses on the peripheral detail test than those subjects who made incorrect identifications. A new set of subjects, playing the role of jurors, later viewed these videotapes and gave a confidence rating of belief or disbelief in the accuracy of the witnesses' identifications. Subject jurors assumed a positive relationship between identification accuracy and memory for peripheral details, indicating some disbelief in the testimony of those witnesses who had given less detailed testimony but who, in fact, were more accurate in their identification of the perpetrator.

Stress and Amnesia

Recently a new dimension has been added to the list of possible arousal factors which may be involved in eyewitness identification. Loftus and Burns (1982) have demonstrated a "retrograde amnesia" effect induced by a shocking event. In this experiment two groups of subjects were shown nearly identical film clips of a mock crime, except that one film had a violent ending while the ending of the other was non-violent. Recall of a detail which had occurred just prior to the violent incident was significantly decreased in the shock group. This finding may be a part of the explanation for weapon focus:

the presence of a weapon may not only tunnel attention to it but may also be causing amnesia for other details. This amnesia phenomena will be further discussed in part 3 of this paper.

When a witness is asked to make an identification of a suspect from a recognition test, it is assumed that the witness has processed and stored relevant information into long-term memory. It is also generally accepted that the length of observation has a direct effect on the integration of an image into long-term memory (Loftus, 1972; Hintzman, 1972). Another possible explanation of the weapon focus phenomenon may be that the presence of a weapon divides attention time and shortens the effective observation period of the target (face).

For clarification of this phenomenon, the questions which need to be addressed are: On what is the basis for the anecdotal evidence concerning weapon focus based? Did the information which is being sought, physical description of a perpetrator, ever get into long term storage in the first place and if so, then why is it blocked on the way out? If not, was the critical information not perceived at all or not thoroughly processed, leaving a witness dependent upon a fragmentary impression and vulnerable to the distorting effects of post-event information?

Hypotheses Regarding Weapon Focus

HYPOTHESIS 1: A weapon in the hands of a perpetrator in a crime episode decreases the accuracy of eyewitness description for features of the weapon-carrying individual.

HYPOTHESIS 2: The possession of a weapon by a perpetrator during a crime episode leads eyewitnesses to make fewer correct recognitions of the perpetrator on a lineup recognition test.

HYPOTHESIS 3: The possession of a weapon by a perpetrator during a crime episode leads to higher arousal of eyewitnesses, and that arousal level is negatively correlated with eyewitness memory accuracy for features of the perpetrator.

Experiments on Weapon Focus

EXPERIMENT 1

The first experiment was designed to produce experimentally the phenomenon of weapon focus within a complex crime scene. Drawing on past research with violent crime scenes (Eugenio, et al, 1982), the research paradigm was arranged to simulate a real crime in which witnesses were confronted with the sight of a man carrying a weapon during an assault. The scene was of an attack in which the victim was approached by an assailant who breaks a liquor bottle over his head. There was profuse bleeding and screaming as the assailant stole the victim's money and exits through a doorway. This scene was chosen in the hope of evoking a state of arousal in the subject-witnesses and gave subjects the opportunity to attend to a variety of stimuli other than the weapon or the face of a perpetrator.

Method

Design

The independent variable was the degree of visibility of the weapon during the approach to the victim. In the experimental version, the weapon (glass bottle) was clearly visible, while in the second (control) version, the weapon was held behind the back of the

perpetrator so that it was not visible during the approach. The dependent variables included a feature accuracy score and recognition accuracy score.

Subjects

Sixty-four Brooklyn College undergraduates served as subjects, receiving experimental credit in their introductory psychology course for participation. Subjects were assigned by group to either the experimental or control condition, groups were counter-balanced for day of testing or by division of room, left vs. right side. The groups were tested in separate settings.

Apparatus

The subjects were shown 40 2 x 2 color slides with an accompanying sound track of a staged assault. The experiment was conducted in a darkened room, and a Singer Caramate Model 3300 slide projector was used to display the stimuli. The Caramate projector has a soundtrack capability which was synchronized with the slide presentation. Slides were presented on a screen 3.1 m in front of the projector.

The film for the experimental group depicted three young men playing cards at a table. Two of them accused the winner of cheating, and, after arguing, they got up and angrily stalked out, exiting to the right. While the winner was counting his money, a fourth young man entered the room through a door to the left and behind the table. Holding a bottle in front of him at chest level he moved to within

striking distance of the winner, cursed him and smashed the bottle over his head. The victim slumped on the table as the attacker picked up the money and exited through the rear door. The victim was screaming and one of the card players entered to assist him and then left to get help. In the control condition film, the same scene was used except for five substitute slides in which the attacker held the bottle hidden behind his back when entering the room.

The card table held many details: cards, cigarettes, portable radio, beer bottles and money. The sound track was rich in detail: rock music, arguing, names mentioned, the smash of a bottle breaking, screaming and moaning. The total length of the slide presentation was 70 s. The presentation rate of each slide was 1-1,5 s, timed to match events on the sound track. The perpetrator's face was clearly visible for 17 s, the weapon was also in view for 12 s. of that time. In the control condition the weapon was in view only after the attack and then only for 4 s.

For the recognition test, a Polaroid instant color camera was used to produce a six-picture photospread slide (2 rows of 3 pictures each) containing a photo of the perpetrator and five similar looking individuals. Each photo was labeled with a number. The photos were chest and head shots and each of the individuals was wearing the same zipped-up brown leather jacket, a jacket which was not seen in the slide sequence. The photospread was designed to achieve a high degree of similarity among the photo of the perpetrator and foils (Wells, Leippe & Ostrom, 1979).

Procedure

Subjects were tested in a group setting. They were seated from 2.5 m to 5 m in front of the screen. Subjects were informed that they were going to be shown a short slide show and that all they needed to do was to pay attention. They were asked to put on eyeglasses if required, and to make themselves comfortable. Subjects were told that they would be briefed after the experiment.

Following the slide presentation, questionnaires were distributed (Appendix A). The first sheet had questions relevant to a description of the perpetrator: height, weight, age, hair length, hair color, hair style, nose, lips, eyebrows, facial hair, and body build. There were also questions asking for descriptions of the perpetrator's shirt style, shirt color, pants, shoes, and jewelry. These variables made up the overall feature accuracy score, further described below. The last question asked about the weapon with which the victim was assaulted. This was not included in the calculation of the feature accuracy score since it was predicted that the response would be negatively correlated with it.

The subjects were instructed both verbally and in writing to use their own words in answering each probe on the questionnaire. If they did not remember a particular feature, they were to indicate that they did not remember.

The second page of the questionnaire, labeled WITNESS DATA (Appendix B), asked subjects to supply information about themselves: sex; age; race; height; weight; whether they wore glasses or contact

lenses and if so, were they wearing them during the presentation; how clear the presentation was; how good their view was; how long the crime took; and how long the attacker's face was visible.

Finally, an arousal scale was presented, asking subjects to indicate their feelings, ranging from bored (1) to anxious (7), as they watched the assault take place.

When all subjects had finished the above, a final questionnaire (see Appendix C) was administered as the photospread slide was displayed, to test for recognition. Subjects were told to pick out the perpetrator from the photospread if they thought he was there. The subjects were instructed both in writing and verbally that the perpetrator might or might not be in the photospread. The subjects were also instructed to respond to one of two 7-point confidence scales. One scale was for subjects who believed the perpetrator to be present in the photospread, the other for subjects who believed that none of the photos was that of the perpetrator.

The criteria for scoring the feature accuracy measure were established from a standardized checklist of facts about the perpetrator's appearance gleaned from averaged repeated observations of the slides by a group of judges (N = 59). For height, weight and age, a "hit" was scored if the estimate fell between plus or minus one standard deviation of the mean values reported by the judges. All other features used the modal response of the judges to indicate hits. Correct responses, (hits) were scored as +1, incorrect responses (misses) were counted as -1, and "don't remembers" were scored as 0. The algebraic total of this count made up the feature accuracy score.

The maximum achievable score was a +17, the minimum a -17. A composite recognition accuracy score was computed in a similar manner, wherein a correct identification was assigned a score of +1, a mistake (false alarm) got a -1 and a non-recognition response was scored as 0.

Results

Manipulation Check

There was a significant, $F(1, 62) = 4.552$, $p<.05$, difference in the mean arousal ratings between groups. The modal response of the weapon highly visible (WHV) group was 7 "anxious", while the modal response of the weapon less visible (WLV) group was 3 "interested".

Feature Accuracy (Recall)

A t test on the feature accuracy scores showed a significant effect for weapon visibility, $t(62) = 3.224$, $p<.01$. The WHV group gave an overall poorer description of the perpetrator than did the WLV group. The mean score for each group was as follows: WHV = 0.724, S.D. = 3.927 and WLV = 3.628, S.D. = 3.282 (see Figure 1).

Insert Figure 1 about here

Recall of Specific Details

In analyzing the raw percent accuracy scores of each component of

the feature accuracy score, it was found that the WLV group was more often correct on all variables except for hair color, shirt color and weapon. The widest margin of difference was seen in the height and age description of the perpetrator. There was a highly significant difference in recall of the weapon, $X^2 = 24.1039$, $p<.001$). All subjects in the WHV group correctly identified the weapon, while only 42.9% of the subjects in the WLV group identified it (see Figure 2).

Insert Figure 2 about here

Recognition Accuracy

In the lineup recognition test neither group reached even chance level for correct choices. There was no significant difference between the two groups even though the WLV group was correct 10.0% of the time, while the WHV group had zero correct identifications. The largest percentage (35.9%) of the combined group of subjects stated that they didn't recognize anyone, even though the perpetrator's photo was present in the array. The wrong man was identified by 26.6% of the subjects. Others in the array including the perpetrator, were chosen less than 10.0% of the time. A multiple regression analysis performed on the photo array recognition accuracy scores showed no substantial contribution of witness sex, witness race, emotional arousal or visibility of weapon on the degree of recognition accuracy. These results were undoubtedly affected by restriction of the range of the variable.

Interaction of Arousal and Weapon Focus

Across both groups, arousal ratings showed a significant, $r(62) = -0.2449$, $p<.05$, negative correlation with feature accuracy score. Figure 3 shows the feature accuracy scores by arousal results when the arousal ratings were collapsed into a three point scale. "Bored" thru "neutral" became low arousal, "interested" thru "bothered" became medium arousal, and "upset" thru "anxious" became high arousal. There was little correlation between arousal ratings and sex of the subject. A two-way ANOVA of arousal by witness sex on feature accuracy score showed a significant arousal effect, $F(1, 62) = 4.552$, $p<.05$, but there was no significant sex effect or sex by arousal interaction. A two-way ANOVA for feature accuracy score by arousal on each separate group (WHV and WLV), showed no effect of arousal in the WLV group, but arousal did approach significance, $F(2, 26) = 3.058$, $p=.0642$, in the WHV group. As shown in figure 3, those subjects in the WHV group who reported high arousal had the poorest recall of the features of the perpetrator.

Insert Figure 3 about here

Dummy variables were used to estimate one parameter each for witness sex, witness race, and weapon visibility. These variables along with emotional arousal ratings were used in a regression analysis of feature accuracy measure. The results of this analysis are

presented as F scores in Table 1. There was no substantial contribution to the variance in feature accuracy scores due to either witness sex or race. There was a significant, $F(1, 59) = 7.87$, $p<.01$, effect due to emotional arousal and a significant, $F(1, 59) = 9.05$, $p<.01$, decrease in feature accuracy scores due to the high visibility of the weapon.

Insert table 1 about here

Discussion

The experiment demonstrated that a highly visible weapon in the hands of a perpetrator negatively effects the accuracy of a witness's description of that perpetrator. The difference observed between the two groups in ability to describe the weapon points to the possibility that these subjects in the WLV group may have been focusing their attention on stimuli other than the weapon. Using the total time involved in the crime effectively to register a description of the perpetrator is disrupted by the sight of the weapon. Witnesses have less time to concentrate on the perpetrator's features, less information to store and ultimately less complete information in memory storage.

The role of emotional arousal on feature accuracy scores appears to have had its impact primarily on the WHV group, with much less

effect on the WLV group. When the feature accuracy scores were examined in a treatment by arousal array, the only instance in which average feature accuracy scores (which can vary from -17 to +17) dropped to a negative value was among subjects who had high arousal scores and happened to be in the WHV treatment condition.

Sex differences have been reported for memory of violent incidents by Clifford and Scott (1978), and in the only previous experiment on weapon focus (Johnson and Scott, 1976). These studies had led us to expect a similar outcome. However, no significant effect due to sex was found, nor was any sex by emotional arousal factor involved in the decreased ability of feature recall. Similar results of no sex differences in feature recall or identification have recently been reported for a violent scene by Yarmey and Tressillian Jones (1983).

There are a number of problems with the above study which need to be addressed, as they may have affected feature accuracy scores. First and most central is the fact that in both groups there was a weapon present. In the WHV group the weapon is highly visible, being carried directly in front of the chest against a background of a black tee shirt. In the WLV group the weapon was hidden behind the back until the perpetrator was within striking distance. Although the bottle was not initially seen in the sequence, it was obvious that there was something behind the back of the perpetrator.

A second factor which may have decreased feature accuracy scores was that the scene was fairly complex. There were a number of different individuals, an argument, card players stalking out amidst

name calling and insults, plus tables, chairs and a multiplicity of objects within the visual field. There was also the component of a violent attack whose aftermath involved profuse bleeding and loud screaming, all against a background of loud music. Noting that arousal was negatively correlated with the feature accuracy score, it would seem necessary to attempt to isolate the weapon focus phenomena from high arousal and the confusion that it may involve.

When the various factors were put into the regression analysis it was deemed prudent to include race of the witness as one of the variables. The ability to recognize someone of your own race better than of a different race has been well documented (Malpass & Kravitz, 1969; Luce, 1974; Scott and Foutch, 1974; Brigham and Barkowitz, 1978). However, much controversy on this point still prevails (see Lindsay & Wells, 1983). The results of this regression analysis, however, did not show any difference between white and non-white witnesses.

The relative dearth of positive identifications on the photospread was at first surprising. When considering that the episode was short and that the photospread had six similar looking individuals all dressed in the same jacket and standing against the same background it becomes understandable. The presence of a number of individuals at a crime scene has been previously shown to reduce recognition rate (Maass & Brigham, 1982).

Experiments 2a - 2d

To try and isolate the phenomenon of weapon focus, the paradigm described above was stripped of the extraneous factors common to a scenario which was rich in ecological validity in an effort to test for weapon focus in the absence of emotion arousing stimuli and competing individuals. A series of experiments was conducted in which only one individual appeared in a short series of slides. The design required that the person carry either a weapon or a neutral object. The dependent variables were essentially the same as in experiment one: feature accuracy score with the individual components and recognition accuracy. There was no soundtrack accompaniment and very few peripheral objects in the scene. No other person was present, and, most importantly, no assault took place.

The following four experiments systematically varied the length of exposure of both the weapon or neutral object and the face of the individual (see Table 2).

Insert Table 2 about here

The scene was composed of six slides. Slide 1: the individual entered through the first of two sets of adjoining double doors; Slide 2: the person passed the second set of doors; Slide 3: a full face

shot of the individual (this was also the closest shot); Slide 4: profile shot, walking past a push broom; Slide 5: a 3/4 profile, passing a fire extinguisher; Slide 6: profile shot of the person leaving the first of two sets of double doors.

The back wall and doors were all painted flat black, each set of doors had an EXIT sign over them. During the time that the slides were shot, the target individual held this position constant while the stimulus (weapon or neutral object) was exchanged in order to control for camera angle and distance.

The following series of experiments (2a thru 2d) used the same method and stimulus material, differing only in exposure time of the individual's face and the object carried. Therefore, a complete methods section is given for Experiment 2a only and an abbreviated method section is given for Experiments 2b thru 2d. Subject data and stimulus slide descriptions are given for each experiment. The procedure, identical in all studies, will be reported only for experiment 2a. An overall results section is included in which witness sex and race, emotional arousal, condition of object carried and sub-experiment were studied in a regression analysis to determine which of these factors may have contributed to any differences in observed feature accuracy score and recognition accuracy.

EXPERIMENT 2a

The first step was to test whether the new stimulus material would produce the weapon focus effect. In this relatively simple scene a man walking from one set of doors to another, carrying either a weapon or a magazine. If the arousal ratings are essentially the same across groups and the weapon focus effect occurs, a possible dichotomy between heightened arousal and the phenomenon of weapon focus would be indicated. If this were the case, then there could be a split in the investigation with degree of arousal receiving separate attention. If weapon focus were still intact without arousal then the presence of a weapon might possess some intrinsic element which captures attention without the aid of a heightened arousal state. On the other hand, if arousal is necessary for the effect, then perhaps it is not the weapon which draws attention but rather a pattern of active evasion of the perpetrator's face and a scanning for substitute stimuli to attend to. One possibility is a behavior pattern aimed at reducing the probability of eye contact with a potential adversary. Argyle (1967) points out that a lowering of eyes by one individual is an admission of fear as well as submission to the other individual. Kendon (1967), has referred to this as "point granting signals." This being the case, some stimuli in the environment might benefit from this diversion of gaze and receive more attention. That stimulus might just be a weapon.

Method

Subjects

Sixty-four Brooklyn College undergraduates served as subjects, receiving experimental credit in their introductory psychology course for their participation. There were 65.8% females and 34.2% males in the experiment. Testing was done in groups. The experimental and control groups were tested in separate sessions.

Apparatus

Subjects were shown six 2x2 color slides of a walk through scene. The experiment was conducted in a darkened room in which a Singer Caramate Model 3300 slide projector was used to display the stimuli. The Caramate Projector's automatic advance was timed for 3 s per slide. Slides were shown on a screen approximately 3.1 m in front of the projector.

The film depicts a man in the same setting as described earlier. In the man's hand is a meat cleaver with blood-like ketchup on the blade. In the control condition, the man is carrying a news magazine (Social Action and the Law). In every slide the weapon or paper is clearly visible. A six-picture photospread slide similar to that used in Experiment 1 was composed. It differed only in the photographs used. The target individual's photograph was matched to photos of five other similar people.

Procedure

Subjects were told that they were going to be shown a short slide show and that they would have the experiment explained to them at the end. They were seated from 2.5 m to 5.0 m in front of the screen. They were instructed to put on eyeglasses if required, and to make themselves comfortable. Three slides of scenery were presented just before the stimulus to adjust the subjects' eyes to the opening and closing of the slide projector's shutter. The subjects were told of the purpose of these slides.

Following the slide presentation, questionnaires were distributed. These questionnaires asked for the same information as in Experiment 1 except that the word "person" was substituted for "attacker." For example "CAN YOU TELL US THE HEIGHT OF THE PERSON?" replaced "CAN YOU TELL US THE HEIGHT OF THE ATTACKER?" The last question, "WHAT WAS THE VICTIM ASSAULTED WITH?" was replaced by "WHAT WAS THE PERSON CARRYING?" (see Appendix D). The data collection procedure was the same as in the previous experiment, with one important difference: subjects were told that they must answer every question, that "can't say" or "I don't remember" were unacceptable answers. They were instructed that if they didn't remember, then they had to make their best estimate. This forced-choice procedure represents an attempt to heighten ecological validity by mirroring current police interrogation methods. This is not to say that the police tell witnesses to guess, but officers are expected to fill in blanks on a description form and they often push both subtly and hard to avoid leaving gaps in a report.

Feature accuracy scores were calculated in the same manner as in Experiment 1. The second page of the questionnaire "WITNESS DATA" was similar to that used in Experiment 1 (see Appendix E) and the photospread questionnaire (see Appendix F) was similar to that used in the earlier Experiment. However the photo spread questionnaire did not mention that the individual might not be present and did not include a confidence scale for subjects who didn't believe the individual to be present. The subjects were instructed that the individual seen in the slide presentation was in the photospread and that they should make their best choice.

Results

The results of Experiment 2a show a significantly lower feature score, $t(36) = 3.845$, $p<.001$, for the subjects who viewed the individual when he was carrying a weapon (cleaver). The group that viewed the man with the news magazine had a mean feature accuracy score of 3.105, S.D. = 3.364. Subjects who witnessed the man with the weapon had a mean feature accuracy score of -1.158, S.D. = 3.468. The largest disparities in specific feature recall were for lips and facial hair. The neutral object group had higher or equal recall as compared to the weapon group on all variables except hair style, skin color and jewelry. Percent correct of each feature by group is shown in Figure 4.

Insert Figure 4 about here

Describing the Weapon (Object)

Recall of the object that was carried showed a significant difference ($X^2 = 7.125$, $p<.05$) between groups. The group that saw the weapon had 100% recall of it. Only 68.4% of the subjects in the other group recalled having seen the news magazine.

Recognition Accuracy

There was no difference in percentage of lineup recognitions. Both groups scored approximately one-third correct identifications.

Arousal

Ratings of arousal for both groups were low and not significantly different. Once again, there were no sex differences in either degree of arousal or feature accuracy score.

Discussion

Experiment 2a replicated and extended the findings of the previous experiment. The weapon focus effect was replicated in a fairly uncomplicated situation. There were no other individuals present from which confusion of physical attributes might arise. The heightened arousal found in the previous experiment (in which a crime

had been committed with the accompaniment of blood, screams, and a theft) was minimized. The influence of witness sex remained an undetermined factor in feature accuracy scores.

This experiment allowed for the direct comparison of objects carried by an individual. The first a priori prediction that a weapon would attract attention and cause lower feature accuracy and increased weapon recall was upheld.

Recognition accuracy on the photospread test, although not high, was well above chance level for both groups, a factor which is attributable to the lower complexity of the event shown.

EXPERIMENT 2b

In this experiment the point of interest was whether concealing the face of the man with a mask in the beginning of the sequence would have any effect on feature accuracy score or recognition accuracy. One possible outcome might be that subjects deprived of the opportunity to see the face would attend initially to the weapon. When the face became visible subjects might turn their attention to it since it would now be a new stimulus in the environment. Attention to the target individual is enhanced by the third slide, which led up to the exposure of the face, thereby focusing the action around the head. Additionally, information about the weapon might already have been obtained, thus freeing the subject to search for new stimuli. A second outcome, one following from the original hypothesis, would be that once the weapon is in view, it would capture the subjects' attention and retain it, even when the face-concealing mask is removed. Therefore, it is to be expected that feature accuracy in this situation would be lower, or at least equally depressed, when compared to a situation in which no mask was worn.

Method

Subjects

Thirty-two Brooklyn College undergraduate students served as subjects. There were 68.8% females and 31.2% males in the experiment. They received experimental credit in their introductory psychology

course for participating. Testing was done in a group setting. The experimental and control subjects were tested in separate groups.

Apparatus

The scene was composed of six color slides where the target individual was in the same setting as described earlier, but, in the first two slides the man was wearing a nylon stocking over his face. In the third slide the individual is shown removing the stocking. His face is clearly shown but the mask is not yet completely off his head. The fourth slide is a full face shot with the mask in the man's hand by his side. The fifth and sixth slides are parting profile shots. In the control condition the sequence was the same except that the person is shown carrying the news magazine rather than the cleaver.

Procedure

The procedure was the same as in the previous experiment.

Results

The results on feature accuracy scores showed a significantly lower feature accuracy score, $t(30) = 4.329$, $p<.001$, for the subjects who were shown a scene of the man carrying a weapon. The group that viewed the news magazine being carried scored a mean of 3.187, S.D. = 3.331. The subjects who viewed the weapon scored a mean of -1.875, S.D. = 3.283. Percent correct on each component of the feature accuracy score by group is shown in figure 5. The group that viewed the individual carrying the neutral object had higher recall for all

features except hair color and eyebrows. Skin color recall was 100 percent for both groups.

Insert Figure 5 about here

Describing the Weapon (Object)

There was a significant difference, $X^2 = 12.345$, $p<.01$, in recall of the object carried. Recall of the weapon was 86.7% correct, while only 25.0% correctly remembered the news magazine.

Recognition Accuracy

There was no difference in percentage of lineup recognition between the two groups. Again, both groups had approximately one-third correct identifications.

Arousal

Reports of arousal by subjects did not differ across groups. All subjects rated their level of arousal in either the low or medium range of the scale. High emotional arousal was not reported by any subject of either group. There also was no relationship between arousal or gender on feature accuracy scores.

Discussion

The results of experiment 2b showed no effect of the attempt to draw attention to the face of the individual. This attempt was made by first having a mask over the face of the individual and then having it removed, thereby centering action about the face. One indication that this might have worked at least for the news magazine group is that the recognition for the object that was carried showed a substantial lowering of recall as compared to the same variable in experiment 2a. Arousal was again low for both groups. Witness gender also had no effect on feature accuracy scores.

Lineup recognition paralleled results obtained in experiment 2a. Taking this fact into account as well as the similarity in the feature scores for each group, it may be safe to assume that depriving the witnesses of a view of the face in the first two slides (one-third total time) had no significant effect on these two critical dependent measures.

EXPERIMENT 2c

Experiment 2c was designed to test whether the weapon focus effect would be maintained if subjects were given the opportunity to view the individual initally without the weapon. The previous experiment failed to heighten attention on the features of the individual, perhaps because of the presence of the weapon throughout. If the weapon were not present for the first one-third of the slide sequence, then the subjects might take in enough information to counteract the weapon focus effect.

Method

Subjects

Forty-eight Brooklyn College undergraduates served as subjects. There were 72.9% females and 27.1% males in the experiment. They received experimental credit in their introductory psychology course for participating. The subjects were run in groups, however the experimental and control subjects were run separately.

Apparatus

The stimulus material in both the experimental and control condition showed the individual empty handed for the first two slides. The third slide (the only full-face shot) and the following three slides, showed the individual carrying either the cleaver or the news magazine.

Procedure

The procedure was the same as in the previous experiments.

Results

Feature accuracy scores were significantly lower, $t(46) = 3.23$, $p<.01$, for those subjects exposed to the weapon. Subjects who viewed the individual carrying the news magazine scored a mean of 1.68, S.D. = 3.43, while subjects who viewed the weapon scored a mean of -2.09, S.D. = 4.59. The neutral object group had a higher correct response rate than the weapon group for all feature variables except hair color and lips. Figure 6 displays percent correct for each component of the feature accuracy score.

Insert Figure 6 about here

Describing the Weapon (Object)

There was a difference in recall of weapon vs. the news magazine but it was not significant. The weapon was correctly recalled by 91.3% of the witnesses and the news magazine was recalled by 80.0% of those witnesses.

Recognition Accuracy

Lineup recognition showed the news magazine group making 56.0% correct identifications while the subjects who saw the weapon made 34.8% correct choices. Although there was a 20.0% differential, it was not statistically significant.

Arousal

Ratings of arousal were equivalent across groups. Neither arousal or witness sex showed any relationship to feature accuracy.

Discussion

The above results indicate that even when a weapon is not initially observed but is later present there is still a decline in feature accuracy score. There are at least two possible explainations for this result. The weapon was visible for a large proportion of the total time so it is possible that the weapon was being paid attention to, and not the individual's features, for most of the time. The second possibility is that the presence of a weapon for any amount of time is so relevant a cue that it disrupts processing of other information in the environment. Experiment 2d addresses this question.

EXPERIMENT 2d

Experiment 2d was designed to determine whether the presence of a weapon for a short interval (one-sixth total time) would still produce a decline in feature accuracy score. The object carried was introduced on the third slide, thus the onset of the critical stimulus was similar to the timing in Experiment 2c. However unlike Experiment 2c slides 4, 5 & 6 did not show an object being carried. It also deserves mentioning that the third slide contains the best look at the target individual's features.

Method

Subjects

Forty-two Brooklyn College undergraduates served as subjects to fulfill an experimental requirement in their Introductory Psychology course. There were 57.1% females and 42.9% males in the experiment. The subjects were run in groups, however the experimental and control subjects were tested separately.

Apparatus

The sequencing of slides in experiment 2d was such that the only time the weapon or news magazine appeared was in the third slide (full face shot). In all other slides the individual was empty handed.

Procedure

The procedure was the same as in the previous experiments.

Results

Feature accuracy scores for the two groups were not found to be statistically different at the $p<.05$ level. The mean score for the group which viewed the news magazine was 1.105, S.D. = 3.78. The subjects who viewed the weapon had a mean score of 0.22, S.D. = 4.67. The percent correct for each component of the feature accuracy score by group is shown in Figure 7.

Insert Figure 7 about here

Describing the Weapon (Object)

Recall of the object carried was 78.3% for the weapon and 63.2% for the news magazine. This difference did not prove to be statistically reliable.

Recognition Accuracy

Lineup recognition did not substantially differ across groups. The weapon group scored 47.8% correct while the news magazine group scored 42.1% correct.

Arousal

Neither group experienced high arousal as indicated by arousal ratings, nor did they differ.

Discussion

The results of experiment 2d showed that a mere glimpse of the weapon did not lead to substantial differences between the two conditions in feature accuracy scores. This suggests that the presence of a weapon does not serve as an overpowering cognitive influence over other stimuli seen both before and after its viewing. The present results shed light on the findings of Experiment 2c in that the discrepancy seen between the two groups might be accounted for by the total time on target. In Experiment 2c the weapon was not seen in the initial two slides but it was visible for the majority of viewing time. The fact that the weapon is repeatedly the variable that is most highly recalled demonstrates that it does command considerable attention. The outcome of this increased attention is seen in 2c where for the major portion of the presentation the weapon is receiving high attention at the cost of other variables, whereas in Experiment 2d it appeared that the weapon was not present long enough to draw attention away from other variables.

GENERAL RESULTS AND DISCUSSION: EXPERIMENTS 2a - 2d

Dummy variables were used to estimate one parameter each for witness sex, witness race, the presence of a weapon or news magazine. Three parameters were estimated for Experiments 2a thru 2d. Using these variables along with arousal data, a regression analysis for feature score was performed on the combined scores from Experiments 2a thru 2d. The results of this analysis are presented as F values (see Table 3). There were no substantial differences in feature accuracy scores due to sex of the witness, arousal, or nature of the experiment the subject took part in. There was a significant, $F(1, 148) = 31.269$, $p<.001$, effect due to the presence of a weapon or news magazine. Those subjects who viewed the weapon had lower feature accuracy scores, mean = -1.173, S.D. = 4.174, than those viewing the news magazine, who had a mean of 2.19, S.D. = 3.53, (see figure 8).

Insert Table 3 about here

Insert Figure 8 about here

These results lead to the conclusion that the weapon focus effect is a strong phenomenon. It does not appear to be dependent upon the

sex of the witness or on heightened arousal. The effect occurs in an environmentally stark situation without the accompaniment of violence, injury, screaming or theft, as well as in the more complex crime scene employed in Experiment 1.

Experiment 2b represented an attempt to draw attention to the face of the individual by going from a masked to an unmasked face. Experiment 2c gave subjects a chance to view the individual without the weapon initially present. The reason that both of these manipulations failed to counteract the weapon focus effect may be due to the fact that in this experiment both the individual and the weapon were visible for the majority of time. The weapon, competing with all other stimuli, would be receiving the most attention, unlike the news magazine. It is not until the weapon is visible for only a small fraction of the total time (Experiment 2d) that the weapon focus effect is reduced. These results also rule out the possibility that the mere presence of a weapon independent of timing considerations can lead to memory disruption.

There was also a significant effect, $F(1, 148) = 4.566$, $p<.05$, due to the race of the witness. White subjects ($n = 107$), who were the same race as the target individual (white), scored higher, mean = 0.981, S.D. = 4.112, than nonwhite subjects ($n = 52$), mean = -0.423, S.D. = 4.263. A Pearson's Correlation between witness race and feature accuracy score proved to be significant, ($r(157) = 0.1573$, $p<.05$). However, even though there was a significant correlation, the magnitude was small (accounting for less than 5% of the variance) so that this variable has little predictive value for feature score and

may account for the lack of a race effect in Experiment 1.

EXPERIMENT 3

Experiment 3 was designed to test whether a shortened initial viewing of the weapon would lead to a decrease in feature accuracy scores. This view would be for one-third of the total time of the slide presentation. This duration of weapon visibility and the point in time of its appearance allows for two hypotheses to be tested. First, if the weapon is present for only a small portion of the total viewing time, then it is predicted that the weapon focus effect will not occur. The second prediction is that the initial presence of the weapon will make little difference in feature accuracy scores. In other words, the presence of a weapon will not interfere with or adversely affect the perception of an individual once the weapon is no longer in view.

Method

Subjects

Sixty-two Brooklyn College undergraduates served as subjects to fulfill an experimental requirement in their Introductory Psychology course. There were 69.4% females and 30.6% males in the experiment. Subjects were assigned as a group to either the experimental or control condition, and were tested in separate group settings.

Apparatus

The slides used in Experiment 3 were from the same set used in experiments 2a - 2d. The sequencing of slides was such that the weapon or news magazine only appeared in the first and second slides. In all other slides the individual was empty handed.

Procedure

The procedure was the same as that used in Experiments 2a - 2d.

Results

Feature accuracy scores for the two groups were minimally different. Mean score for the weapon group was 0.21, S.D.= 5.01, and for the news magazine was -0.14, S.D.= 4.07, (see figure 9).

Insert Figure 9 about here

Describing the Weapon (Object)

Recall of the object carried indicated a minimal difference between the two groups. Within the newsmagazine group 55.2% of the subjects correctly recalled it, and 60.6% of the weapon group had correct recall of the object.

Recognition Accuracy

There were no substantial differences between groups in lineup recognition rate. The subjects who viewed the weapon-carrying individual scored 57.6% correct identifications, while the subjects in the news magazine group scored 60.2% correct.

Discussion

The results of Experiment 3 showed that an initial view of a weapon does not necessarily alter the subsequent perception of other stimuli within the viewing field. This is not to say that the weapon was ignored, for a majority of subjects in both groups did recall what the individual was carrying.

The results of Experiments 2c and 2d support the proposition that time on target, a target that intrinsically draws attention, is the critical variable in the weapon focus phenomena. It appears that a weapon draws attention to itself only during the time it is visible. Its presence does not cause such arousal or surprise that it brings on a memory deficit for features of the individual. Apparently the weapon competes with other stimuli in the environment for attention and usually wins out. However when the weapon is not visible, then the viewer attends to other stimuli, i.e., the target individual's features.

GENERAL DISCUSSION ON WEAPON FOCUS

Hypothesis 1 predicted that the presence of a weapon would decrease the accuracy of eyewitness memory for features of the weapon-carrying individual. This hypothesis has been confirmed in a variety of situations as well as with two different weapons (a bottle and a meat cleaver) and two different target individuals. However, the mere presence of a weapon does not predicate decreased recall of features. The length of time a weapon is visible plays a major role. Contrary to the only previous report on weapon focus (Johnson and Scott, 1976), no sex differences were observed.

Hypothesis 2 predicted that the possession of a weapon by a perpetrator during a crime episode would lead to fewer correct recognitions of the perpetrator by eyewitnesses on a lineup recognition test. This prediction was not supported even though it would seem to be a logical outcome when taking into account the fulfillment of hypothesis 1. However, hypothesis 2 is not necessarily totally invalidated by these data. The length of observation time was short, from 12 to 18 s and was interrupted every 3 s by slide changes. Although there were significant differences between the experimental and control groups' feature accuracy scores, all scores were relatively low as compared to a maximum possible score of 17. Also the photospread used was especially difficult because such high similarity among choices had been achieved.

Hypothesis 3 predicted that the mere possession of a weapon by a

perpetrator during a crime episode would lead to reports of higher arousal by eyewitnesses and that arousal level would be negatively correlated with eyewitness memory accuracy for features of the perpetrator. This prediction was upheld in Experiment 1 for a crime situation. However, Experiments 2a thru 2c showed that the weapon focus effect can exist without accompanying emotional arousal. It may be that the weapon gives the best information for predicting future behavior, and that may be relevant to the observer whether in an aroused state or not.

Buswell, (1935) had noted that time spent viewing a picture was not evenly distributed but, rather, that a relatively small area would receive a large proportion of fixations. These results were later explained on the basis of subjects fixing on areas of information (Antes, 1974; Mackworth & Morandi, 1967; Mackworth & Bruner, 1970; Pollack & Spence, 1968). In this context, a weapon becomes an area from which information will be sought. The information may be "What is it?" "Is it pointed at me?" "Is it about to be used?" Loftus & Mackworth (1978) have reported that subjects "...tend to look earlier, more often and for longer fixation durations at informative as opposed to non-informative objects in pictures." Considering the relevance of the information to be gathered, it would be expected that these parameters would be exaggerated when the informative object is a weapon. Yarbus (1967) has demonstrated that surprising objects in a picture tend to receive heightened fixation. The fact that a weapon is an atypical object may lead to surprise in a witness, thus adding further to his/her tendency to stare at it.

The above studies help in gaining some insight into the results of this investigation. Laboratory studies, however, are far removed from the plight of an eyewitness confronted by an individual carrying a weapon.

The ethics of confronting subjects with actual adversaries do not allow for proper demonstration or measurement of such factors as a lowering-of-gaze response. Diversion of gaze would heighten the probability of the weapon falling within the visual field and being fixated upon. While this does not block out perception of all other stimuli, it does depress those other stimuli which would improve eyewitness identification. Nowakowska (1983), in discussing her model of attraction mechanisms on perception, postulates that there is a conflict between terminating a glance at one focal point and starting a glance concentrating on some other focal point. The conflict exists between the attraction forces of the two focal points. This conflict was metaphorically exemplified by comparing it to TV channel switching. If you are watching an interesting movie, but a different channel is broadcasting a basketball game in which you are also interested, then the longer you watch the movie the more curious you will become about the score of the game. If you switch channels and learn once the score, the attraction for the movie returns to a high level, and the channel may be switched back. The attraction of a weapon may be high enough for the viewer to cut short the viewing of another focal point and go back to the weapon focal point. The high attraction of the weapon may also force a return of glance to its focal point rather than to the next new point. The weapon would thereby receive longer and more frequent glances than some other

object which may be carried by an individual.

To sum up, it can be concluded that, even in the laboratory, weapon focus is a robust phenomenon which appears to be dependent upon the proportion of time the weapon is visible. Although only speculative, it is likely that the weapon focus effect is interactive with, although not dependent upon, both heightened arousal and diversion of gaze, and that these factors would produce a greater impact in a real life situation than in a laboratory setting.

Research on Arousal

The main objective of this research was to test the hypothesis that a mentally shocking event can lead to memory failure for incidents that took place just prior to or immediately following that event. Such an event can be criminal. Witnesses and victims to crimes have reported memory deficits for short periods of time surrounding the incident as well as complete blackouts (traumatic neurosis) for any detail of the incident. This line of research is related to weapon focus to the extent that the presence of a weapon may produce a shock.

Using a film with either a violent or nonviolent ending, Loftus and Burns (1982) have demonstrated what has been referred to as retrograde amnesia produced by a shocking event. This film portrayed the a bank robbery. Following the robbery, the robber walks quickly out of the bank. Two employees pursue the robber into a parking lot, where two young boys are playing. In the violent version, as the robber approaches the getaway car he turns and fires at the two employees but hits one of the boys in the face. The boy falls, bleeding, his hands clutching his face. The nonviolent version is identical except just prior to the shooting the film returns to the inside of the bank, where customers and employees are being calmed by the bank manager. Twenty-five probe questions were administered. The critical item tested for was the number on the back of a football jersey worn by the boy who was shot. A large number of subjects were tested (N = 226). A memory deficit was observed for the number on the

jersey for the subjects who viewed the violent version of the film. It was suggested "that mentally shocking episodes may disrupt the lingering processing necessary for full storage of information in memory." (p 322).

A shocking event within the context of a filmed episode is very similar to the paradigm used to produce the Von Restorff effect (Von Restorff, 1933). The Von Restorff effect is the facilitation of learning of a critical item that is in some way isolated from a homogenous background. This isolation might be accomplished by putting a meaningful word within a list of nonsense syllables or printing one word in red in a list printed in black. This "isolation effect" showing enhanced recall for the critical item was the main focus of early research investigations into the Von Restorff effect (for a review see Wallace, 1965). The spread of the isolation effect, (the enhanced learning of terms adjacent to the critical item), or what can be referred to as the association strength of the critical item, was reported (Smith, 1948) for terms both preceding and following the isolated item. However, a subsequent study (Smith, 1949) failed to replicate this result, and a third report (Smith & Stearns, 1949) found a slight enhancement for the terms immediately following the isolated term but not for those preceding it.

Jenkins and Postman (1948) demonstrated the isolation effect by embedding a meaningful syllable in a list of nonsense syllables. Recall of items immediately following the isolated term were decreased. Although not referred to as such in their report, Jenkinss and Postman's findings could be seen as a demonstration of anterograde

amnesia. The authors explained that "...the atypical item 'catches subjects' attention' and prevents him from concentrating on the following one (item) (p 219)." We have seen that Loftus and Burns had found retrograde, not anterograde amnesia using violence as a critical item. Tulving (1969), was the first to explicitly demonstrate induced retrograde amnesia in a verbal learning study. He did so by embedding a critical word (name of a famous person) in a list of common nouns. The dependent measure was the free recall of all items. I would note that subjects in Tulving's study were given prior instructions to remember the distinctive word, a level of anticipation not found in crime witnesses. Similar results have been found without the use of specific instructions by Saufley and Winograd (1970). Ellis, Detterman, Runcie, McCarver and Craig (1971) used a unique stimulus (photographs of nudes) as the critical item, and demonstrated both retrograde and anterograde amnesia effects. Detterman and Ellis (1972) concluded that different processes account for retrograde and anterograde amnesia. Retrograde amnesia was viewed as retrieval failure, while anterograde amnesia was seen as failure to encode items. Loftus and Burns proposed that retrograde memory failure may result from the disruption of the lingering processing necessary for full storage of information into memory. This last proposal fits with the rehearsal hypothesis of Waugh (1969), in which recall is shown to be determined by the amount of time an item is held in mind as opposed to its mere availability: when one item receives extended attention it will be at the expense of other items.

The following serie of experiments was designed to investigate further the effect of shock stimuli on memory. The paradigm to be used

is similar to the one which produces the Von Restorff effect, except that multiple learning trials were used in the classic version of this paradigm. The present design uses one trial learning as would occur with eyewitness of shocking events. Listed below are several hypotheses to be tested.

Hypotheses Regarding Arousal

HYPOTHESIS 1: A shocking stimulus embedded into a series of neutral stimuli produces a retrograde amnesic effect for immediately preceding stimuli. This hypothesis relies on the findings of Loftus and Burns.

HYPOTHESIS 2: A shocking stimulus embedded into a series of neutral stimuli produces an anterograde amnesic effect for stimuli which immediately follow.

HYPOTHESIS 3: The presence of a shock stimulus leads to an overall reduction of items recalled from the slide presentation. This hypothesis stems from the prediction that if amnesia occurs for slides around the critical stimulus, this deficit would not be compensated for by recall of more slides in other positions.

HYPOTHESIS 4: The presence of a shock stimulus leads to a higher occurrence of intrusions (information reported as observed which was not).

Experiments on Arousal

EXPERIMENT 4

The Loftus and Burns study tested only for retrograde amnesia and for its effect on a peripheral detail. The following experiments were designed to look at both retrograde and anterograde amnesia for details on either side, chronologically, of a shocking event.

Experiment 4 was designed to test memory both before and after a shocking event. The test was for discrete, easily recognizable stimuli. Subjects viewed 20 slides. The eleventh was shocking for the experimental group but not shocking for the control group. Subjects' memories were tested by asking for free recall of all slides.

In an early pilot study, the shocking picture used was of a man killed by an attack to the face with the back end of a claw hammer (see Appendix G). Recall of slides was substantially the same for this group as for the control group, who viewed a neutral picture of a woman. During debriefing, many of the pilot subjects commented on the fact that they thought the shocking picture was a makeup job and they were not impressed by it. These comments, plus the absence of any amnesic effect, led to a reconsideration of the experimental design. The first option was to use a more shocking slide. This was tried but produced similar results. The second option was to use the information gathered from the pilot subjects to an advantage. It was decided to use the same shocking slide for both groups, pairing each with a label which would designate the origin of the slide as from either the New

York Police Department or a major motion picture studio. Speisman, Lazarus, Mordkoff & Davison (1964), using different narratives to the same film sequence, had suggested that "the same stimulus may be either a stresser or not depending upon the nature of the cognitive appraisal the person makes regarding the significance for him" (p. 367). Following this line of thought in the present study, the slide used for the control group was the same autopsy slide as used in the experimental group. However the bottom of the control slide was labeled "Courtesy of M.G.M. Studios" to reinforce the feeling of the face being a product of makeup and to produce a non-shock or neutral reaction. The experimental group viewed the same slide with the caption reading "Courtesy of N.Y. Police Dept." to heighten the authenticity of the slide, and hopefully produce a mentally shocking state.

Method

Subjects

Sixty-nine Brooklyn College undergraduates served as subjects, receiving experimental credit in their Introductory Psychology course for their participation. There were 71.6% females and 28.4% males in the experiment. The experimental and control conditions were tested in separate sessions.

Apparatus

The subjects were shown 20 2x2 color slides of diverse content

(see listing below). A Singer Caramate Model 3300 slide projector was used to display the stimuli. The slides were automatically advanced at five-second intervals. Slides were presented on a screen approximately 3.1 m in front of the projector. Subjects were seated from 2.5 m to 5 m away from the viewing screen. The slides are described as follows:

Slide 1. Dining table set with a turkey dinner

Slide 2. A grasshopper

Slide 3. A cactus plant in the desert

Slide 4. A child drinking from a cup

Slide 5. Purple and yellow flowers

Slide 6. An old barn

Slide 7. Boats

Slide 8. Two parrots

Slide 9. Cable car going up a mountain

Slide 10. A stained glass window

Slide 11. Independent variable Autopsy slide of murder victim (MGM vs NYPD)

Slide 12. A Christmas tree

Slide 13. A tombstone

Slide 14. Traffic on a busy street

Slide 15. Two polar bears

Slide 16. Musicians

Slide 17. Beach scene at ocean

Slide 18. A castle

Slide 19. A skier

Slide 20. A dog

The slide used as the independent variable was from the autopsy of a man killed by an attack to the face with a claw hammer. The slide was a head and shoulders photo, the man's face substantially damaged by the attack. The independent variable manipulation occurs in the printing at the bottom of the slide. In the experimental group it read "Courtesy of N.Y. Police Dept.", in the control condition it read "Courtesy of M.G.M. Studios."

Procedure

Subjects were tested in groups, ranging in number from 6 to 18. They were told that they were to be shown a short slide show, and that they would have the experiment explained to them at the end. They were instructed to put on eyeglasses if required, to make themselves comfortable, and to refrain from any talking.

Following the slide presentation, questionnaires were distributed (see Appendix H). The questionnaire read as follows: "Please recall in any order you wish the slides you just viewed." The side of the page was numbered 1 through 20. Attached to this page was a final multiple choice question to rate arousal level (see Appendix I). Subjects were instructed not to look at the final question until they had completed the first page and that once the last question on the first page had been answered they could not go back. After all questionnaires were collected a statement was distributed (Appendix J) which read "Due to the subject matter that was viewed, if you have any questions or unsettling feelings now or later, please feel free to

contact Dr. Robert Buckhout, 5113 James Hall or call 780-5960, 5635." Subjects were also debriefed orally about the nature of the experiment. Finally, subjects were asked not to divulge any information concerning the experiment to potential future subjects.

The dependent variables of interest were: (1) the number of slides recalled among the set of 3 preceding the critical stimulus (retrograde amnesia), (2) the number of slides recalled among the 3 which followed the critical stimulus (anterograde amnesia), (3) the total number of slides recalled, and (4) the number of intrusions (reports of non-existent slides).

Results

The results of Experiment 4 were analyzed using a two-way ANOVA, testing for the effect of groups (MGM vs NYPD) and sex of subject. This analysis showed a significant, $F(1, 63) = 4.456$, $p<.05$, anterograde amnesia for the for the combined score of the three slides that followed the critical stimulus in the N.Y.P.D. group (see Figure 10). No effect for sex of subject or sex by group interaction occurred. In a separate ANOVA, no retrograde amnesia was observed.

Insert Figure 10 about here

In the total recall count the M.G.M. group showed a marginally significant, $t(67) = 1.89$, $p<.07$, higher total recall rate, mean = 10.87, S.D. = 2.75, compared to the N.Y.P.D. group, mean = 9.68, S.D.

= 2.40. This finding supplies limited support for hypothesis 3. Intrusions for each group did not substantially differ, averaging approximately .3 intrusions per subject. The manipulation check for arousal showed that both groups reported moderate arousal and did not substantially differ.

Discussion

The results of Experiment 4 showed a Von Restorff type effect with the critical stimulus, which was highly recalled by virtually all subjects. Hypothesis 2 concerning a predicted anterograde amnesia was confirmed. Hypothesis 1 concerning a predicted retrograde amnesia effect was not confirmed, contrary to the results reported by Loftus & Burns.

High arousal, thought to be a necessary element to obtain this effect, did not occur. Speisman et al. (1964) demonstrated differential arousal in subjects by using various sound track narratives in a film depicting a primitive ritual involving a crude operation on young boys called "subincision". The present experiment used labels at the bottom of the slides to alter the subject's cognitive appraisal of what the slide represented, in an effort to produce high vs. low arousal, although no difference in arousal was observed. It may be premature to dismiss the possibility that there were real differences. One explanation may be that the scale used to measure arousal was not sensitive enough to record any differences. The impression gained by the experimenter while conducting the study was that differences in subjects' reactions were easily observable.

During the debriefing of the subjects those in the M.G.M. group made comments like, "What was that slide?" Subjects in the N.Y.P.D. group asked if that slide was real or "What happened to that guy?" A second explaination may be that the oral instructions referred to the arousal scale merely as the "last question," emphasizing that the subjects were to look at it and answer it only after they had completed the recall section. In my opinion singling out the arousal scale by both the experimenter and by the fact that it appeared as an attached sheet of paper only two inches wide may have made subjects self-conscious about their responses. This may have been especially relevant given that testing was done in groups.

EXPERIMENT 5

Experiment 4 showed that anterograde but not retrograde amnesia occurs among people attempting to recall a long serial list of slides when a shocking picture is placed in the center of the sequence. Experiment 5 was designed to test if retrograde amnesia would occur when the critical stimulus was shifted to the last position in the series. This shifting of the shocking slide to the end of the sequence more closely replicates the Loftus and Burns (1982) study. That study showed a retrograde amnesia effect for subjects who viewed a filmed episode in which there was a violent ending as compared to a neutral ending.

Method

Subjects

Ninety-four Brooklyn College undergraduates served as subjects to fulfill an experimental requirement in their Introductory Psychology course. There were 62% females and 38% males in the experiment. The subjects were tested in groups, however the experimental (N.Y.P.D.) and control (M.G.M.) subjects were tested separately.

Apparatus

The apparatus was the same as in Experiment 4; however, a shifting of the independent variable slide (critical stimulus) moved it from the eleventh position to the twentieth (last slide).

Procedure

The procedure was the same as that used in Experiment 4.

Results

The results showed high recall of the independent variable, however no retrograde amnesia was observed, nor was there any substantial difference in recall between the M.G.M. and N.Y.P.D. groups for the three slides immediately preceding the independent variable (see Figure 11).

Insert Figure 11 about here

The total recall of all slides was equal across both groups, mean = 10.8, S.D. = 2.52. Intrusions for each group did not substantially differ, averaging approximately .43 intrusions per subject. Arousal was reported as moderate for both groups.

Discussion

The failure of retrograde amnesia to occur as well as the lack of any difference between groups in total recall points to some sharp differences between these data and those reported by Loftus and Burns (1982). These differences will be detailed in the general discussion. The next three experiments deal with further investigation and

refinements on the design of this particular paradigm.

EXPERIMENT 6

To test the reliability of the findings of experiment 4, this experiment replicated the design of the former with two changes. First, slide 4 of a baby in a carriage drinking from a cup was eliminated. There were two reasons for removing this slide: 1) removal would allow the same number of stimuli to come before the independent variable as after, thereby balancing stimuli around the independent variable; 2) this slide had an inordinately high rate of recall, giving a bimodal impression of recall with only the independent variable rivaling this high rate. The second change in the design of the experiment was to reverse the order of slide presentation. This allowed for a check on any unexpected relationships between slide content and the anterograde amnesia elicited in Experiment 4.

Method

Subjects

Seventy-eight Brooklyn College undergraduates served as subjects, receiving experimental credit in their Introductory Psychology course for their participation. There were 68.4% females and 31.6% males in the experiment. Subjects were tested in groups, however the experimental and control subjects were tested separately.

Apparatus

The slide presentation order is listed below.

Slide 1. A dog

Slide 2. A skier

Slide 3. A castle

Slide 4. Beach scene at ocean

Slide 5. Musicians

Slide 6. Two polar bears

Slide 7. Traffic on a busy street

Slide 8. A tombstone

Slide 9. A Christmas tree

Slide 10. Independent variable Autopsy slide of murder victim (MGM vs NYPD)

Slide 11. A stained glass window

Slide 12. Cable car going up a mountain

Slide 13. Two parrots

Slide 14. Boats

Slide 15. An old barn

Slide 16. Purple and yellow flowers

Slide 17. A cactus plant in the desert

Slide 18. A grasshopper

Slide 19. Dining table set with a turkey dinner

Procedure

The procedure was the same as that used in the previous experiments.

Results

The results again showed a very high recall rate for the critical stimulus. An ANOVA testing for the effect of groups and sex of subject showed a significantly lower, $F(1, 72) = 15.226$, $p<.001$, recall of the three slides that immediately followed the critical stimulus in the N.Y.P.D. group in comparison to the M.G.M. group (see Figure 12). There was no effect of sex of subject or any sex by group interaction. Once again a test of retrograde amnesia showed no significant difference.

Figure 12 about here

An ANOVA, computed on the total number of slides recalled, showed that the M.G.M. group had recalled a significantly greater number of slides, $F(1, 72) = 4.453$, $p<.05$, mean = 11.05, S.D. = 2.46 vs. 9.86, S.D. = 2.30 for the N.Y.P.D group.

Differences in intrusion rates approached significance, $t(76) = 1.86$, $p=.067$), with fewer intrusions in the M.G.M. group mean = 0.39, S.D. = 0.89 as compared to the N.Y.P.D. group, mean = 0.81, S.D. = 1.10.

This time there was a significant difference, $F(1, 72) = 25.233$, $p<.001$, in arousal ratings. The M.G.M. group reported a low mean arousal, while the N.Y.P.D. group showed a moderate mean arousal.

Discussion

Experiment 6 replicated the results of Experiment 4 in the finding of anterograde amnesia following a shocking slide. The anterograde amnesia effect was seen with the same slides that had previously failed to produce retrograde amnesia when seen before the shock slide in Experiment 4. It can therefore be assumed that it was not any particular slide content that was responsible for the amnesia but rather the slide's relationship by position to the autopsy slide. The finding of a reduction in total slide recall due to the shocking slide was also supported. This result suggests that the amnesic effect is not compensated for by increased recall of other slides not immediately anterograde to the shocking stimulus.

EXPERIMENT 7

To test whether content of the labels ("Courtesy of M.G.M. Studios" vs. "Courtesy of N.Y. Police Dept.") alone could have caused the amnesic effect observed in the preceding experiments, the autopsy slides were removed from the stimulus sequence and replaced by slides which contained only the labels. The independent variable in this study was the difference in label content, while the dependent variables were the same as in Experiments 4, 5, and 6.

Method

Subjects

Seventy-four Brooklyn College undergraduates served as subjects receiving experimental credit in their Introductory Psychology course for their participation. There were 75.4% females and 24.6% males in the experiment. The subjects were tested in groups with the experimental and control groups being tested separately.

Apparatus

The apparatus was nearly the same as in experiment 6. The order of slides remained reversed. The only change was that only the labels without any picture appeared in position 10 (see Appendix K). Black with white lettering appeared across the middle of the slide reading "Courtesy of M.G.M. Studios" or "Courtesy of N.Y. Police Dept.".

Procedure

The procedure was the same as that used in the previous experiments.

Results

The results of Experiment 7 did not show a high degree of recall for either of the independent variables. An ANOVA was used to test for the effect of groups and sex of subjects on recall of the three slides immediately prior to and following the critical stimulus. No anterograde or retrograde amnesic effect was shown (see Figure 13).

Insert Figure 13 about here

Total recall of the slides showed no distinct differences between groups. The M.G.M. group recalled a mean = 10.78, S.D. = 2.16 and the N.Y.P.D. group, mean = 10.00, S.D. = 2.26. Intrusion rates were low for both groups and did not substantially differ. Both groups rated in the moderate arousal range with no significant differences.

Discussion

No anterograde or retrograde amnesic effect was observed. The independent variable did not show an "isolation effect" (high recall relative to surrounding stimuli). The absence of any Von Restorff effect was not anticipated in this experiment. The independent variable stimulus was unique in both composition and color. Because of

this, it was expected to receive high recall.

In view of the lack of an amnesic effect in the present experiment, the results of experiments 4 and 6 cannot be attributed solely to the different labeling of the independent variable. This does not rule out the possibility that the observed amnesic effect may be due to a combination of the labels with a highly recalled slide. Experiment 8 was designed to test this possibility.

EXPERIMENT 8

The final experiment using this design was to test whether a non-shocking slide which was recalled by most subjects (84%) would produce anterograde amnesia as had been elicited earlier by a shocking slide. The slides were labeled in the same manner as the previous autopsy slides, "Courtesy of M.G.M. Studios" or "Courtesy of N.Y. Police Dept.". This allowed for a test of whether the combination of an easily recalled slide with these labels would produce the same effect.

Method

Subjects

Seventy-five Brooklyn College undergraduates served as subjects, receiving experimental credit in their Introductory Psychology course for their participation. There were 66.2% females and 33.8% males in this experiment. Testing was done in group settings. The experimental and control subjects were tested in separate groups.

Apparatus

The apparatus was the same as in Experiment 7 except for the independent variable slide. This slide was of a baby (see Appendix L) labeled either "Courtesy M.G.M. Studios" or "Courtesy of N.Y. Police Dept.". This same slide of the baby had been used in the fourth position of the slide sequence for Experiments 4 and 5. but had been

removed from Experiments 6 and 7 because of its above average rate of recall, that factor is the reason it was chosen for the present experiment.

Procedure

The procedure remained the same as that used in the previous experiments.

Results

No anterograde or retrograde amnesia effect was observed. Subjects showed no substantial difference in recall of the slides presented prior to or following the picture of the baby. However, the two groups showed a greater than 25% difference in recall of the M.G.M.-labelled slide and the N.Y.P.D.-labelled slide (see Figure 14). A post hoc Bonferroni Multiple comparison procedure was performed on all 19 slides. The critical "t" value for the $p<.05$ level was adjusted to 3.1132. The only comparison to reach this critical value was the difference between recall of the M.G.M.-labelled slide, which was significantly higher, $t(73) = 3.453$, $p<.05$, than recall for the N.Y.P.D. labelled slide.

Insert Figure 14 about here

A two-way analysis of variance on recall of the baby slide by label group and sex showed a significantly higher recall, $F(1, 70) =$

5.071, $p<.05$, for sex of the observer. The recall rate for females was 80% vs 50% recall for males where the N.Y.P.D. label was used. In the M.G.M. label condition the male-female differential was slight, 92.3% recall for males and 100.0% recall for females. There was no significant label by sex interaction.

Total recall of the slides did not differ substantially between groups. Subjects in the M.G.M. group had a mean slide recall of 11.27, S.D. = 2.34, while the N.Y.P.D. group had a mean = 11.359, S.D. = 2.90. Intrusion rates for both groups were below .3 and did not differ in any substantial way.

Modal responses of arousal by group showed a rating of "interested" for the M.G.M.-labeled baby slide and a rating of "neutral" for the N.Y.P.D.-labeled baby slide. A two-way analysis of variance to test for group and sex of subject effect showed that the M.G.M. group had significantly higher, $F(1, 70) = 22.22$, $p<.001$, arousal ratings than the N.Y.P.D. group. The analysis showed no sex effect or sex by group interaction. A Pearson correlation between recall of the independent variable and arousal showed a significant correlation, $r(73) = 0.2388$, $p<.05$.

Discussion

The differential labeling of a slide that had been easily recalled in prior experiments did not produce an anterograde or retrograde amnesia in the N.Y.P.D. group. The anterograde amnesia was seen in Experiments 4 and 6, where an autopsy slide had been used as the critical stimulus.

An unexpected outcome was the differential effect between the two independent variables. This difference may have been caused by the fact that the slide of a baby labeled "Courtesy of M.G.M. Studios" appears more logical and appropriate than one labeled "Courtesy of N.Y. Police Dept.". The M.G.M. label may have sparked interest because of the possibility that the subjects might recognize the child from some movie. The N.Y.P.D. label may have led to confusion, which interfered with full processing of the slide content. It must be noted, however, that any disruption of processing did not carry over to the following slides or affect recall of previous slides any more than the M.G.M. label might have.

Both groups showed heightened recall of the critical item by females, substantially more so in the N.Y.P.D. group. People respond favorably to what has been termed "babyishness" (Lorenz, 1943). Hess and Polt (1960), using pupil dilation as a measure of interest, showed that females respond more positively than males to pictures of babies. This interest may translate into better recall. Separate data were not collected on specific recall for the label or the baby but rather for any recall of the combination of the two. Although a separate topic from the main objective of this research, the sex difference does raise interesting questions as to what exactly is capturing the attention of the observer.

EXPERIMENT 9

The presentation of the shocking slide in experiments 4, 5, and 6 produced surprise as well as shock. Experiment 9 was designed to manipulate unsettling feelings in the observer without the confounding of surprise factors. This experiment also differed from the previous ones in that the stimulus material was a videotaped news show rather than slides. The use of a newscast was thought to be a more ecologically valid testing material since it was assumed that subjects had prior experience in viewing TV and probably had seen at least some news programs. Recall of surrounding commercials was the main dependent measure. The independent variable was the amount of emotional content in a particular news segment positioned in the middle of the broadcast. The High Emotion segment was a story on the Baptist Burn Center which had been judged by the experimenter and a group of judges to be an emotionally arousing experience. It contains vivid scenes of patients suffering from extensive burns and has a soundtrack which intensifies the effect. The Low Emotion news segment was a neutral sounding interview of Rock-Country singer Kris Kristofferson. The dependent measure of particular interest was free recall of the three commercials which ran on either side of the independent variable news segment which was placed in the center of the broadcast. A questionnaire asking for recall of all commercials was administered. A detailed questionnaire containing probe questions was subsequently given to check for more specific recall of details about the commercials. It was predicted that the more stressful

stimulus story (Baptist Burn Center) would lead to significant anterograde amnesia for the commercials following the critical stimulus.

Method

Subjects

Sixty-two Brooklyn College undergraduates served as subjects, receiving experimental credit in their Introductory Psychology course for participating. There were 64.0% females and 34.0% males in the experiment. Testing was done in groups, the experimental and control conditions tested in separate sessions.

Apparatus

The subjects were shown a 17 minute videotape of a newscast obtained from an Ohio station unfamiliar to the subjects, who were New Yorkers. The sequence of news stories was the opening segment, Channel 4 Eyewitness News, Cincinnati, Ohio, then a Christmas story, three commercials, two more stories, five commercials, the independent variable (either The Baptist Burn Center or the interview with Kris Kristofferson), five commercials, two stories, three more commercials and a sports report. The videotapes were recorded on VHS cassettes and were played on a Panasonic video tape recorder with a Sony 19" color television set used as a monitor.

Procedure

Subjects were told that they would be seeing a newscast and that they should put on their glasses if they were required to wear them. They were told to sit back, pay attention and refrain from talking.

Following the videotape, questionnaires were distributed (see Appendix M) which began: "In any order you wish, please recall all the commercials you just viewed." The side of the page was numbered 1 through 20. Attached to this page was a final multiple choice question on arousal, specificlly asking for subjects' emotional response to either the Baptist Burn Center story or the Kris Kristofferson story (see Appendix N). Subjects were instructed not to look at the final question until they had completed the first page and that once the last question had been answered they could not go back. As each questionnaire was finished, it was collected, then the subject received a second sheet containing 26 probe questions (see Appendix O), asking specific details about each news story and commercial. Subjects were orally debriefed about the nature of the experiment and asked not to divulge any information concerning the nature of the experiment to other potential subjects.

Data analysis consisted of counting the number of recalls of the commercial that immediately preceded or followed the independent variable, count of total number of correct commercial recalls, the number of intrusions (reporting of commercials which did not appear), the arousal rating, and responses to the probe questions were also analysed. Arousal ratings were collapsed into a three point scale.

"Bored thru "neutral" became low arousal (1), "interested" thru "bothered" became medium arousal (2), and "upset" thru "anxious" became high arousal (3). Probe questions were scored on a five point scale, correct responses were scored as 4, partially correct as 3, peripheral detail as 2, no response as 1, and wrong answers as 0.

Results

Using a chi square statistic no reliable difference between groups was seen in the recall of any of the three commercials immediately preceding or following the critical stimulus (see Table 4). The total of commercials recalled did not differ between groups. Out of a total of 16, the number of commercials recalled by the Burn Center group was 6.50 (S.D. = 2.62) and for the Control group, 6.83 (S.D. = 2.61).

Insert Table 4 about here

Of the 26 answers to the probe questions only two were substantially different. Both of those questions pertained to the commercial that immediately followed the independent variable. The Burn Center group scored significantly lower for both question 21a, $F(1, 57) = 9.689$, $p<.01$ and question 21b, $F(1, 57) = 4.736$, $p<.05$. There was neither a sex difference or a sex by group interaction for either question. Intrusion rates were low for both groups and did not substantially differ.

An analysis of variance was performed on the arousal ratings and indicated a significantly higher arousal, $F(1, 57) = 104.78$, $p<.001$, for the Burn Center group, scoring in the high arousal range, while the Kristofferson group rated medium arousal.

DISCUSSION

The results of Experiment 9 replicated to some extent the finding of anterograde amnesia following an emotion-arousing event found in the slide sequence studies. The effect was not seen in recall of commercials but rather in the two specific probe questions concerning details of the commercial following the critical segment. This generalization supports the premise that an emotion-arousing event disrupts memory processes.

There is one point that needs to be discussed concerning Experiment 9. The commercial of interest that followed the independent variable was an advertisement for Litton microwave ovens. I initally had some doubt about the results due to the obvious connection between ovens and burning even though microwave ovens are not normally thought to cause burns and the commercial displayed no open flames or hot elements. In a later unreported study a commercial for Calibri touch sensor cigarette lighters replaced the Litton ad. The commercial showed a finger breaking a beam of light on the lighter causing a flame to appear. It was felt that this commercial would produce an exaggerated amnesic effect, but to the contrary a hypermnesia effect was observed. This is a sober reminder that the content of the stimulus to be remembered must be evaluated on the degree of

relationship it has with the shocking stimulus.

General Discussion on Arousal Research

Hypothesis 1 predicted that a shocking stimulus embedded into a series of neutral stimuli would produce retrograde amnesia. This prediction stemmed from Loftus and Burns' (1982) research and was not confirmed. Experiment 5 was designed to specifically test for retrograde amnesia, but there was no evidence of it. Given this fact, I feel that the Loftus and Burns study should be given closer examination. One of the more striking differences between theirs and the present study was their use of a peripheral detail (a number on a jersey) as the single item to be remembered. This should be compared with the present study's overall design in which written descriptions were requested of each observer of up to 20 distinct images. In the neutral conditions, these items were remembered easily by 50% or more of the observers. Loftus and Burns' paradigm only allowed for a test of retrograde amnesia on one item and that one immediately preceded the end of the episode.

Hypothesis 2 predicted anterograde amnesia following a shocking stimulus. This hypothesis has been confirmed by Experiments 4, 6 and 9. Experiment 4 established the phenomenon. Experiment 6 replicated it, using slides which had failed to produce any differential amnesic effect in the retrograde position in Experiment 4. Experiment 9 added further support to the anterograde amnesia phenomenon by generalizing to a non-surprise emotion-arousing filmed episode rather than a suddenly shocking stimulus. The use of a nightly news show with commercial recall as a dependent variable adds to the generalizability

of this paradigm to a more real world situation. In working with clinical anterograde amnesia, Ervin and Anders (1970) have suggested that it results from a failure in transfer from primary to secondary memory. Another plausible explanation may be that information processing at the acquisition stage is disrupted for a period of time following the shock.

Hypothesis 3 predicted that the presence of a shocking stimulus would lead to an overall reduction in recall of neutral stimuli. This would include all slides or commercials that were presented. This prediction was confirmed in Experiment 6 but not in Experiment 4. In Experiment 9 no difference was observed in either free recall of total commercials or in the total score of the probe questions. I can only speculate that the differences in the paradigm from the slide show to the television news show muted the effects of the independent variable manipulation.

Hypothesis 4 predicted that a shocking stimulus would lead to higher intrusion rates. This prediction was not confirmed by any of the experimental data.

Because of subjects reaction and comments observed by the experimenter, it is believed that there may have been a higher degree of arousal than indicated by my rating procedure. The post-hoc arousal ratings summarizing the observers' mood may have been too insensitive to the changes in arousal which were happening during stimulus presentation.

There were no substantial differences in any of the recall data

due to sex of the subject, except in Experiment 8. The recall of the M.G.M.-labeled baby slide used as the critical stimulus was significantly higher for females than males. I frankly think that this result was a fairly minor finding, indicative more of stimulus preference than relative to any of the major concerns of this research. In Experiments 4 through 6, as expected, the shocking slide was recalled by a greater number of observers than any other slide.

Overall, these results provide good evidence that a shocking stimulus disrupts subsequent processing of information for a time to an extent that may help explain why other researchers continuously report negative correlations between arousal and recall accuracy. The hypothesis predicting retrograde amnesia was not supported, raising some question in my mind that Loftus and Burns may have been reaching for the wrong metaphor to explain their findings.

CONCLUSIONS

In essence, the main criticism by Egeth and McCloskey (1983) was that Loftus was relying on a non-existent or very thin base of empirical data to formulate a workable conclusion about memory in crime situations. Egeth and McCloskey seem embarrassed that, in a book written for a general audience, Loftus (1979) chose to rely on an unpublished study by Johnson and Scott (1976) and her own forensic experience to back up her conclusions about "stress" and "weapon focus."

The problem as I see it is that true ecological validity regarding a research design which can generalize specifically to the role of a crime witness or victim is nearly unattainable without resorting to unethical practices. And when we try to increase validity the research design can become so messy as to render it scientifically worthless. Yet the legal establishment places a high premium on research that is "on point," favoring research findings from very close simulations of real crime events. What Loftus was trying to do was to compromise between what she felt was a real phenomenon (weapon focus) as reported by experienced investigators and a chain of experimental evidence in the memory literature which could be synthesized to explain it.

A far more convincing argument can be made for the existence of the weapon focus phenomenon by putting together what we do know about episodic memory. A gun, knife or other weapon can be seen as a salient object which will demand a certain amount of attention from any

observer. This status of the weapon seems to fit any of a number of modern theories of attention. My research was designed to test whether a weapon could distract the observer's attention enough to reduce the total amount of time that the witness would have to process information from the features of the perpetrators. Any reduction in the accuracy of the witness's memory for the perpetrator can be traced to the presence of the weapon. This was found whether the weapon was part of the simulated crime episode or was present as part of a simple slide show whose complexity was reduced to a series of still pictures shown with and without a weapon. Weapon focus (or distraction by a highly salient object) results in reduced accuracy in memory for the features of the weapon carrier. The number of replications of this result indicates that it is a robust finding which fits in with our accumulated knowledge about human information processing.

Eyewitnesses who testify in court often state, with great certainty, that they will never forget the face of the weapon wielder (Buckhout, 1974). The present results suggest that such confidence may be misplaced. What they remember well is the weapon itself, and perhaps the gist of the situation. Neisser (1983) dramatically illustrated this point in his now classic paper on "John Dean's Memory," in which the testimony of the former Counsel to President Nixon was found to be distorted regarding details while being essentially correct on the general gist of what was taking place. As Figure 8 makes clear, the observers who saw a weapon as opposed to a neutral object consistently gave more incorrect than correct feature information. Only the witnesses in the "neutral object" conditions scored in the positive range of the feature accuracy score.

In exploring the interaction between presence of a weapon and the witness's measured level of arousal, I am faced with a less than adequate arousal measure, but, in the first experiment, which produced the highest observed arousal levels, Figure 2 shows that the weapon focus deficit in feature accuracy was intensified at high arousal levels. These data, which emerged from exposure to a realistic crime episode, should not detract from the demonstrations in the later experiments that the weapon focus deficits occurred even in the absence of a high degree of arousal.

It has been suggested facetiously that a decrease in feature recall might be found if a witness observed someone carrying a dead parrot! Parrot Focus? (Personal communication, I. Abramov). This might be true if the parrot was salient to the situation. The point is that the novel or potentially dangerous object (e.g. a gun) may attract attention because it carries information which may be vital to the observer. This attention may be especially observable in eye movements. A logical next step for this research would be to run the paradigm with eye tracking equipment. Littman and Becklen (1976) have stated that "eye movements do not initiate a perceptual act, but rather are dependent upon perceptual anticipation." My expectation is that the gun would lead to fixations to itself at the expense of time spent in looking at the face of the bearer. Easterbrook's (1959) cue utilization theory would therefore receive some support as the stressful crime situation leads the witness to heighten attention to central as opposed to peripheral details (Clifford and Hollins, 1978, 1981).

The effect of stress or arousal on our ability to recall has been interpreted by Loftus (1979) and others as an area within the scope of the Yerkes-Dodson Law, applicable at the time of acquisition. This may be stretching theory somewhat since the U-shaped function envisioned by the law was designed to explain performance, especially learned performance, and not memory. Most of the studies cited by Loftus and Burns (1982) rely on data from recall tests of serial lists of words which have been learned to a fixed criterion of mastery, have generated serial position curves, and demonstrate retrograde amnesia for those items which precede a "critical" item. It must be remembered that eyewitness studies typically employ a paradigm which involves one exposure to a fixed order of stimuli. As Figures 6 - 11 show, the resulting curves look unlike any of the classic serial position curves. Outside of the period following the shocking stimulus, the data appear to reflect the ease or difficulty of remembering slide content. None of these studies employed the intensely high levels of stress which we can reasonably assume to be present in a crime situation. Egeth and McCloskey use the straw man argument that our "reasonable assumption" is "merely an assumption." But, unless we wire up potential crime victims and wait until they are subject to an armed threat against life, we will always be compelled to make reasonable assumptions.

The findings in the present research are relatively unambiguous. When the observers were exposed to a stimulus with a high shock value, there was a significant recall deficit for the next three stimuli. Consistent with the language used by Loftus and Burns, these findings were regarded as evidence for anterograde amnesia. In terms of a crime

situation, I would infer that if a witness was confronted by the sudden onset of a shocking stimulus, aided by a reasonably clear guide to cognitive appraisal of its shock value (e.g. the N.Y.P.D. label), that witness would experience a reduction in his or her ability to recall events which occur immediately afterward. On retrograde amnesia, I can only say that this particular paradigm gave no evidence of it.

I am not particularly comfortable with the line of thinking espoused by Loftus and Burns which led them to call this phenomenon "amnesia" of any kind. "Amnesia" is a clinically loaded word, whose usage implies an injury or other insult to the central nervous system. Their results, showing a deficit in recall of a clearly visible number on a jersey due to subsequent violence was a solid, replicated finding which could be used to support a number of theories about the consolidation of memory without appealing to a medical metaphor which has not been traditionally used by memory researchers. Timing, an important but so far unstudied factor, may determine whether the shocking stimulus interrupts processing of prior stimuli (retrograde) and/or interferes with processing of subsequent information (anterograde). A more parsimonious explanation of the present findings and an avenue for future investigations may lie, as in the weapon focus research, in the disruption of eye movement patterns which would reduce the amount of glance time at stimuli which follow the shock.

Research on eyewitness testimony and identification has come around full circle to the thinking at the turn of the century which could be described as a period during which practical problems

motivated basic research on memory. Cognitive psychology had become very sophisticated at constructing models about how information is stored and processed but most researchers seldom deviate from the study of memory for highly practiced chunks of information. To generalize to real life situations such as that of the crime witness, we should remember that Muensterberg (1908) posed questions to the field concerning witness's testimony which have largely gone unanswered until Buckhout (1974), Loftus, and others began to do experiments on simulations of the crime situation. Between Muensterberg and Buckhout, a wealth of knowledge about memory and information processing has been accumulated. In the courts, eyewitness testimony is evaluated as if none of this research ever took place. The present studies make a small contribution to a body of knowledge which may prove to be very useful in the development of a working theory of everyday memory. I cannot help but feel that it may aid the psychologist in revising theory and perhaps in catching up with Muensterberg's unanswered questions.

Table 1

Regression Analysis of Feature Accuracy Scores, Experiment 1

SOURCE	S.S.	d.f.	M.S.	F	p
SEX	10.96373	1	10.96373	0.91373	n.s.
AROUSAL	94.43908	1	94.43908	7.87067	>.01
RACE	9.76751	1	9.76751	0.81403	n.s.
WEAPON	108.64735	1	108.64735	9.05481	>.01
ERROR	707.93233	59	11.99885		

Note: Each variable is an increment in the regression from the preceeding variables. Each source variable is that variance given the variance of the above variables, i.e., arousal is arousal given sex.

Table 2

Face and object carried visibility for experiments 2a thru 2d.

Experiment	Slide sequence by time					
	Time 1. 0-3 s	Time 2. 4-6 s	Time 3. 7-9 s	Time 4. 1-12 s	Time 5. 13-15 s	Time 6. 16-18 s
2a.						
Face visible	yes	yes	yes	yes	yes	yes
Stimulus present	yes	yes	yes	yes	yes	yes
2b.						
Face visible	no	no	yes	yes	yes	yes
Stimulus present	yes	yes	yes	yes	yes	yes
2c.						
Face visible	yes	yes	yes	yes	yes	yes
Stimulus present	no	no	yes	yes	yes	yes
2d.						
Face visible	yes	yes	yes	yes	yes	yes
Stimulus present	no	no	yes	no	no	no

Table 3

Regression Analysis of Feature Accuracy Scores, Experiments 2a - 2d

SOURCE	S.S.	d.f.	M.S.	F	p
SEX	7.18476	1	7.18476	0.48915	n.s.
AROUSAL	1.35689	1	1.35689	0.09237	n.s.
RACE	67.07022	1	67.07022	4.56627	>.05
OBJECT	459.28871	1	459.28871	31.26927	>.001
EXPERIMENT	38.77696	3	12.77696	0.86988	n.s.
ERROR	2173.85109	148	14.68818		

Note: Each variable is an increment in the regression from the preceeding variables. Each source variable is that variance given the variance of the above variables, i.e., arousal is arousal given sex.

Table 4

Recall of commercials immediately surrounding the critical stimulus

	Commercial	Burn Center	Kristofferson
Before:	Higby furs	59.4%	73.3%
	Royal Danish Ice Cream	37.5%	46.7%
	Toyota	43.8%	36.7%
Critical Stimulus			
After:	Litton Microwave Oven	31.3%	33.3%
	Genie Garage Door Opener	18.8%	10.0%
	Federal Express	34.4%	23.3%

Figure Captions

Figure 1. (Experiment 1) Feature accuracy scores for weapon highly visible and weapon less visible groups.

Figure 2. (Experiment 1) Percent correct of each variable in the feature accuracy scores for the weapon highly visible and weapon less visible groups.

Figure 3. (Experiment 1) Feature accuracy scores for weapon highly visible and weapon less visible groups by arousal ratings.

Figure 4. (Experiment 2a) Percent correct of each variable in the feature accuracy scores for the weapon and neutral object groups.

Figure 5. (Experiment 2b) Percent correct of each variable in the feature accuracy scores for the weapon and neutral object groups.

Figure 6. (Experiment 2c) Percent correct of each variable in the feature accuracy scores for the weapon and neutral object groups.

Figure 7. (Experiment 2d) Percent correct of each variable in the feature accuracy scores for the weapon and neutral object groups.

Figure 8. (Experiments 2a - 2d) Feature accuracy scores for the weapon and neutral object groups.

Figure 9. (Experiment 3) Feature accuracy scores for the weapon and neutral object groups.

Figure 10. (Experiment 4) Percent recall of the N.Y.P.D. and M.G.M. groups for each stimulus slide. The arrow indicates the independent variable (critical stimulus).

Figure 11. (Experiment 5) Percent recall of the N.Y.P.D. and M.G.M. groups for each stimulus slide. The arrow indicates the independent variable (critical stimulus).

Figure 12. (Experiment 6) Percent recall of the N.Y.P.D. and M.G.M. groups for each stimulus slide. The arrow indicates the independent variable (critical stimulus).

Figure 13. (Experiment 7) Percent recall of the N.Y.P.D. and M.G.M. groups for each stimulus slide. The arrow indicates the independent variable (critical stimulus).

Figure 14. (Experiment 8) Percent recall of the N.Y.P.D. and M.G.M. groups for each stimulus slide. The arrow indicates the independent variable (critical stimulus).

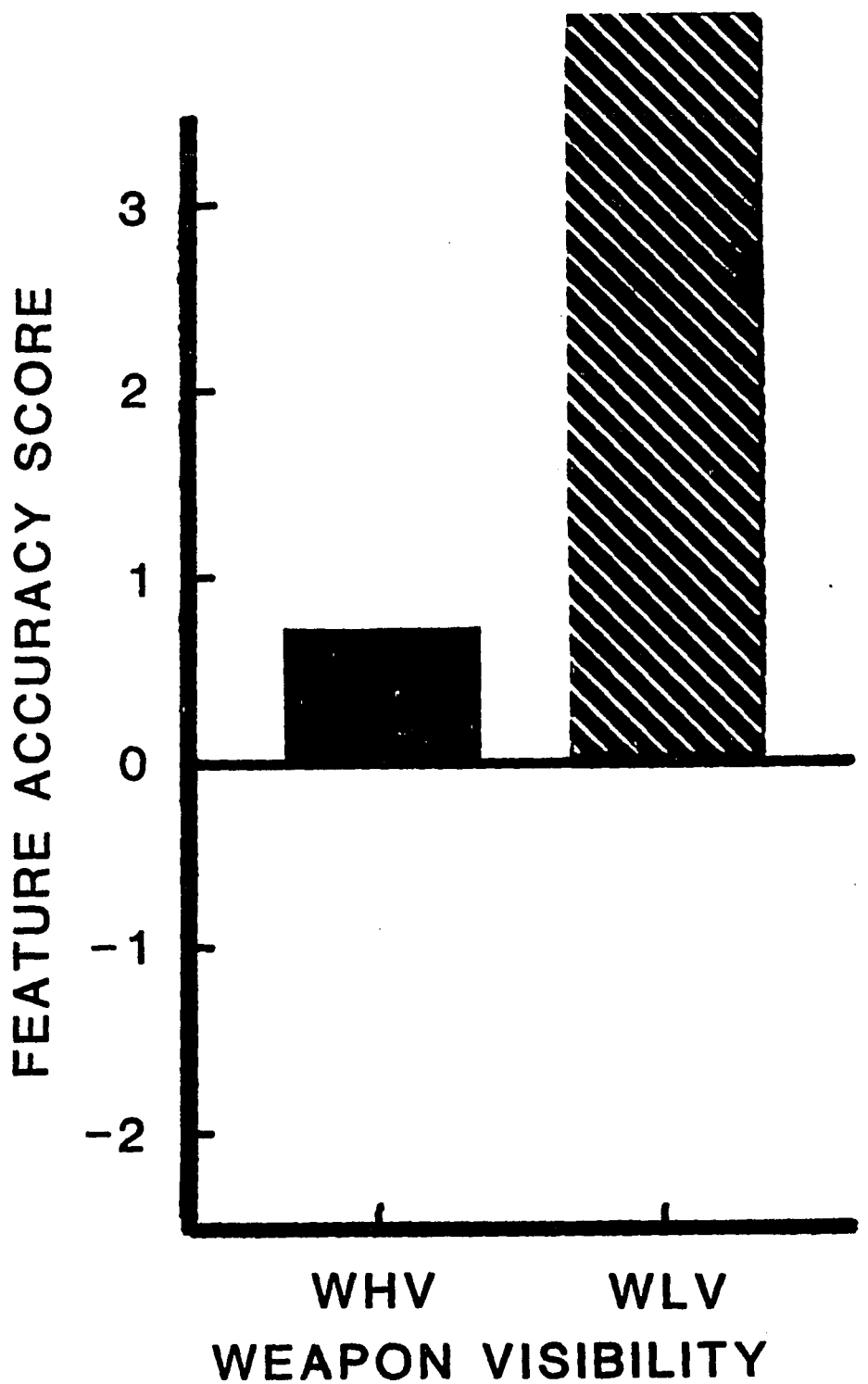


Figure 1.

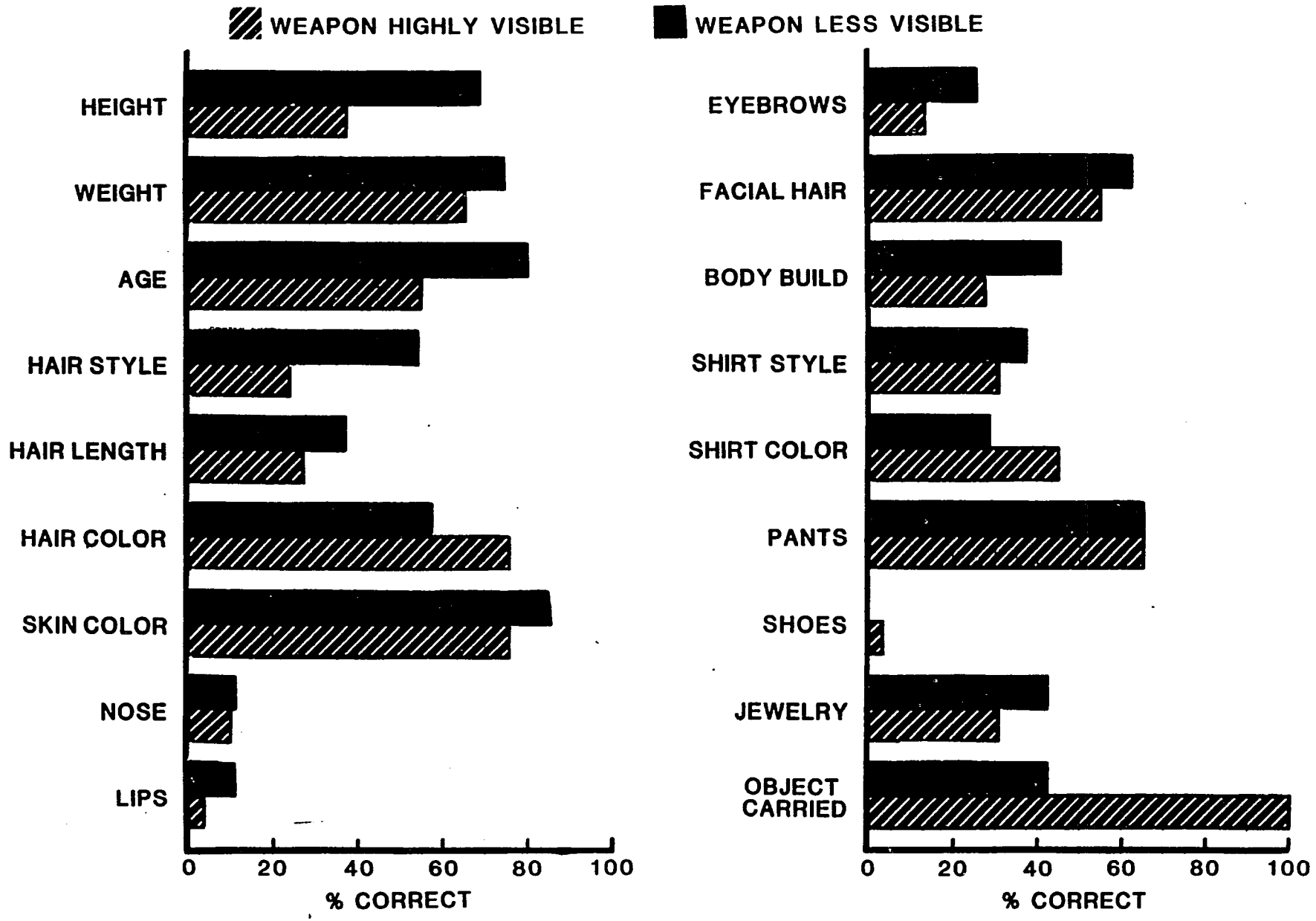

WEAPON HIGHLY VISIBLE
WEAPON LESS VISIBLE
HEIGHT
WEIGHT
AGE
HAIR STYLE
HAIR LENGTH
HAIR COLOR
SKIN COLOR
NOSE
LIPS
EYEBROWS
FACIAL HAIR
BODY BUILD
SHIRT STYLE
SHIRT COLOR
PANTS
SHOES
JEWELRY
OBJECT CARRIED
0
20
40
60
80
100
% CORRECT
0
20
40
60
80
100
% CORRECT

Figure 2.

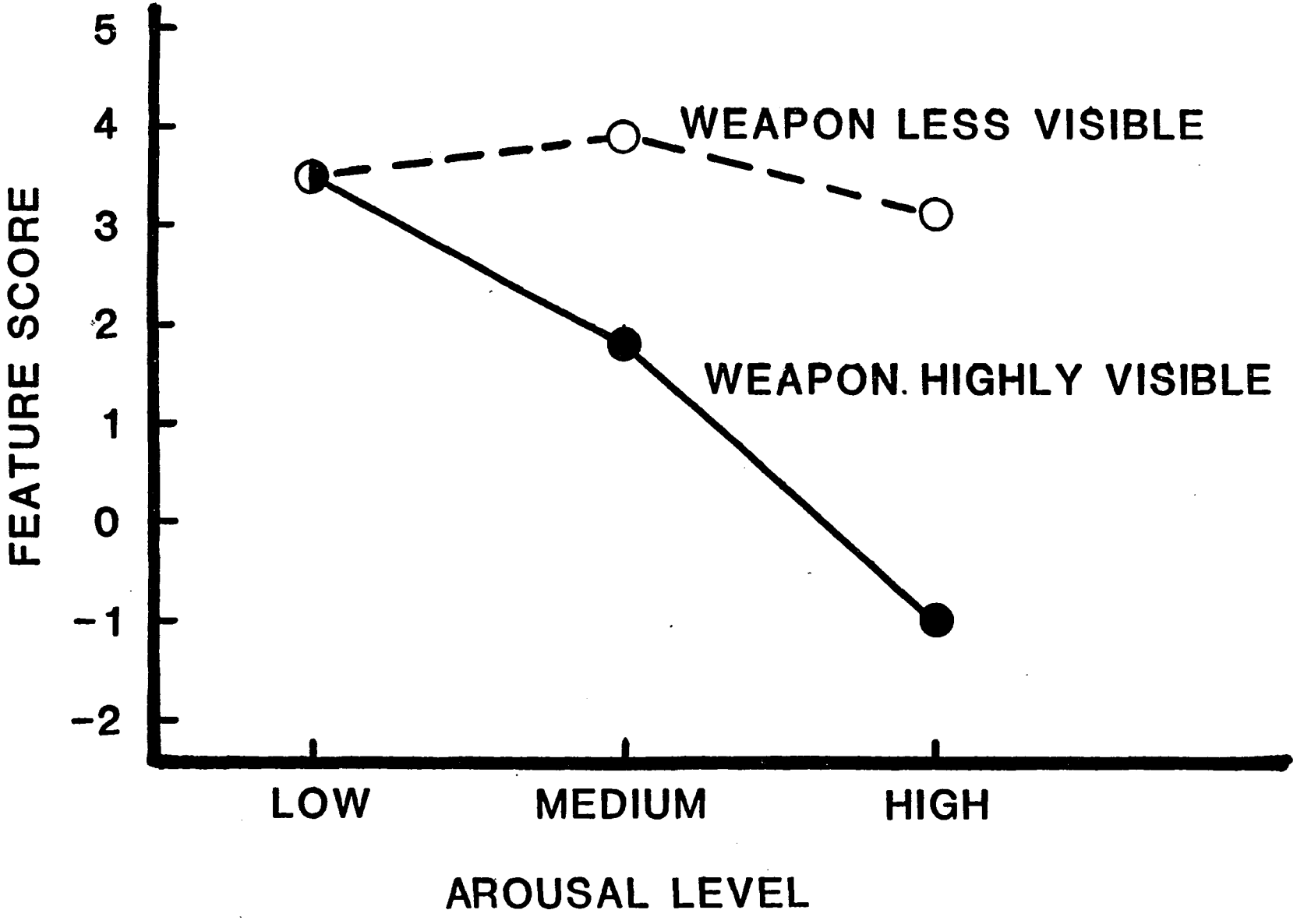

5
4
3
2
1
0
-1
-2
FEATURE SCORE
WEAPON LESS VISIBLE
WEAPON HIGHLY VISIBLE
LOW
MEDIUM
HIGH
AROUSAL LEVEL

Figure 3.

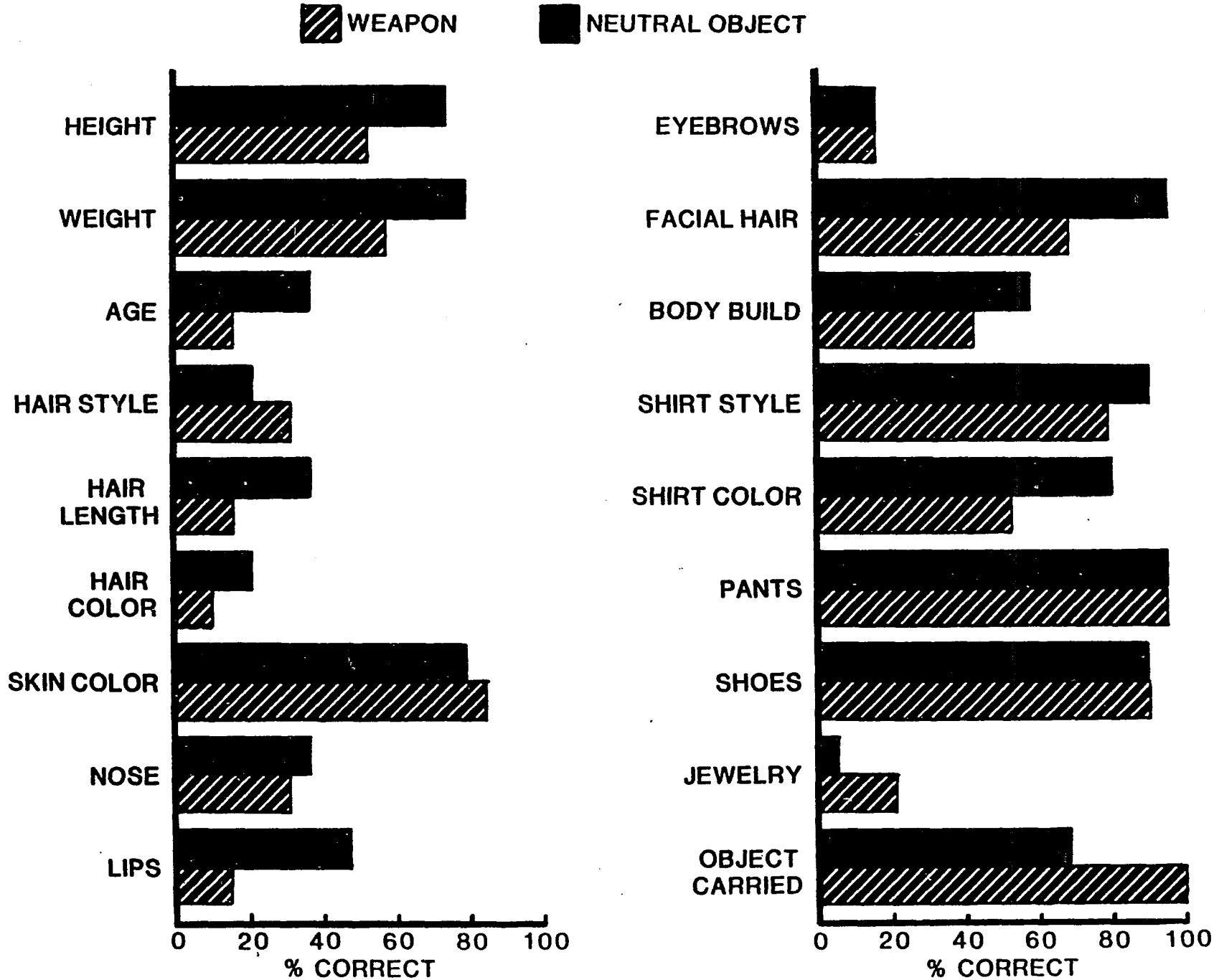

WEAPON
NEUTRAL OBJECT
HEIGHT
WEIGHT
AGE
HAIR STYLE
HAIR LENGTH
HAIR COLOR
SKIN COLOR
NOSE
LIPS
EYEBROWS
FACIAL HAIR
BODY BUILD
SHIRT STYLE
SHIRT COLOR
PANTS
SHOES
JEWELRY
OBJECT CARRIED
0 20 40 60 80 100
% CORRECT
0 20 40 60 80 100
% CORRECT

Figure 4.

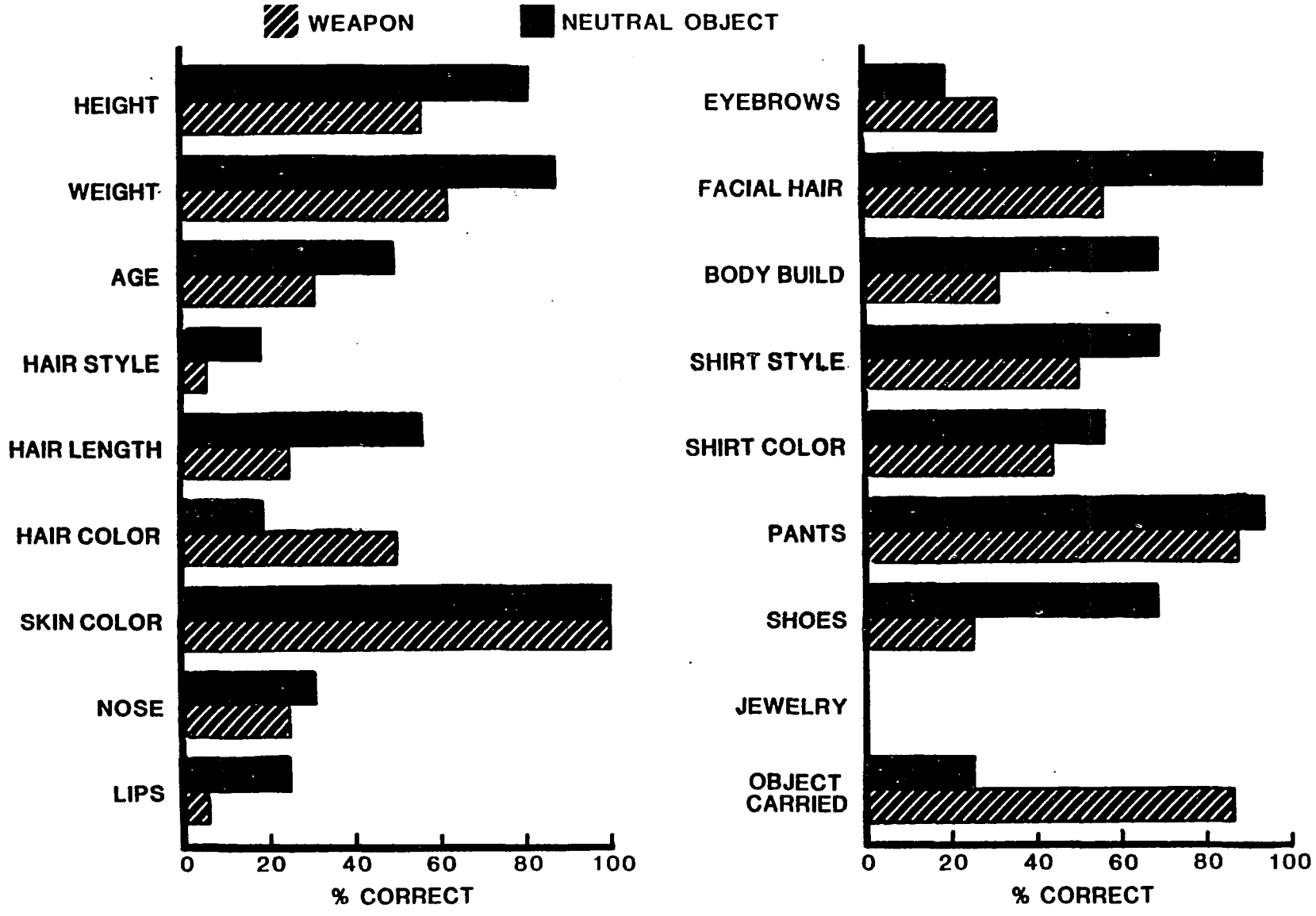

WEAPON
NEUTRAL OBJECT
HEIGHT
WEIGHT
AGE
HAIR STYLE
HAIR LENGTH
HAIR COLOR
SKIN COLOR
NOSE
LIPS
EYEBROWS
FACIAL HAIR
BODY BUILD
SHIRT STYLE
SHIRT COLOR
PANTS
SHOES
JEWELRY
OBJECT CARRIED
0 20 40 60 80 100
% CORRECT
0 20 40 60 80 100
% CORRECT

Figure 5.

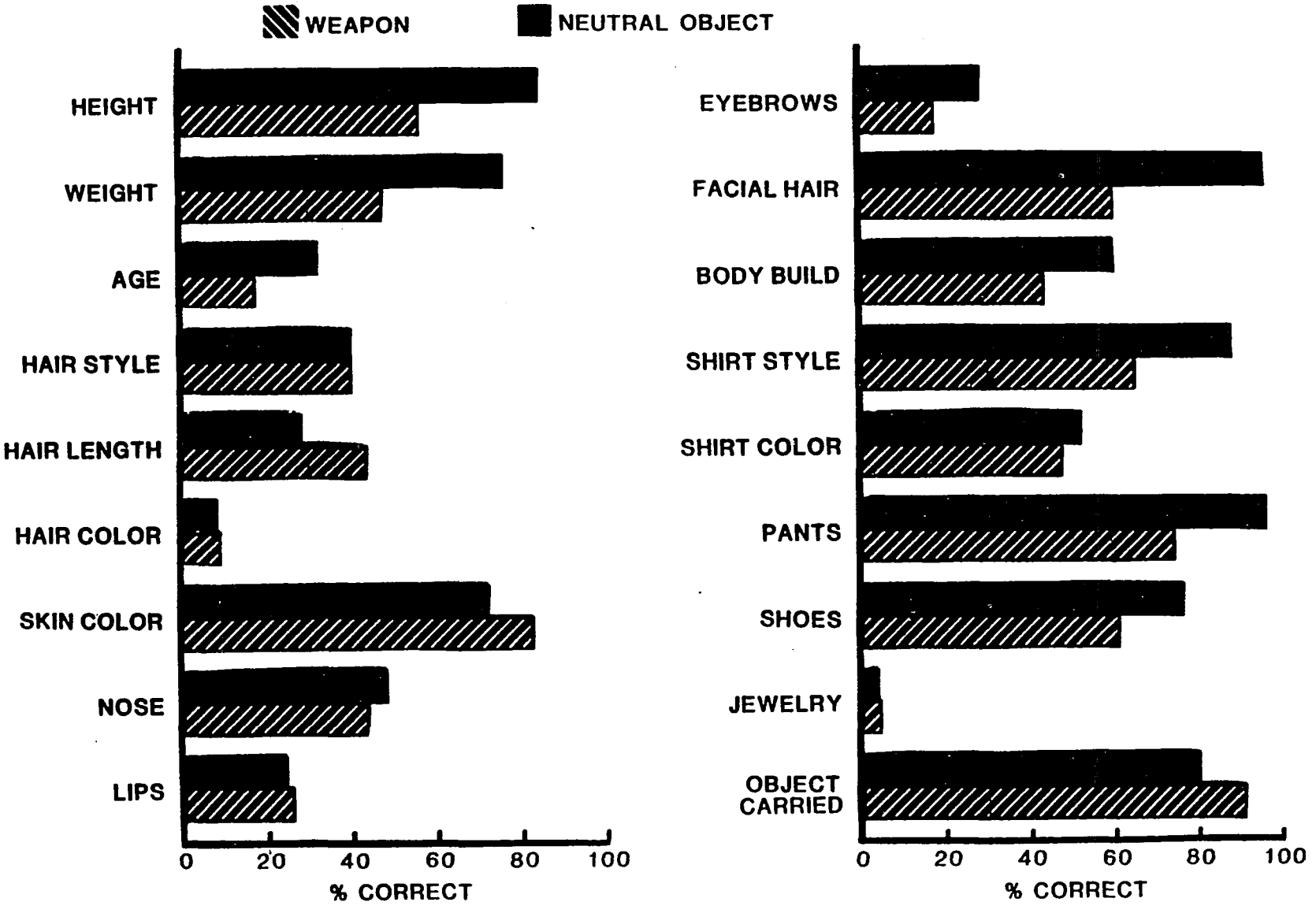

WEAPON
NEUTRAL OBJECT
HEIGHT
WEIGHT
AGE
HAIR STYLE
HAIR LENGTH
HAIR COLOR
SKIN COLOR
NOSE
LIPS
0
20
40
60
80
100
% CORRECT
EYEBROWS
FACIAL HAIR
BODY BUILD
SHIRT STYLE
SHIRT COLOR
PANTS
SHOES
JEWELRY
OBJECT CARRIED
0
20
40
60
80
100
% CORRECT

Figure 6.

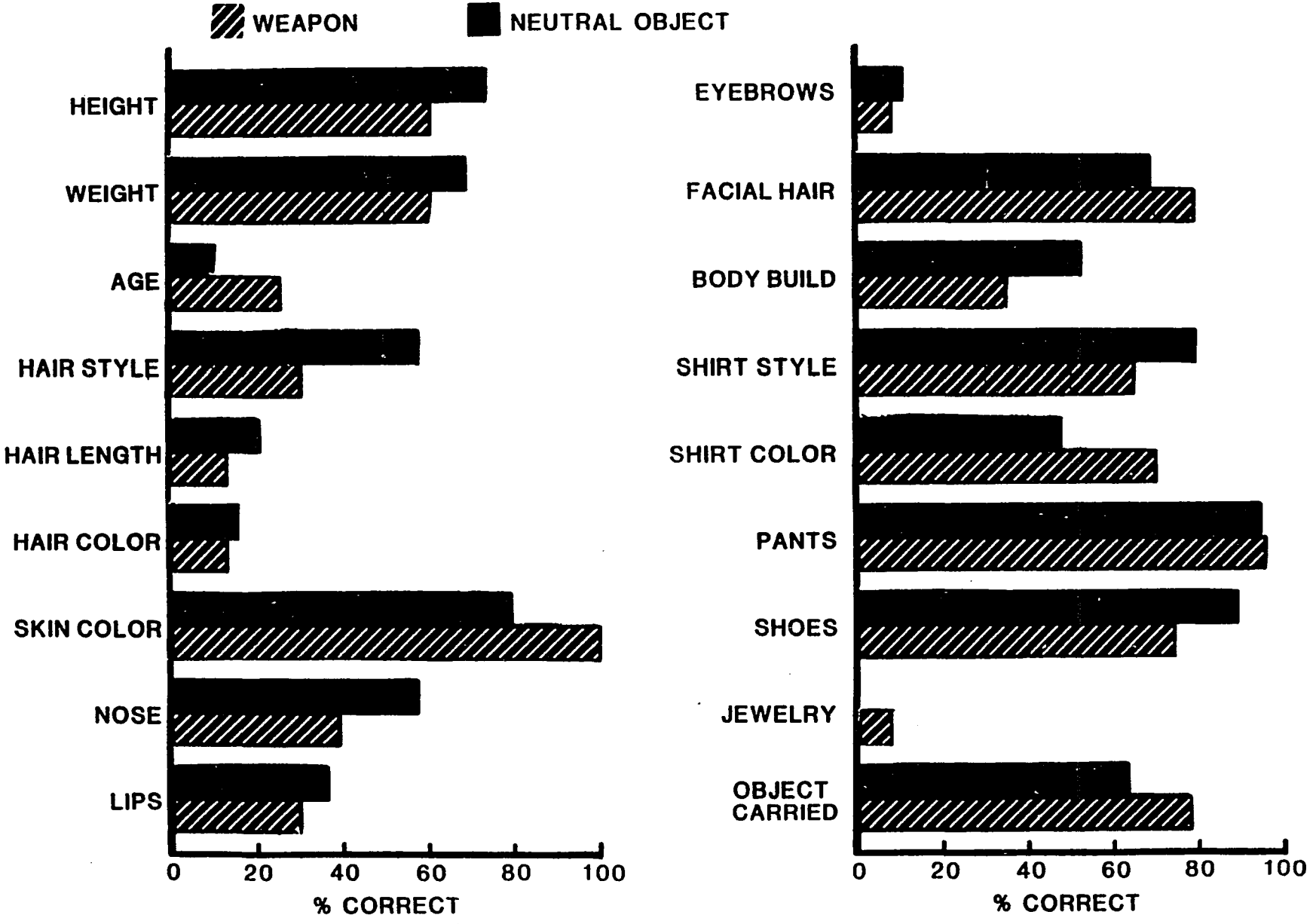

WEAPON
NEUTRAL OBJECT
HEIGHT
WEIGHT
AGE
HAIR STYLE
HAIR LENGTH
HAIR COLOR
SKIN COLOR
NOSE
LIPS
EYEBROWS
FACIAL HAIR
BODY BUILD
SHIRT STYLE
SHIRT COLOR
PANTS
SHOES
JEWELRY
OBJECT CARRIED
0
20
40
60
80
100
% CORRECT
0
20
40
60
80
100
% CORRECT

Figure 7.

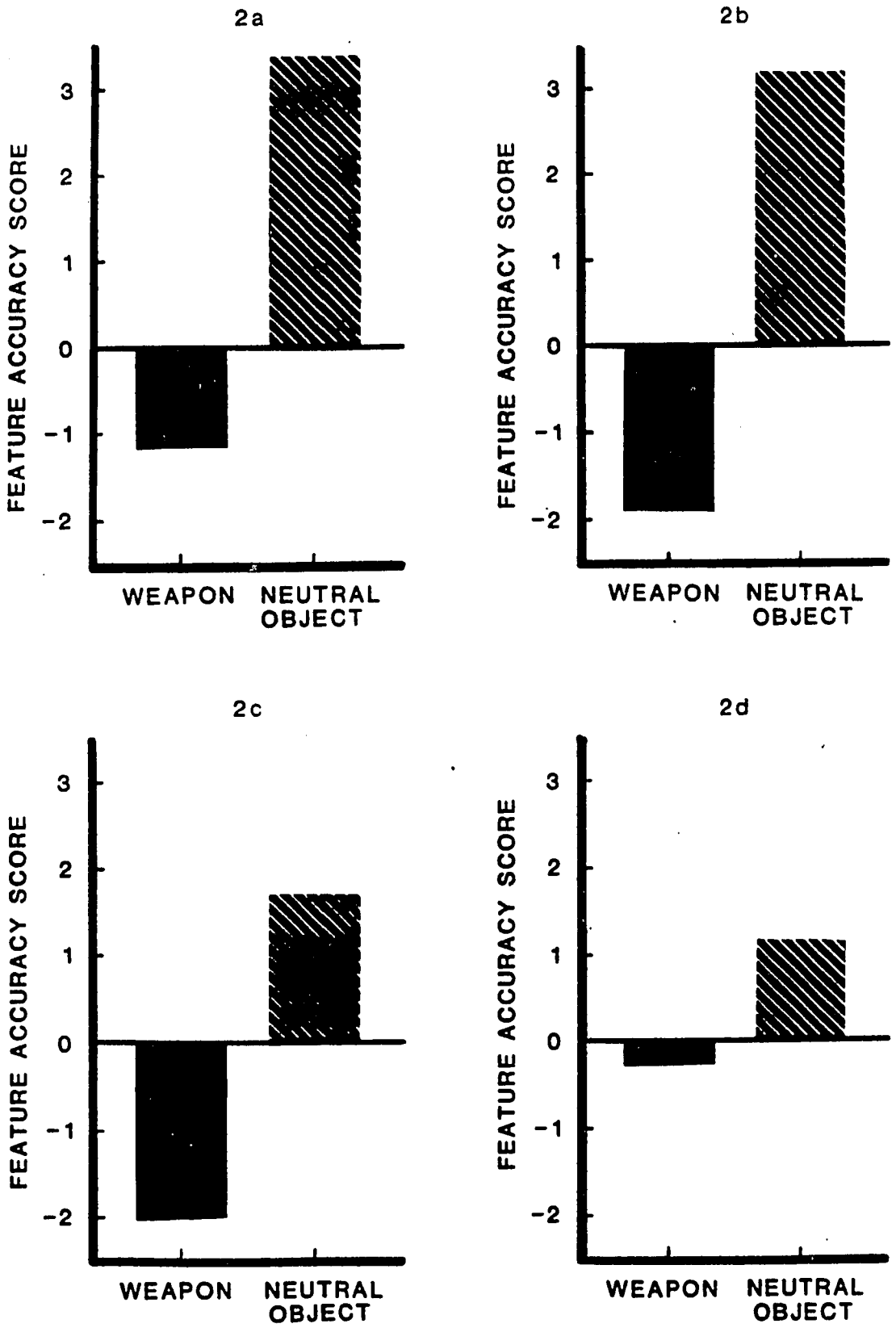

2a
2b
2c
2d
FEATURE ACCURACY SCORE
3
2
1
0
-1
-2
WEAPON
NEUTRAL OBJECT

Figure 8.

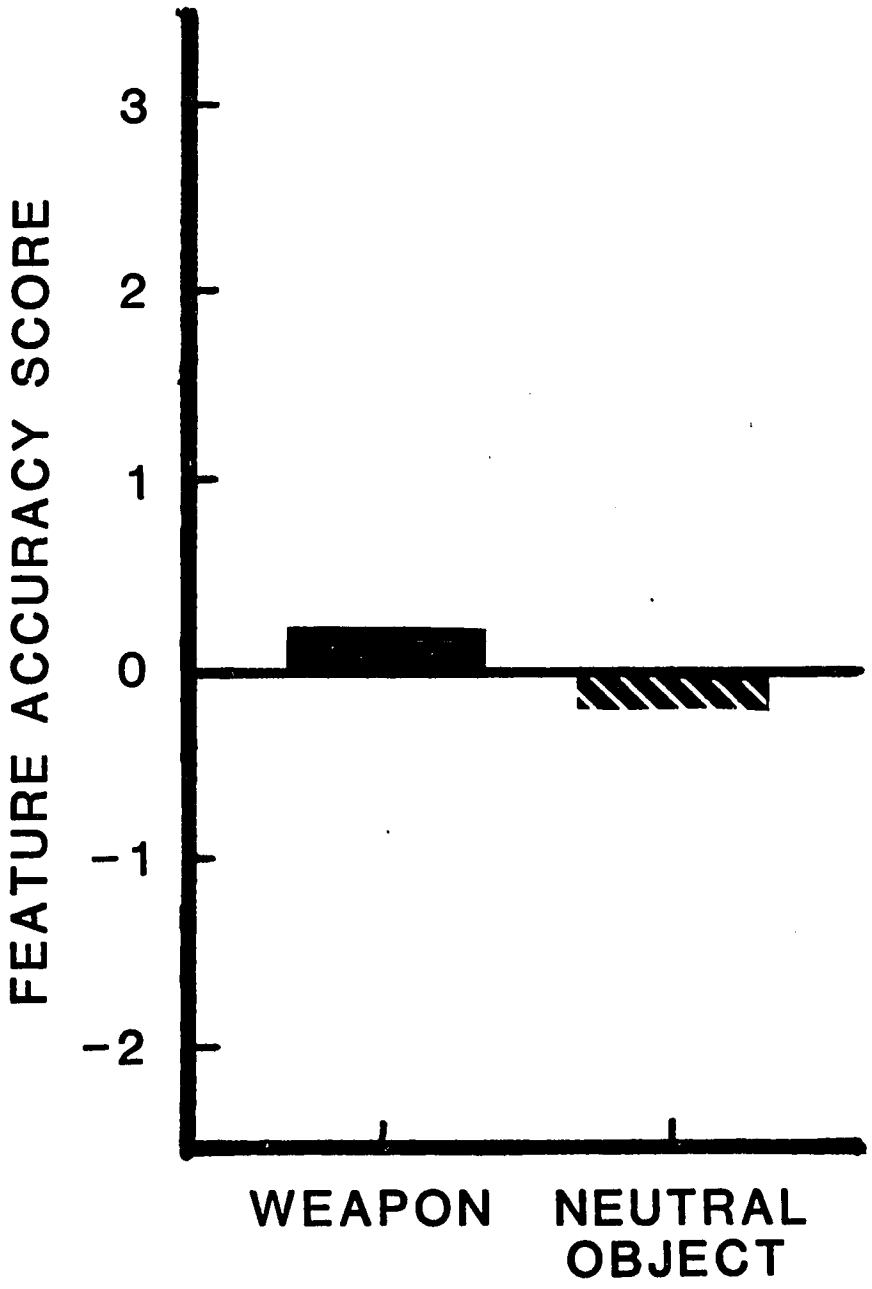


Figure 9.

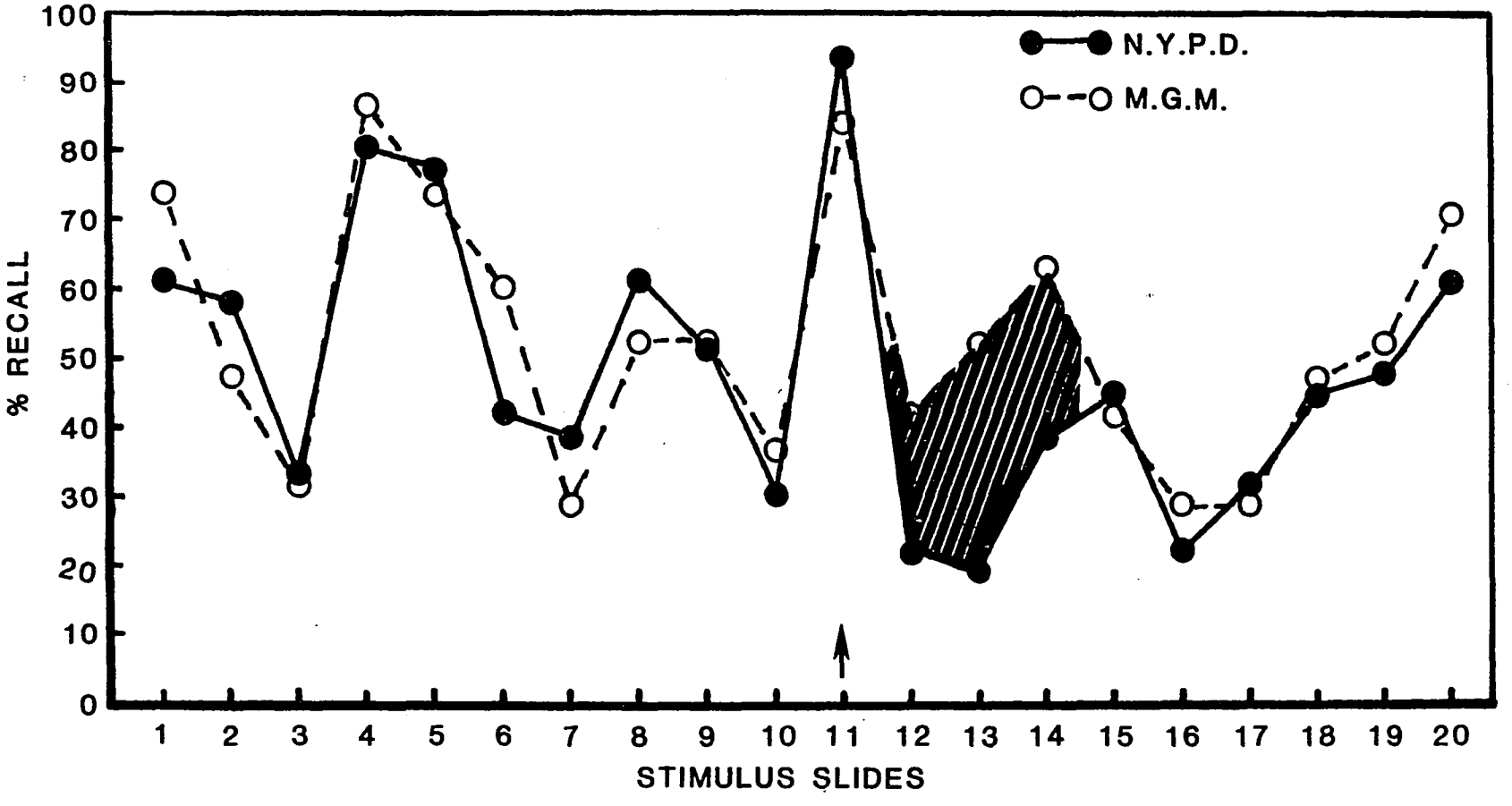

100
90
80
70
60
50
40
30
20
10
0
% RECALL
N.Y.P.D.
M.G.M.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
STIMULUS SLIDES

Figure 10.

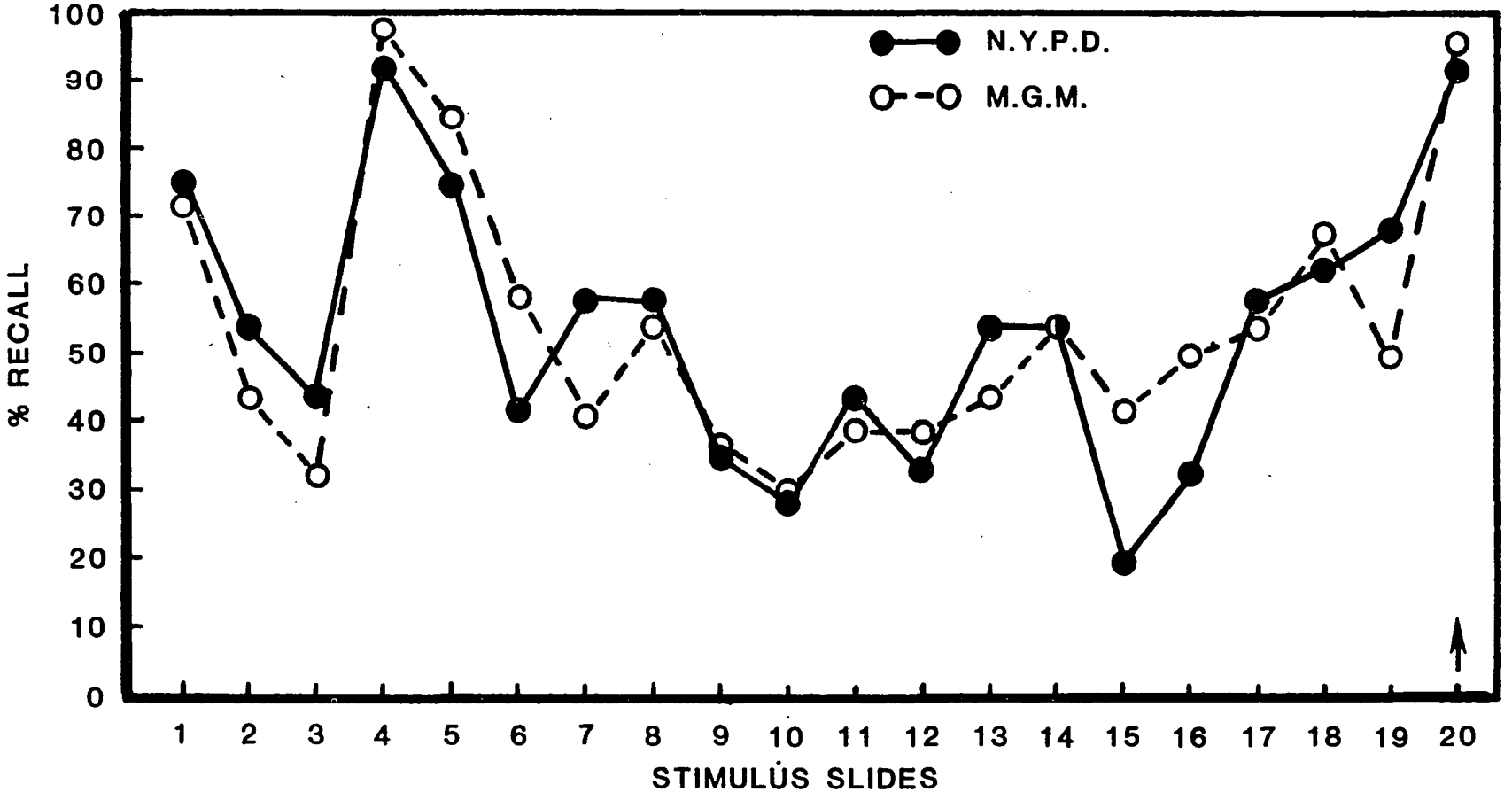

100
90
80
70
60
50
40
30
20
10
0
% RECALL
N.Y.P.D.
M.G.M.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
STIMULUS SLIDES

Figure 11.

100
90
80
70
60
50
40
30
20
10
0
% RECALL
N.Y.P.D.
M.G.M.
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
STIMULUS SLIDES

Figure 12.

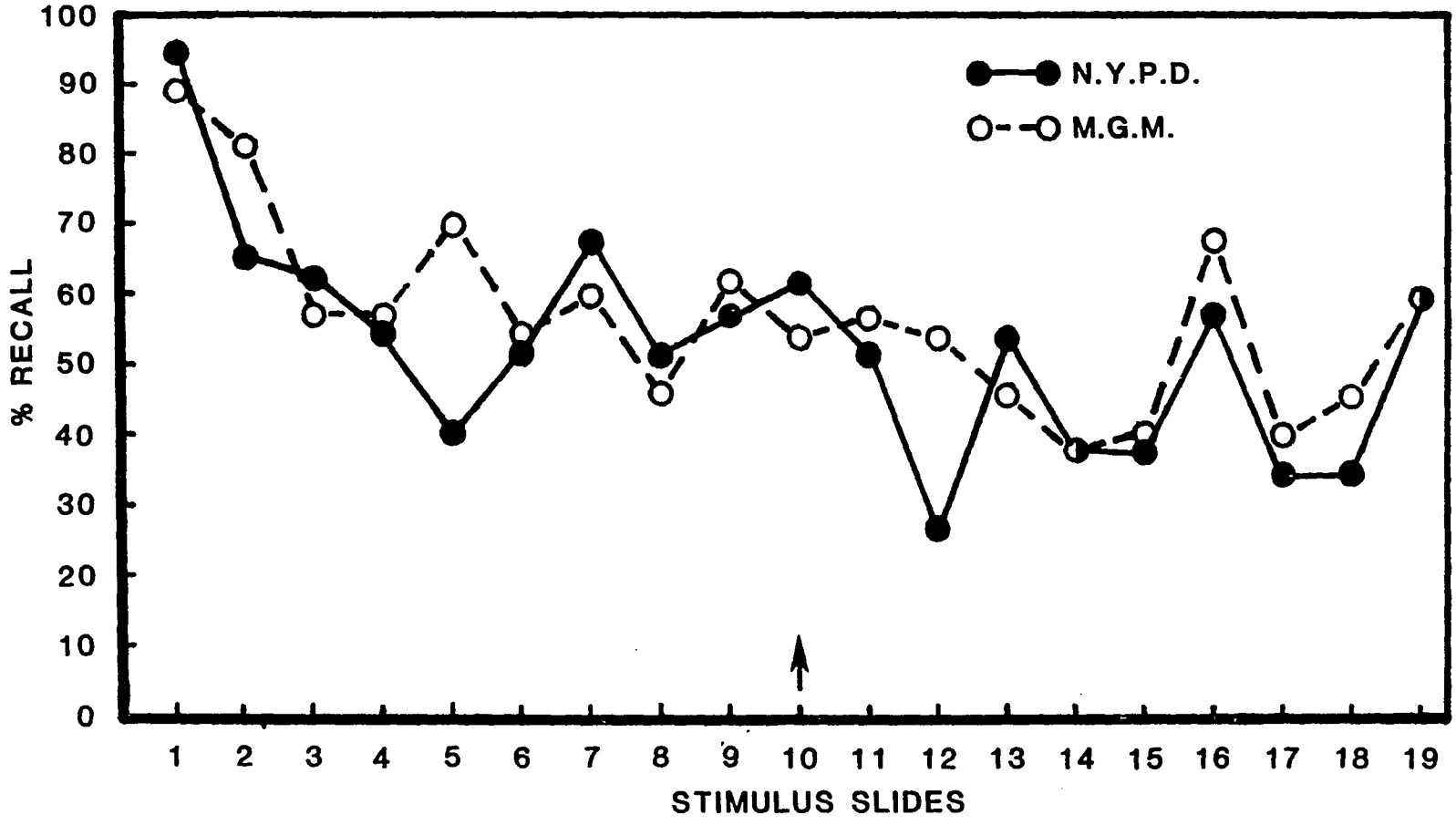

100
90
80
70
60
50
40
30
20
10
0
% RECALL
N.Y.P.D.
M.G.M.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
STIMULUS SLIDES

Figure 13.

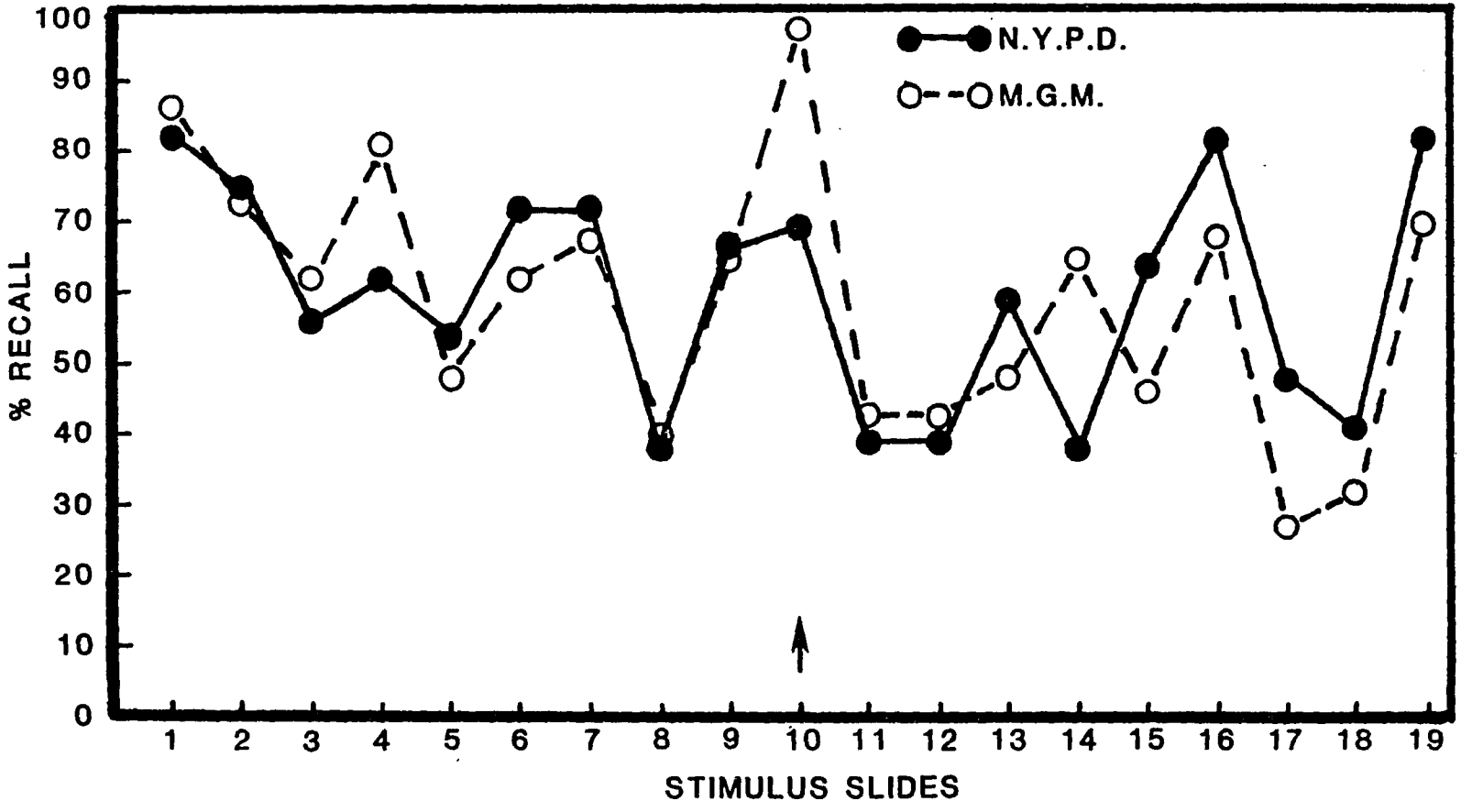

100
90
80
70
60
50
40
30
20
10
0
% RECALL
N.Y.P.D.
M.G.M.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
STIMULUS SLIDES

Figure 14.

Appendix A

Feature description questionnaire, experiment 1.

NAME:_____

PHONE #_____

CLASS_____SECTION_____

You have been a witness to a crime. A man was injured. I would like you to tell me what you saw in your own words. I will ask you first to describe the person who committed the crime. If you don't remember some part of the description at this time, please tell me you "don't remember."

1. CAN YOU TELL US THE HEIGHT OF THE ATTACKER? (feet & inches)
2. CAN YOU TELL US THE WEIGHT OF THE ATTACKER? (in exact pounds)
3. CAN YOU TELL US THE AGE OF THE ATTACKER? (exact # of years)
4. CAN YOU TELL US THE HAIR STYLE OF THE ATTACKER?
5. CAN YOU TELL US THE ATTACKER'S HAIR LENGTH?
6. CAN YOU TELL US THE ATTACKERS HAIR COLOR?
7. CAN YOU TELL US THE ATTACKER'S SKIN COLOR?
8. CAN YOU TELL US ABOUT THE ATTACKER'S NOSE?
9. CAN YOU TELL US ABOUT THE LIPS OF THE ATTACKER?
10. CAN YOU TELL US ANYTHING ABOUT THE EYEBROWS?
11. CAN YOU TELL US IF THE ATTACKER HAD ANY FACIAL HAIR?
12. CAN YOU TELL US ABOUT THE BODY BUILD OF THE ATTACKER?
13. CAN YOU TELL US ABOUT HIS SHIRT STYLE?
14. CAN YOU TELL US ABOUT HIS SHIRT COLOR?
15. CAN YOU TELL US ABOUT HIS PANTS?
16. CAN YOU TELL US ABOUT HIS SHOES?
17. WAS THE ATTACKER WEARING ANY JEWELRY?
18. WHAT WAS THE VICTIM ASSULTED WITH?

Appendix B

Witness information questionnaire, experiment 1.

Center for Responsive Psychology
Questionnaire

WITNESS DATA

PLEASE CIRCLE YOUR ANSWER

1. SEX MALE FEMALE

2. AGE _____ Yrs.

3. RACE White Black Hispanic Asian American Other _____ Specify

4. HEIGHT _____

5. WEIGHT _____

6. Do you normally wear glasses or contact lenses? Yes No

---

7. If you do wear glasses or contact lenses, were you wearing them during the film? Yes No

---

8. How clear would you say the Filmed presentation of the crime was? Very hard to see / Somewhat hard to see / Somewhat easy to see / Very easy to see

---

9. How would you describe your own view of the crime? Missed it / Caught only a quick look / Saw it reasonably well / Saw it very clearly

---

10. How long did the whole filmed crime take? Please by specific in minutes or seconds or both. _____

---

11. How long was the attacker's face visible? Be specific. _____

---

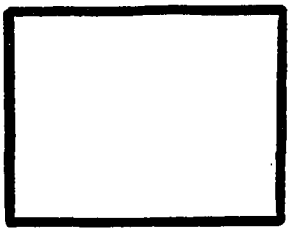
12. How would you describe your own feelings as you watched the assault take place? Bored / Neutral / Interested / Excited / Bothered / Upset / Anxious

Appendix C

Photospread questionnaire, experiment 1.

LINEUP CHECKLIST

You will be seeing a set of six photographs. The person who was in the scene you were a witness to is shown in the set of photographs. Look over all of them. If you recognize anybody from the scene, please write the number in the box below corresponding to the photo.



If you made a choice

How certain are you that you recognized the actual person? (Please circle a number).

1 2 3 4 5 6 7

Not Certain at all — Somewhat Certain — Very Certain

If you said "none", how certain are you that the perpetrater's picture wasn't there? (please circle a number).

1 2 3 4 5 6 7

Not Certain at all — Somewhat Certain — Very Certain

Appendix D

Feature description questionnaire, experiments 2-3.

NAME:_____

PHONE #_____

CLASS_____SECTION____

1. CAN YOU TELL US THE HEIGHT OF THE PERSON? (feet & inches) _____
2. CAN YOU TELL US THE WEIGHT OF THE PERSON? (in exact pounds) _____
3. CAN YOU TELL US THE AGE OF THE PERSON? (exact # of years) _____
4. CAN YOU TELL US THE HAIR STYLE OF THE PERSON? _____
5. CAN YOU TELL US THE PERSON'S HAIR LENGTH? _____
6. CAN YOU TELL US THE PERSON'S HAIR COLOR? _____
7. CAN YOU TELL US THE PERSON'S SKIN COLOR? _____
8. CAN YOU TELL US ABOUT THE PERSON'S NOSE? _____
9. CAN YOU TELL US ABOUT THE LIPS OF THE PERSON? _____
10. CAN YOU TELL US ANYTHING ABOUT THE EYEBROWS? _____
11. CAN YOU TELL US IF THE PERSON HAD ANY FACIAL HAIR? _____
12. CAN YOU TELL US ABOUT THE BODY BUILD OF THE PERSON? _____
13. CAN YOU TELL US ABOUT THE SHIRT STYLE? _____
14. CAN YOU TELL US ABOUT THE SHIRT COLOR? _____
15. CAN YOU TELL US ABOUT THE PANTS? _____
16. CAN YOU TELL US ABOUT THE SHOES? _____
17. WAS THE PERSON WEARING ANY JEWELRY? _____
18. WHAT WAS THE PERSON CARRYING? _____

Appendix E

Witness information questionnaire, experiments 2-3.

-2-

Center for Responsive Psychology
Questionnaire

WITNESS DATA

PLEASE CIRCLE YOUR ANSWER

1 SEX MALE FEMALE

2. AGE_____Yrs.

3. RACE WHITE BLACK HISPANIC ASIAN AMERICAN OTHER_____
Specify

4. HEIGHT_____

5. WEIGHT_____

6. Do you normally wear glasses or contact lenses? Yes No

7. If you do wear glasses or contact lenses, were you wearing them during the film? YES No

8. How clear would you say the filmed presentation of the scene was? Very hard to see / Somewhat hard to see / Somewhat easy to see / Very easy to see

9. How would you describe your own view of the scene? Missed it / Caught only a quick look / Saw it reasonably well / Saw it very clearly

10. How long did the whole film take? Please be specific in minutes or seconds or both _____

11. How long was the person's face visible? Be specific _____

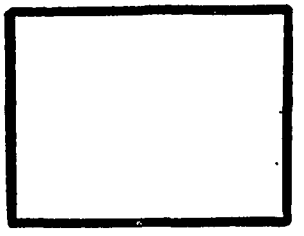
12. How would you describe your own feelings as you watched the scene take place? Bored / Neutral / Interested / Excited / Bothered / Upset / Anxious

Appendix F

Photospread questionnaire, experiments 2-3.

LINEUP CHECKLIST

You will be seeing a set of six photographs. The person who was in the scene you were a witness to is shown in the set of photographs. Look over all of them. If you recognize anybody from the scene, please write the number in the box below corresponding to the photo.



If you made a choice

How certain are you that you recognized the actual person? (Please circle a number).

1	2	3	4	5	6	7
Not Certain at all			Somewhat Certain			Very Certain

Appendix G

Autopsy slide which was labeled and used as independent variable, experiments 4-6.

Appendix H

Slide recall questionnaire, experiments 4-8.

Name

Age Sex

Please recall in any order you wish the slides you have just viewed.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

15.

16.

17.

18.

19.

20.

Appendix I

Arousal scale, dotted line indicates width, attached at top as second page of Appendix H., experiments 4-8.

How would you describe your own feelings after viewing the slides? (circle one)

Bored Neutral Interested. Excited Bothered Upset Anxiou

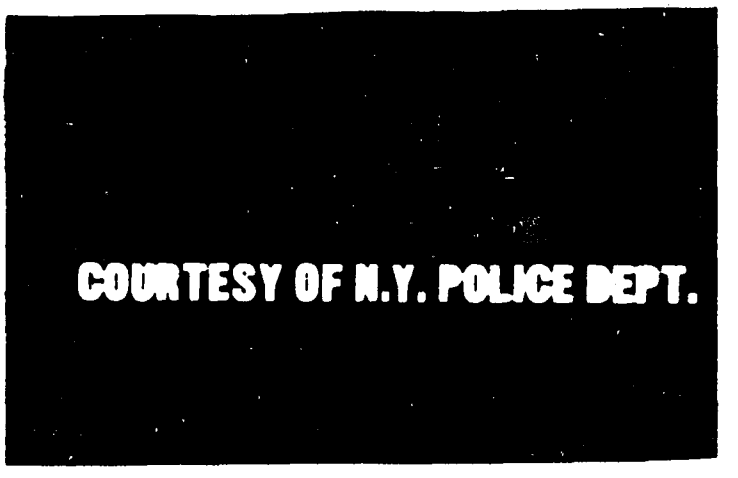
Appendix J

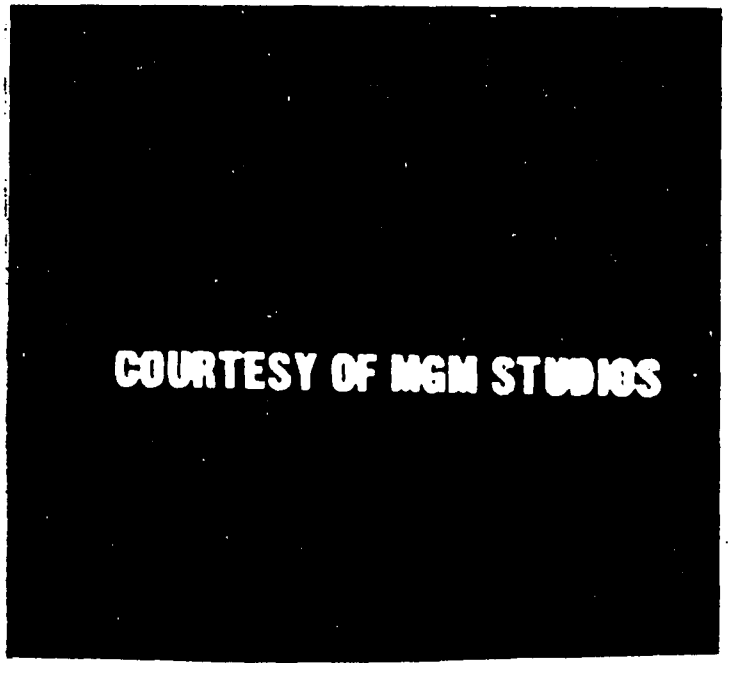
Proviso distributed to subject following all data collections, experiments 4-6.

Due to the subject matter that was viewed, if you have any questions or unsettling feelings now, or later, please feel free to contact Dr. Robert Buckhout, 5113 James Hall or call 780-5960, 5635.

Appendix K

Independent variable slide used in experiment 7.





Appendix L

Baby picture which was labeled and used as independent variable in experiment 8.

Appendix M

Commercial recall questionnaire, experiment 9.

Name_____ _____ Age_____ Sex___

In any order you wish, please recall all the commercials you just viewed.

1.
2.
3.
4.
5.
6.
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12.
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16.
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18.
19.
20.

Appendix N

Arousal scales for each group, dotted line indicates width, attached at top as second page of appendix M., experiment 9.

How would you describe your feelings while viewing the Baptist Burn Center segment. (circle one)

Bored Neutral Interested Excited Bothered Upset Anxious

How would you describe your feelings while viewing the Kris Kristofferson segment. (circle one)

Bored Neutral Interested Excited Bothered Upset Anxious

Appendix O

Probe questionnaire, experiment 9.

Name-_____

1. How does Cleaveland traditionally mark the start of the Christmas season?_____

_____

2. Who sponsored the Christmas parade?_____

3. What was the name of the cable TV company advertised?_____

4. What was the number on the back of the football player's jersey that scored the touchdow

_____

5. What brand tire was on sale?_____

6. What model Cadillac was advertised?_____

7. In the Ford commercial, what was the financing rate?_____

8. What day of the week was the weather reported for?_____

9. What was the brand name of the specialty foods advertised, the store that carried them?

_____

10. In what city were the big gambling arrests made?_____

11. What automobile service station was advertised?_____

12. What was the name of the food store advertised?_____

13. What was the major selling point of the Calibri Cigarette Lighter?_____

14. What home computer was advertised?_____

15.a What was the name of the TV store advertised?_____

b What brand name did they carry?_____

16. What is the product that NIGHTE'S sells?_____

17.a What overnight delivery service was advertised?_____

b In that commercial the man had his name on his coffee cup, what was it?_____

18.a What was the Ice Cream brand name?_____

b What color was the girl's blouse and matching headband in that ad?_____

19. What brand name was the garage door opener?_____

20.a Which holiday was the TOYOTA commercial taking place in?_____

b What day did the sale end on?_____

21.a What was the brand name of the microwave oven?_____

b What was unique about the kitchen it was displayed in?_____

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