THE EFFECTS OF AROUSAL, SEX OF WITNESS AND SCHEDULING OF INTERROGATION ON EYEWITNESS TESTIMONY

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CHAPTER I

INTRODUCTION

For 200 years eyewitness testimony has been the evidence of choice in the prosecution of criminal cases in the American court system. This state of affairs has persisted despite repeated incidents of misidentified suspects and false testimony that has resulted in the incarceration and even execution of many innocent persons. For example, Adolf Beck was found guilty in 1924 and incarcerated as a result of the eyewitness testimony of 22 witnesses (Wall, 1965). Five witnesses, including two police officers, stated that Beck was positively the culprit. Seven years later Beck was acquitted in a retrial as the tragic error of misidentification by the witnesses emerged in the courtroom. Ironically, as the guilty individual was ushered into the courtroom, it was observed that he only remotely resembled Beck in appearance.

During the 1920's another defendant was identified as the guilty party by 30 witnesses. More fortunate than Beck, however, he gained acquittal by proving that he had been in jail at the time when part of the crime had been committed.

Countless other cases of unreliable testimony (Commonwealth vs. Sacco & Vanzetti, 1921; State vs. Purvis, 1894) (Wall, 1965) had led respected judges and investigators to comment on the use of eyewitness testimony. The late Judge Jerome Frank, in a book dealing with miscarriages of justice, stated, "Perhaps erroneous identification of the

accused constitutes the major cause of the known wrongful convictions" (Frank & Frank, 1957). Felix Frankfurter, noted jurist, commented before his death:

> "What is the worth of identification testimony even when uncontradicted? The identification of strangers is proverbially untrustworthy. The hazards of such testimony are established by a formidable number of instances in the records of English and American trials. These instances are recent--not due to the brutalities of ancient criminal procedure" (Frankfurter, 1957).

In England, after Adolf Beck was found to be the victim of misidentification, a committee was formed to investigate the case. It concluded that "evidence as to identify based on personal impressions, however bona fide, is perhaps of all classes of evidence the least to be relied upon, and therefore, unless supported by other facts, an unsafe basis for the verdict of a jury" (Watson, 1924).

Despite the numerous cases of erroneous testimony, it is unlikely that the use of the eyewitness in our criminal justice system will abate. It is possible and desirable to investigate the dynamics of the eyewitness process, with special emphasis on variables that significantly affect such testimony. The discovery of the interrelationship of these variables, hopefully, will allow the court system to minimize future breaches of justice.

CHAPTER II

REVIEW OF THE LITERATURE

Recent public criticism regarding the seemingly molecular and inconsequential nature of some psychological research has forced many experimenters to broaden the scope of their experimental questions and attempt to become more responsive to current social issues. As a result of this "new look" in research a stimulating relationship has developed between psychology and the criminal justice system. Behavioral scientists at present are providing information for the courts in the areas of jury selection, interrogation and identification procedures and the dynamics of expert and eyewitness testimony. Gaining particular attention is the effect and reliability of eyewitness testimony.

The importance of eyewitness testimony in criminal proceedings is well documented. The overwhelming impact of such testimony, regardless of mitigating circumstances, was recently demonstrated in a simulated jury trial (Loftus, 1975). In this study 150 students were selected as jurors and given a written account of a robbery-murder incident. They were also presented with a summary of evidence and arguments presented at the defendant's trial. Each juror, based on the information provided, had to arrive at a verdict, guilty or not guilty.

The written accounts of the incident and trial differed only in

the presence or absence of eyewitness testimony. One group of jurors was told that there had been no eyewitness to the crime. Another group was told that a store clerk testified, with conviction, that he saw the defendant shoot the two victims, although the defense attorney claimed he was mistaken. The final group was told the store clerk had testified to seeing the shooting, but the defense attorney had discredited him. The attorney showed that the clerk had not been wearing his glasses on the day of the shooting, and since he had vision poorer than 20/400 he could not possibly have seen the face of the perpetrator from where he stood.

Results indicated that 82 percent of the jurors that had not heard about an eyewitness voted for acquittal. Seventy-two percent of the group that received accounts where there appeared to be a credible witness voted guilty. Most noteworthy, however, was the voting of the last group which received the account where the witness was apparently discredited. Sixty-eight percent of these jurors voted guilty despite the seeming discreditation. Jurors do, indeed, appear to be highly influenced by a witness that states with conviction, "That's the man".

In light of the dramatic influence of this form of testimony several researchers have attempted to explore the reliability of eyewitness recall and identification. Buckout (1974) staged a live assault on a university campus in front of 141 witnesses. After the assault, sworn statements were taken from each of the witnesses concerning the details of the incident. It was discovered that the witnesses were only able to accurately recall 25 percent of the maximum possible details of the situation. It was also found that the passage

of time was overestimated by a factor of almost 2½ to 1, weight estimates were 14% too high and the age was underestimated by more than two years. After seven weeks each witness was presented with a set of six photographs and asked to make an identification. Forty percent of the witnesses identified the suspect correctly, 25 percent identified an innocent bystander and 35 percent were unable or unwilling to make an identification.

In a similar study Alper (1974) staged a live purse snatching incident in a classroom in front of 52 witnesses. Using a videotapted line up of five suspects, each witness was asked to make an identification. Thirteen percent correctly identified the culprit, while 68% identified an innocent person. Particularly noteworthy is that only 20 percent of the witnesses chose to not attempt an identification. Over 80 percent attempted an identification and most of them were mistaken. Evidently many witnesses, in an attempt to be responsible and helpful, overstep their recognition and recall abilities.

Also of interest in the above study is that a significant correlation was found between errors of commission (the tendency for observers to perceptually fill in false details) and the level of confidence. The more confidence a witness reported in his testimony the greater the amount of erroneous recall. In juxtaposition, more accurate witnesses reported less information and lower confidence in their testimony but they did not fill in their recall gaps with false information.

Buckout (1975) further demonstrated the unreliability of eyewitness identification through a rather novel experimental technique. A 12-second purse snatching incident was broadcasted on the nightly news in New York. Following the purse snatching segment a six-person line-

up was presented on the air and viewers were informed the suspect might or might not be in the line-up. Viewers then called in and registered their choice as to which person in the line-up, if anyone, was the real attacker. (The culprit was in the number two position in the line-up.)

Two thousand, one hundred and forty-five identifications were reported. Results indicated that 14.1% of the viewers made a correct identification. (The chance level for the line-up was 14.29%.) Twenty-five and nine tenths percent of the viewers stated that the attacker was not in the line-up, while 60 percent identified an innocent person. Overall, out of 2,145 attempted identifications, 1843 or 86% were mistaken.

Johnson and Scott (1975) in a well-controlled study attempted to investigate the effects of arousal and the sex of the witness on identification and recall. Male and female subjects reported individually to a laboratory to participate in a learning experiment. While waiting alone in the reception area an individual subject could hear a fight occurring in the next room. During the fight a great deal of commotion was heard and subsequently a suspect emerged from the room with a bloodied knife in hand. The suspect stood six feet away from the subject for four to six seconds, uttered a disclaiming sentence and then ran from the room. At this point a confederate fressed in full police uniform appeared on the scene and an immediate interrogation and identification was obtained. A low arousal social interaction was used as a control. In this condition the subjects overheard a casual conversation regarding an equipment failure. Following the equipment failure the same suspect that was used in the knifing incident entered

the reception area where the subject was seated, remained for four to six seconds six feet away, made a one sentence comment, then left the room. An experimenter then entered and requested the same interrogation and recall information as in the knifing (arousal) incident.

Results indicated that a consistent interaction effect was found between the level of arousal and the sex of the witness. Male witnesses, overall, performed better than female witnesses during high arousal whereas female witnesses performed significantly better than male witnesses in the neutral or low arousal situation.

Figure 1 represents the percentage of correct recall calculated from the maximum number of details possible.

Figure 2 represents the percentage of correct identifications made in the conditions.

As can be observed, the percentage of correct recall and identification, although better than earlier studies, is far from impressive. It should be noted, however, that in the above study subjects were exposed to the stimulus event individually rather than in a large group of people. Being exposed to a crime individually may prevent diffusion of responsibility, thus forcing the witness to be more attentive. This is one possible explanation for the somewhat better performance of witnesses in the Johnson and Scott study.

In these early stages of this type of recognition and recall research it appears that eyewitness testimony is unreliable. Because of its continued presence in criminal proceedings, however, new research is being conducted to discover what improvements can be made to enhance the quantity and accuracy of eyewitness recall and identification.

In conversation with criminal investigatores it was discovered

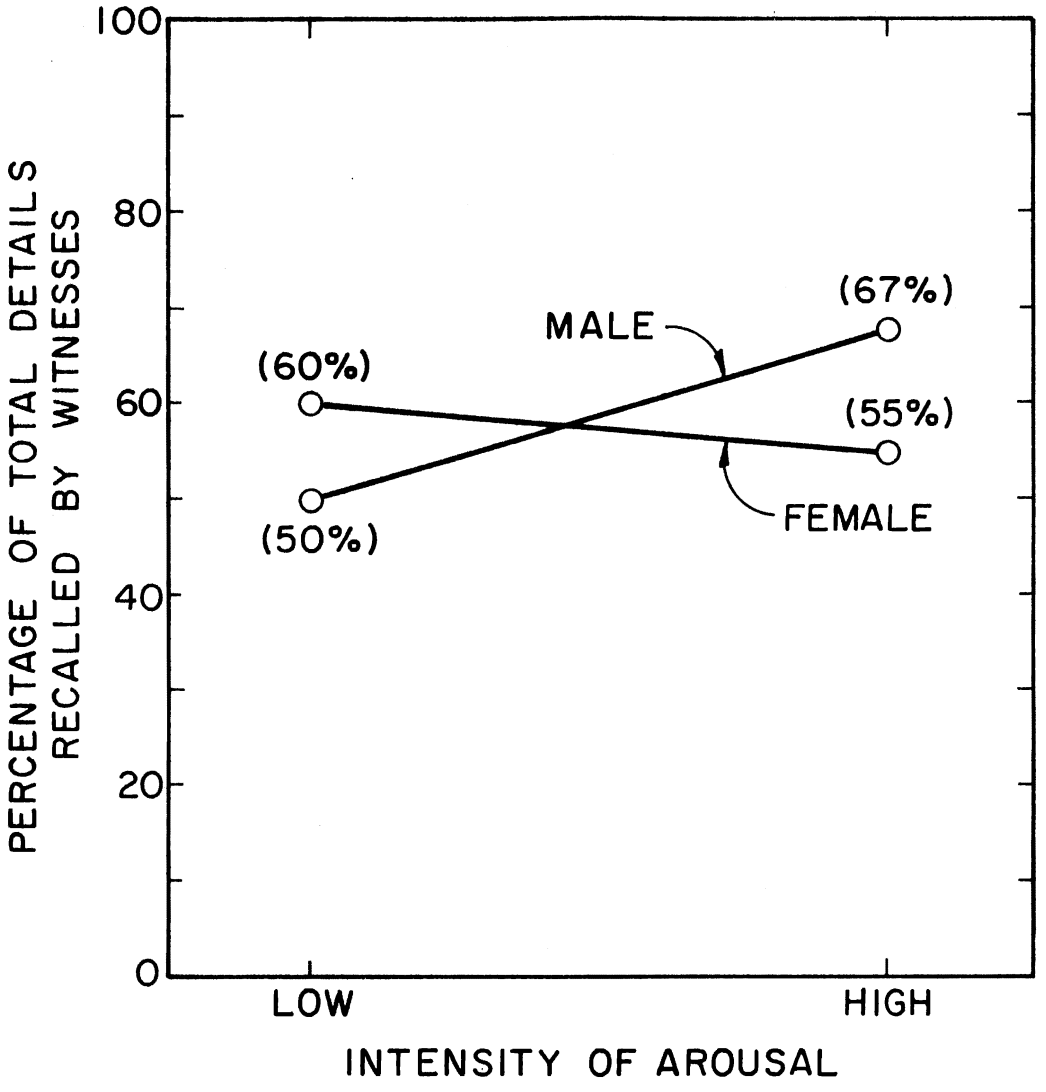

Figure 1. Total Percentage Recall

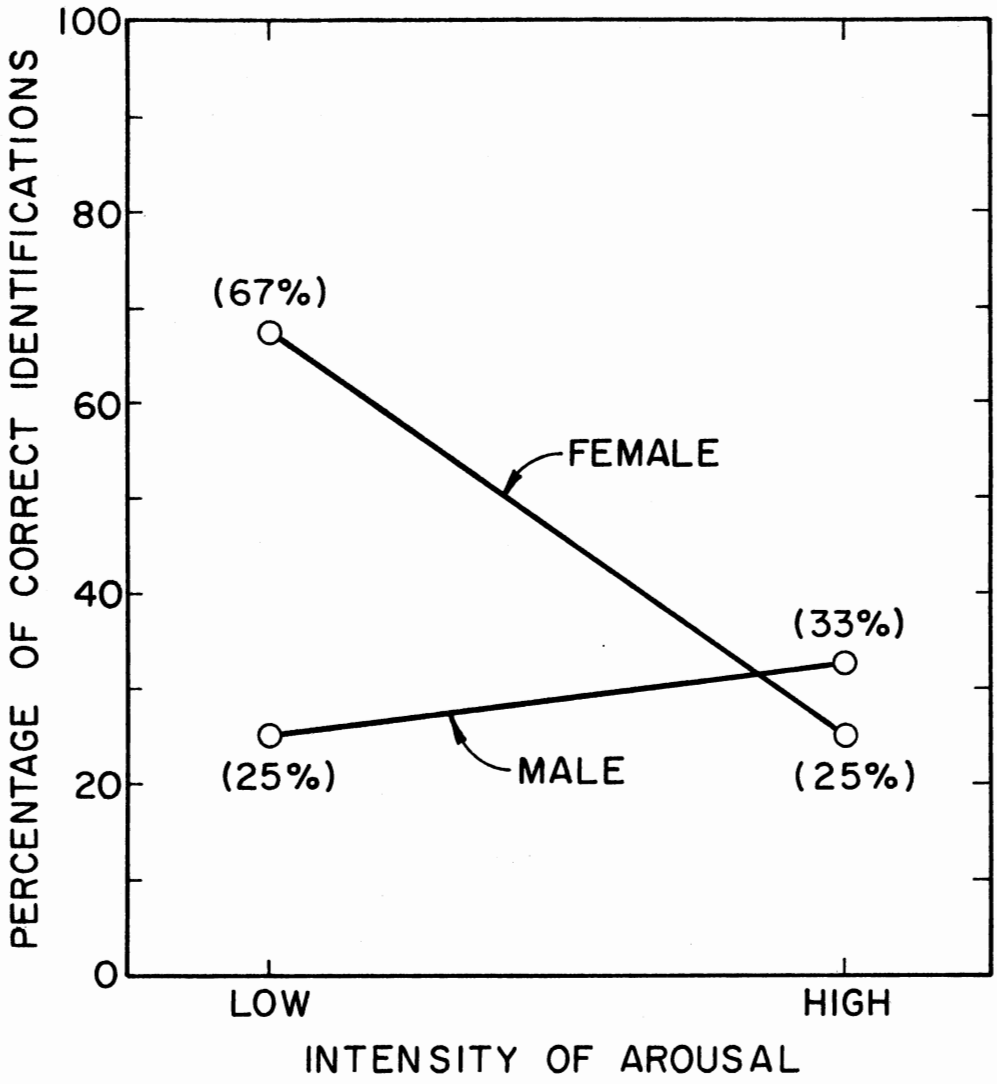

Figure 2. Arousal X Sex of Witness Interaction for Correct Identification of Suspect

that the timing of an interrogation was of particular importance. There is apprantely a differing of opinion as to when is the best time to interrogate. Some crime labs prefer interrogating immediately following an incident, while others prefer time delays up to a week or more.

Highly controlled laboratory research on learning, memory, recognition and recall has shed some light on the issue. The issue revolves around what effect arousal has on long-term vs. short-term retention of information. This is particularly relevant since most criminal situations would be regarded as highly arousing.

Results from this line of research indicate that a substantial relationship exists between arousal during learning and subsequent retention of the information. The relationship is such that low arousal results in better short-term retention, whereas high arousal results in better long-term retention.

This phenomena emerged whether the stimulus material was meaningful (Kleinsmith, Kaplan & Tarte, 1963; Kleinsmith & Kaplan, 1964), meaningless (Kleinsmith & Kaplan, 1964; Hockney, 1972), or continuously presented via film (Levonian, 1967). Results from these studies consistently indicated that recall of a highly arousing event is best after a time lapse of approximately one week.

This would suggest that investigators would obtain the most complete and accurate investigation report of a high arousal situation if they would conduct the interrogation approximately one week after the event as opposed to immediately following the event. Whether the results from these studies can be generalized to the interrogation situation is indeterminable. Since the studies were conducted in highly con-

trolled laboratory situations, they obviously do not capture the nature and extent of the trauma of being witness to a crime.

CHAPTER III

STATEMENT OF THE PROBLEM

The recent literature involving eye itness identification and testimony continues to demonstrate the unreliability of such evidence. Unfortunately, too few studies have been conducted for the results to be generally accepted. Consequently, the courts are reluctant to instruct jurors as to the experimentally demonstrated unreliability of eyewitness testimony or allow expert testimony concerning the research. Continued rigorous and relevant research is needed so that the courts can be presented with a collection of well-documented and replicated findings regarding the validity of eyewitness testimony. Also, continued research is needed to develop and improve current investigative procedures.

This study was designed to investigate four separate phenomena:

(1) The differential effects of high arousal and low arousal on the processing of information in a staged criminal situation.

(2) Potential sex differences in identification and recall as a function of the level of arousal in a staged criminal situation.

(3) The relative effect that investigating a crime immediately after vs. one week later has on recall and identification.

(4) The overall reliability of male and female eyewitnesses in recalling the events of criminal acts and subsequently identifying a suspect.

The following hypotheses were generated for the study:

(1) Overall performance will be expected to be better in the high arousal rather than low arousal conditions except for the variables suspect description and suspect identification. For these variables performance will be expected to be better in the low arousal condition.

(2) Identification and recall will also be expected to vary as a function of the interaction between the level of arousal and sex of witness.

a) Males will be expected to perform better in the high arousal condition than females.

b) Females will be expected to perform better in the low arousal condition than the high arousal condition.

(3) Identification and recall will be expected to vary as a function of the interaction between the level of arousal and the timing of the interrogation.

a) In the high arousal condition, identification and recall will be expected to be better when the interrogation is obtained after a one week delay.

b) In the low arousal condition, identification and recall will be expected to be better when the interrogation is obtained immedidately following the event.

(4) The errors of commission will be expected to be greater in the high rather than in the low arousal condition.

(5) More negative arousal will be expected in the arousal condition than in the neutral condition.

To investigate these hypotheses, male and female witnesses were exposed to a male suspect in either a high arousal criminal situ-

ation or a neutral social situation. In the criminal situation, males and females viewed a male suspect leaving the scene of a crime in a basement laboratory. In the neutral situation, male and female witnesses viewed a male suspect leaving the same area after the discontinuation of a psychological experiment. Testimony concerning both of these events was obtained from all witnesses. For half of the witnesses, an interrogation occurred immediately after the incident. For the other half it occurred one week later. The dependent measures were the witnesses' abilities to accurately recall the details of the event and to identify the suspect.

CHAPTER IV

METHOD

Subjects

The subjects were twenty-four male and twenty-four female white undergraduate Psychology I students who received bonus points for participation.

Stimulus Materials

Two male upper classmen served as targets throughout the duration of the experiment. One of the targets was 26-years old, 6 feet tall, 200 pounds and of stocky build. The other target was 21 years old, 6 feet tall, 155 pounds and of slender build. Both targets were fair complexioned with dark collar-length hair that was parted near the middle. Each also had noticeable moustaches. Their attire remained constant throughout the experiment and consisted of jeans and a flannel shirt. There were no physical characteristics that were obviously distinguishing about either target.

Fifty male 5x7 color photographs were bound into an album to resemble a mug shot book. Five photographs appeared on each page, and the target's picture was rotated to a new page every eighth subject. All photographs were frontal facial views which included the upper shoulders. A Konica 35mm camera was used with a lens of 135mm effective focal length.

The facial similarity of the targets to the other faces in the mug shot book was determined by having 50 independent observers rate them. Non-target faces were presented one at a time next to the target's face and the observers were asked to rate the similarity of the two faces. A four-point scale with the verbal labels (1) "very dissimilar," (2) "dissimilar," (3) "similar," (4) "very similar" was used for the rating. The mean similartiy rating for the male non-targets to the targets was 1.99 and 1.95, indicating that the non-targets were generally regarded as dissimilar to both of the targets.

The blood used in the high arousal condition was animal blood and the grease used in the low arousal condition was regular axle grease. The letter opener and pen used in the high and low arousal conditions respectively were both silver and 6 inches long. The wire attached to the confederate's arm in the high arousal condition was regular electrical wire approximately 10 inches long and was attached by white adhesive tape.

The police uniform used in the experiment was borrowed from the local police department and was fully equipped according to regulation. Finally, the subjects reported to a little known research facility on campus. The reception area and laboratory were adjoining suites in the basement.

Procedure

Witnesses were recruited for a learning experiment. Upon arriving in the reception area the witness was greeted by a receptionist and informed that the researcher was with another subject in an adjacent room marked laboratory. The laboratory was also distinguished by a

red light over the door. After seating the witness next to the exit of the laboratory, the receptionist tripped a cue light to the laboratory and then began busying herself at her desk. Several minutes later she excused herself to run an errand and left the witness along in the reception area.

The tripping of the light by the receptionist was a cue for the experimenter and confederate to stop an ongoing word association task and to begin either a hostile or neutral interaction. During the hostile interaction (high arousal condition), the witness overheard an argument about the continuation of an experiment involving shock. The exchange ended with bottles breaking, chair crashing and the confederate bolting into the reception area with a bloodied letter opener and electrical wires attached to his forearms. The confederate turned toward the witness, made one disclaiming comment ("He would not let me go"), and then exited. The confederate was in the presence of the witness for about four seconds.

During the neutral interaction (low arousal condition), an equipment "failure" prevented the continuation of the learning experiment. After the equipment failed, the confederate, with grease on his hands and holding a pen, entered the reception area, made one comment ("Too bad the machine broke"), and then left. The confederate was in the presence of the witness for about four seconds also.

Both interactions lasted four to five minutes and were controlled for similarity of content. In the high arousal condition the witness overheard the confederate being wired to receive shock for errors made in recalling word associations. In the low arousal condition the witness overheard the confederate being wired to monitor Galvanic

Skin Responses as he participated in a game involving memorized word associations. (See Appendices A and B for transcripts of these interactions.)

Immediately following the confederate's exit from the reception area, the experimenter entered and asked the witness, "Are you - _____ _____? Please come with me." In the high arousal condition the experimenter was dressed in a full police uniform whereas in the low arousal condition he appeared in a white lab coat. The experimenter then directed the witness to an interrogation area where the investigation report was to be obtained.

At this point the witness was informed regarding the purpose of the experiment, and his help was solicited in recalling the details of the incident and identifying the "suspect". Before the actual interrogation began the witness was asked to complete the Byrne Effectance Arousal Scale. This indicated, in part, the impact of the experimental manipulation.

Upon completing the arousal scale, half of the witnesses were interrogated immediately; for the remaining witnesses the interrogation was delayed one week. Those witnesses that were asked to return one week later were told to treat the situation as though it were something for which they felt the police might be contacting them to ask some questions.

All interrogations began by seating the witness at a bare table and asking him to relax for a minute and think about what had occurred. After this brief interval, the experimenter posed the open-ended question, "Tell me in as much detail as you can what happened after you entered the reception area." Following the initial question concern-

ing the total encounter, the interrogation was broken down into four specific topical areas: (1) the physical setting (furnishing, lighting, etc.), (2) the conversation in the adjacent room, (3) the suspect's exit, and (4) the physical characteristics of the suspect. The initial question within each topical area was open-ended/free recall. Following the free recall, a pre-determined set of probe questions were posed concerning relevant details that were not mentioned in the free recall. All verbal reports by the witness were written by the experimenter during the investigation and tape recorded for subsequent verification.

At the conclusion of the interview the witness was seated in front of an album of mug shots containing 50 male photographs. He was then given the following instructions: "The suspect in question may or may not be included in these photos. We also have no guarantee that the picture would be current. Please look through them and tell me if you see a picture of the person you saw in the other room." At this point the experimenter left the room so as not to influence the witness' choice in anyway. After the witness completed the identification task, he was asked to rate the confidence of his decision. If there were no further additions to the interview, the witness was given a short post-task inventory and further debriefed.

Throughout the experiment every attempt was made to simulate as closely as possible an actual police investigation. To facilitate this objective, tours were made of several crime labs and appropriate props were borrowed to lend realism.

Two weeks following the end of the experiment, follow-up quesionnaires were mailed to the witnesses. They were asked to complete the questionnaire and return it.

Instruments

The Byrne Effectance Arousal Scale

This scale was used to measure the type and extent of the arousal created by the experimental manipulation. (See Appendix C for a copy of scale.) It consisted of 16 questions that were identified through factor analysis to differentiate between a positive arousal (alert, stimulated, interested, etc.) and a negative arousal (anxious, uneasy, disturbed).

Investigation Report

The investigation report consisted of questions directed to the witness in an attempt to obtain information concerning the action. This report was separated into five units which correspond to the flow of the experiment: (1) situation or setting, (2) conversation, (3) suspect exist, (4) suspect description, and (5) identification of the suspect.

Following the experimental manipulation, each witness was initially asked to recall the entire flow of the experiment without intervention from the investigator. After the witness finished recounting as much about the complete flow of the experiment as possible, the investigation proceeded to a more structured interview revolving around the five units mentioned above. (See Appendix D for a copy of the Investigation Report.)

Within each of the first four units the witness was first asked to recall as much about the specific unit as possible without intervention from the investigator. After the witness had exhausted this

free recall within the unit, the investigator would ask predetermined probe questions about any important details that the witness had failed to report during their free recall.

The dependent variable for each of the first four units was obtained by assigning one point to each correct detail reported in the free recall or probe phase of the report. A general description of the units and the range of points possible follows:

Situation/Setting

0-35 points possible for accurate descriptions of the setting in the reception area. This included items such as the number of doors, door signs, number of windows, sources of light and pieces of furniture. The witness was also asked to sketch a floor plan of the room, to identify his position in respect to the suspect, and to diagram the flow of action.

Conversation

0-40 points possible for accurate descriptions of what the witness overheard occurring in the laboratory. This included details such as number of people involved in the conversation, sex of the people, nature of the experiment, arguments overheard, the beginnings and endings of the arguments, length of the conversation, use of foul language, and the presence or absence of physical violence.

Suspect Exit

0-8 points possible for accurate recall of what occurred when the suspect entered the reception area. This included details such as

comments made by the suspect, length of exposure, presence of a knife (or pen), blood (or grease), and wires (or bandaid) attached to the forearm of the suspect in the respective conditions.

Suspect Description

0-15 points possible for accurate descriptions of the physical characteristics of the suspect. This included details such as sex, race, age, height, weight, hair style, color and length of hair, body build, attire and any other distinguishing characteristics.

The fifth unit was the identification of suspect. This unit did not involve any free recall or probe information. Instead, the witness was asked to attempt to identify the photograph of the suspect in the mug shot album. The witness had two choices in the task. They either made an identification or decided that a picture of the suspect was not included in the mug shot book. Following their decision, the witness was asked to rate their confidence concerning the selection of a picture, or decision that the suspect's photo was not included in the book. The scale used to assess the confidence ranged from 0 (no confidence) to 100 (absolute confidence).

Post Task Questionnaire

The post task questionnaire was a series of nine questions concerning the witnesses' reaction to the experiment. All the questions were rated on a scale of 1-9. (A copy of the inventory and mean responses are presented in Appendix F.)

Follow-Up Questionnaire

The follow-up questionnaire was mailed several weeks after the experiment was completed. The questionnaire was designed to determine if the witnesses' participations in the experiment in any way influenced how they would regard eyewitness testimony if they were a juror in the future. It was also designed to find out in what way they had profited from the experiment. (A copy of the questionnaire and the mean responses are presented in Appendix F.)

CHAPTER V

RESULTS

Fourteen dependent variables were analyzed individually by a 2x2x2 analysis of variance representing Arousal (high or low), Sex of Witness (male or female), and Scheduling of Interrogation (immediate or delayed). Other analyses included a 2x2 analysis of variance performed on the Byrne Effectance Arousal Scale which served as an independent variable check, and an intercorrelaton analysis performed on all the dependent variables.

Independent Variable Check

To determine the effectiveness of the arousal manipulation, Byrne's Effectance Arousal Scale was administered immediately following the suspect's exit and the disclosure that the preceeding events were staged. The scale consists of two dimensions, positive and negative effectance arousal, each measured by 16 items. Two scores were computed for each witness by summing the items for each dimension. These scores were separately analyzed by two-way analysis of variance since the scheduling of interrogation variable was introduced following the completion of the questionnaire. These analyses were reported in Table I.

The analysis of the positive arousal data yielded two significant main effects for both the Arousal and Sex of Witness factors. Witnesses

TABLE I

SUMMARY TABLE FOR ANALYSIS OF VARIANCE

	A Motivation Low vs. High Arousal	B Sex of Subject Male vs. Female	C Schedule of Interrogation Immed vs. Delay	AB	AC	BD	ABC
Free Recall							
Entire Flow	*6.45 H L	1.01	.03	.01	.88	.27	2.03
Event Recall							
Situation	.01	.87	**17.87 I D	.01	*4.37	1.23	1.90
Conversation	**32.67 H L	.18	.79	.01	.01	1.10	.04
Suspect Exit	**120.76 H L	*8.25 M F	*4.82 I D	*4.82	.02	.71	.26
Suspect Description	.32	.90	2.31	**60.68	1.29	.00	3.61
Total Details	**18.66 H L	.80	*6.72 I D	2.16	1.55	.69	2.76
Suspect Identification							
Correct Identification	1.48	.37	0.0	**9.25	0.0	.37	.37
Confidence Rating	1.99	2.41	1.44	0.0	.03	.41	2.63
Errors of Commission	**23.25 H L	**16.80 F M	**25.63 D I	*4.70	.52	.23	.23

TABLE I (Continued)

Error of Analysis									
Length of Exposure	.07		**19.66	F	M	.04	1.40	.46	.06	.25
Distance from Suspect	3.01		1.50			.30	(a) 3.23	.01	.08	.64
Age of Suspect	.11		1.51			.79	.79	2.10	1.01	.04
Height of Suspect	3.24		*5.78	F	M	.02	1.06	.02	.73	.73
Weight of Suspect	.02		.75			.11	.44	.44	.53	1.42
Arousal Scale										
Positive	**24.92	H L	*7.05	M	F	.06	2.52	.67	1.59	1.16
Negative	**48.73	H L	(a) 3.61	F	M	.29	.93			

(a) = p .10

* = p .05

** = p .01

L = Low Arousal M = Male I = Immediate

H = High Arousal F = Female D = Delay

reported significantly greater positive arousal in the high than low arousal condition, F (1,40) = 24.92, $p < .01$ and male witnesses rated themselves as experiencing significantly more positive arousal than female witnesses, F (1,40) = 7.05, $p < .05$.

The analysis of the negative arousal scores also yielded two significant main effects. Witnesses reported significantly greater negative effectance arousal in the high than low arousal condition, F (1,40) = 48.73, $p < .01$. The direction of the arousal level for the Sex of Wtiness main effect, however, was opposite to the one found for positive effectance arousal. Female witnesses tended to experience greater negative arousal than did male witnesses, F (1,40) = 3.61, $p < .10$. Although the Witness x Arousal level interaction was not significant, the pattern of the means is of interest. The data from female witnesses indicated somewhat more negative effectance arousal in the high arousal condition in comparison to the male witnesses, t (40) = 1.28, $p < .10$. This interaction is presented in Figure 3. This difference was not found in the low arousal condition.

The manipulation of the arousal factor was successful. Positive and negative effectance arousal were both significantly greater in the high arousal condition. Overall, male witnesses experienced greater positive arousal, whereas female witnesses indicated higher negative arousal. The differential effects this manipulation had on the type and degree of arousal experienced by male and female witnesses suggests that the latter group were more threatened by the staged confrontation and the suspect's exit.

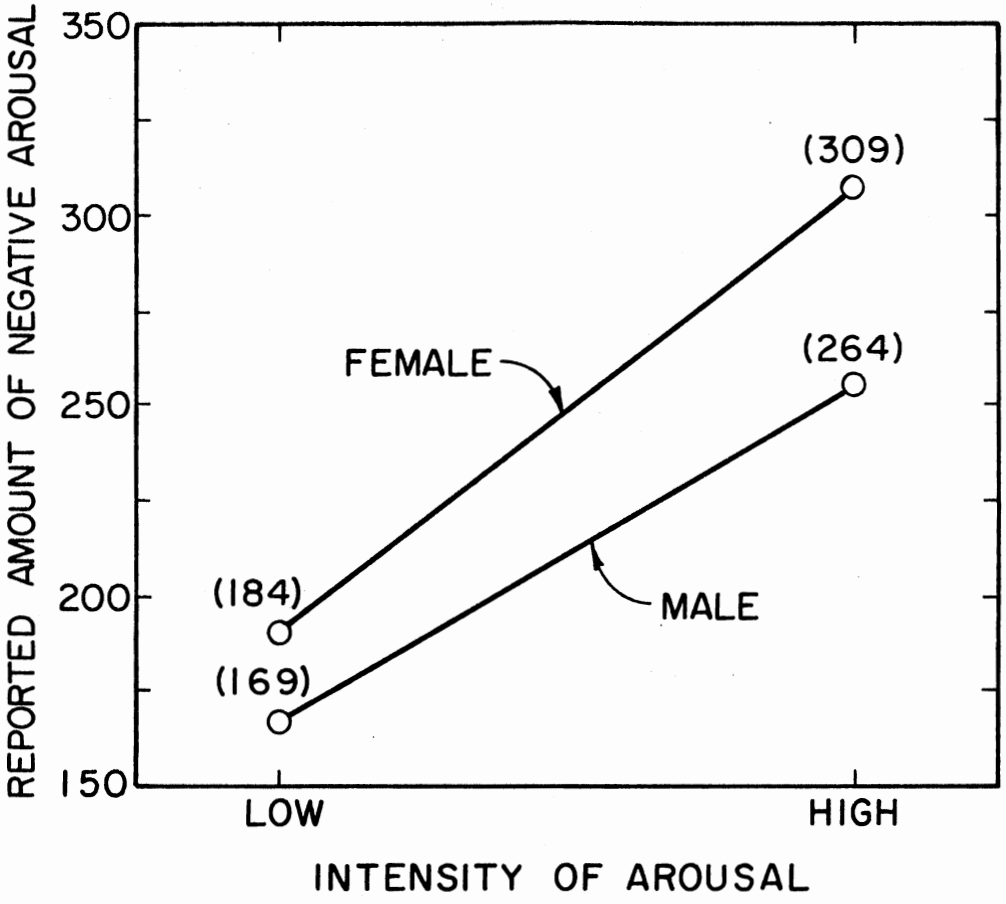

Figure 3. Arousal X Sex of Witness Interaction

Overview of the Separate Analyses

The dependent variables for the 2x2x2 analysis of variance were divided into six categories for separate analysis: (1) Free Recall -- Witnesses' free report of the entire flow of the experiment without intervention from the investigator, (2) Event Recall -- information obtained through probe and free recall questions concerning specific phases of the experiment which include the situation, conversation, suspect exit and suspect description, (3) Total Details -- total details recalled summing all the dependent variables in the Event + Free Recall categories, (4) Suspect Identification -- witnesses' identification of the suspect's photograph and subsequent confidance rating, (5) Errors of Commission -- incorrect details reported by the witness in the Free Recall and Event Recall categories, (6) Error Analysis -- the amount of overestimation or underestimation on key variables such as length of exposure, distance from suspect, age, height, and weight of suspect.

Table I presents a summary of the analyses of variance performed on the dependent variables. Before presenting the results of the separate analyses, however, an overview of the trends which emerged from them will be outlined. First, more information was accurately recalled in the high than the low arousal condition. The only exception to this generalization was the descriptions and identifications of the suspect, which were more accurate in the low arousal condition. Second, delaying the interrogations a week decreased performance for most categories of recall. An exception to this trend was the recall performance of female witnesses in the high arousal condition. Delaying their interrogations a week after they had been exposed to a highly arousing sequel increased their recall. Third, although no consistent results

emerged involving the sex of the witness, a highly consistent Arousal x Sex of Witness interaction did appear across most categories of recall performance. Male witnesses generally performed better than female witnesses during high arousal, whereas this relationship was reversed in the low arousal condition.

Separate Analyses

Free Recall

Free Recall refers to the total number of items that the witness reported concerning the entire sequel without the interrogator intervening. Only the arousal condition main effect was significant, F $(1,40) = 6.45$, $p < .05$. Witnesses freely recalled more information in the high than low arousal condition.

Event Recall

Event recall refers to the recall of specific events comprising the sequel: the reception area, the overheard conversation, the suspect's exit and his description. The scheduling of the interrogation appears to be the major variable affecting the recall of details about the waiting room. Conducting the interrogation immediately rather than delaying it a week significantly facilitated the recall of information about the reception area, F $(1,40) = 17.87$, $p < .01$. The only other significant effect was the Arousal x Interrogation Scheduling interaction, F $(1,40) = 4.37$, $p < .05$. This interaction is presented in Figure 4. Simple effects tests indicated that interrogating the witness in the low arousal condition immediately after the critical incident facilitated recall. Also, although not statistically significant,

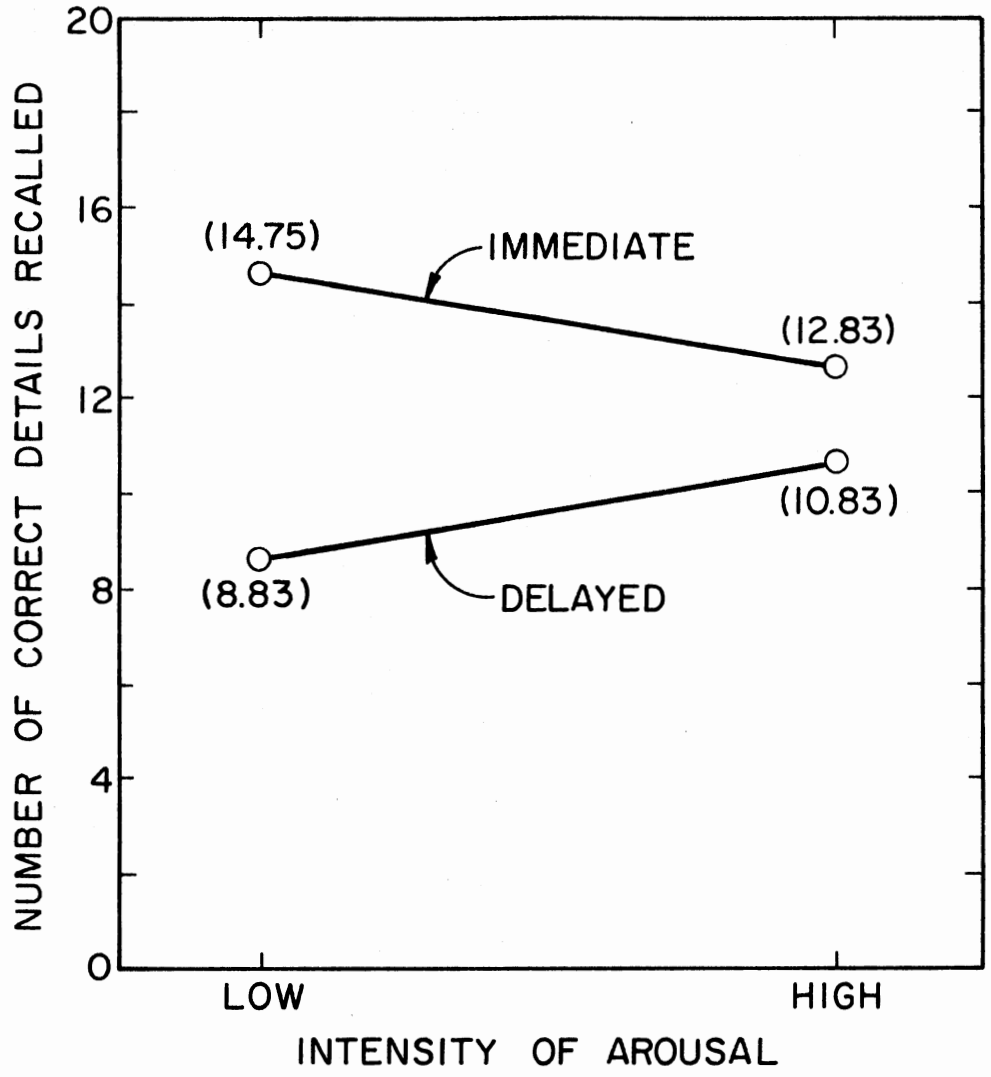

Figure 4. Arousal X Scheduling of Interrogation Interaction for Correct Details Recalled for the Situation

better recall occurred when the interrogation was immediate rather than delayed in the high arousal condition. No other effects were significant.

The recall of the conversation that was overheard in the adjacent room was significantly enhanced when it was highly arousing, $\underline{F}$ (1,40) = 32.67, $p < .01$. The content of the conversation in the high arousal condition was apparently unusual enough to engage the attention of the witnesses which subsequently facilitated recall. On the other hand the content of the low arousal conversation was so inconsequential that it did not command any attention which deterred from recall. No other effects involving the conversation variable were significant.

All the experimental manipulations significantly affected the recall of the suspect's exit. The recall of his exit was more accurate under high rather than low arousal, $\underline{F}$ (1,40) = 120.75, $p < .01$, and male witnesses gave significantly more accurate testimonies concerning his exit than did female witnesses, $\underline{F}$ (1,40) = 8.25, $p < .05$. In the third significant main effect, immediate rather than delayed interrogation produced significantly more recall, $\underline{F}$ (1,40) = 4.82, $p < .05$. Thus, the most accurate recall of a suspect's exit is achieved by a male witness observing under a highly aroused condition and interrogated immediately following the completion of the incident.

The final significant effect involving the suspect's exit was the Arousal x Sex of Witness interaction, $\underline{F}$ (1,40) = 4.82, $p < .05$. Tests for simple effects found that male witnesses recalled significantly more information in the high arousal condition than did female witnesses, $\underline{t}$ (40) = 2.55, $p < .05$, while no difference was found between

the witnesses in the neutral condition. (See Figure 5.) Evidently arousal facilitated accurate recall more for male witnesses than it did for female witnesses. None of the three remaining interactions were significant.

The fourth event to be recalled by the witness was a description of the suspect. On the Arousal x Sex of Witness interaction reached significance, F (1,40) = 60.68, $p < .01$. Simple effects tests yielded two significant differences. Male witnesses' descriptions of the suspect were more accurate than those of female witnesses under high arousal, t (40) = 4.40, $p < .05$. In the low arousal condition, however, female witnesses' descriptions were significantly more accurate than the ones provided by male witnesses, t (40) = 3.44, $p < .05$. (See Figure 6.) Thus, male witnesses performed better under high arousal, whereas female witnesses equalled or exceeded the performance of male witnesses under low arousal.

Total Details

Total details refers to the sum of the items recalled during the free recall period and in response to the interrogator's inquiries. Two main effects were found to be significant. Again, high arousal significantly facilitated the accurate recall of all details summed, F (1,40) = 18.66, $p < .05$. Paralleling previous findings, scheduling an interrogation immediately following the incident rather than delaying it a week significantly enhanced the accurate recall of details regardless of their source, F (1,40) = 6.72, $p < .05$.

Suspect Identification

Following the interrogation, the witness examined a set of photographs to determine if they could correctly identify the suspect. Only the Arousal

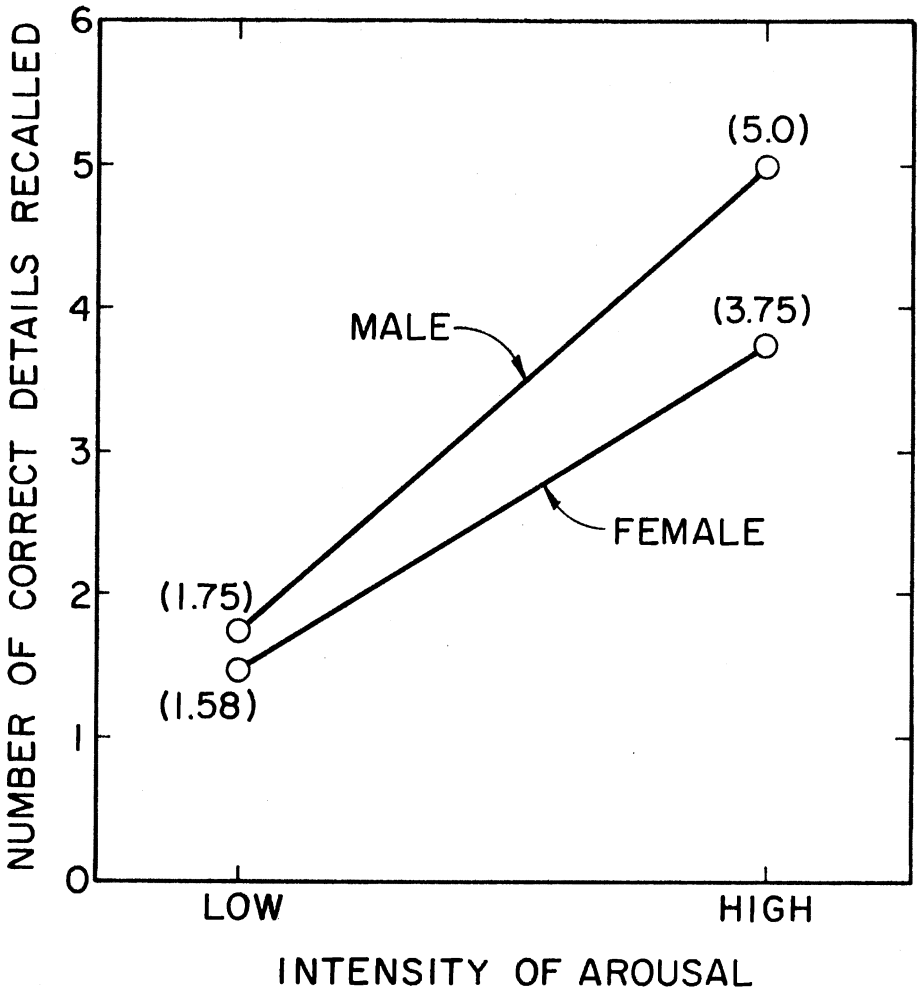

Figure 5. Arousal X Sex of Witness Interaction for Correct Details Recalled for Suspect's Exit

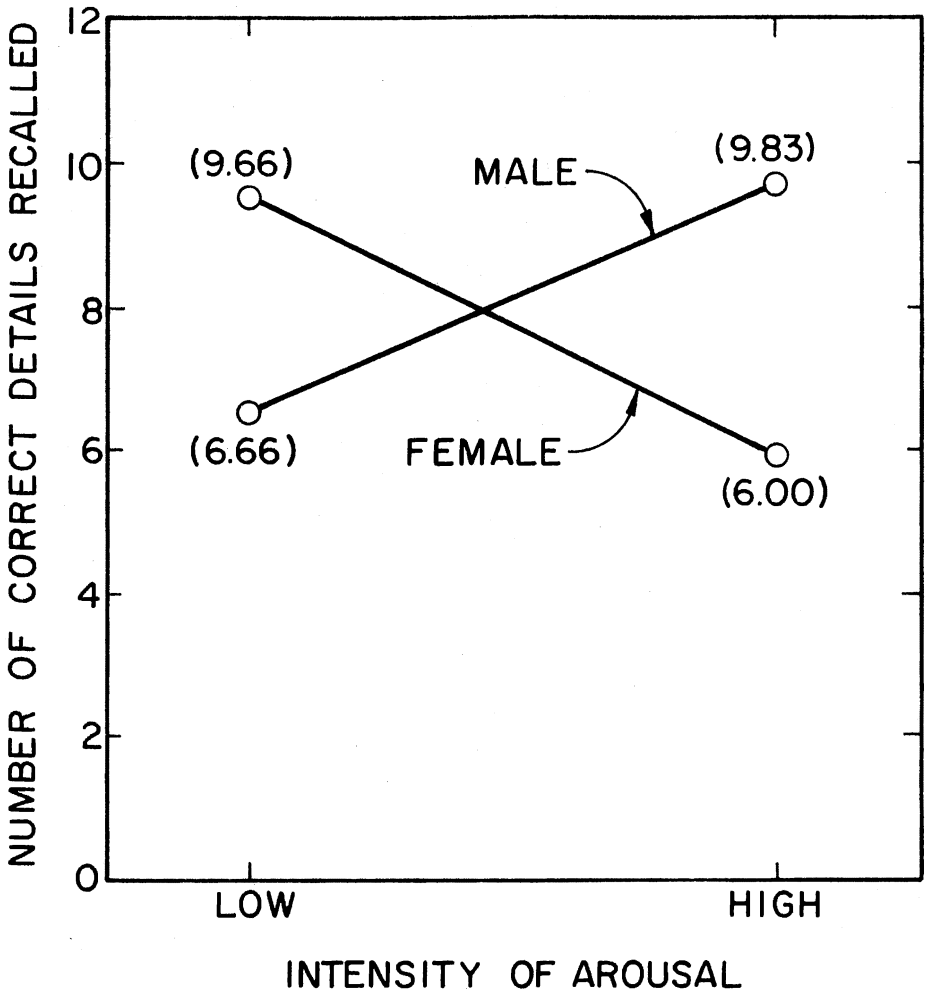

Figure 6. Arousal X Sex of Witness Interaction for Correct Details Recalled for Suspect's Description

Level x Sex of Witness interaction was significant, F (1,40) = 9.25, $p < .01$. The form of this interaction parallels the ones reported for recall accuracy for both the suspect's exit and his description. When the suspect had been viewed in a high arousal situation, male witnesses' subsequent identification rate of 58% was significantly higher than the female witnesses' rate of 8%, t (40) = 1.85, $p < .05$. Convesely, when the suspect was viewed in a low arousal situation, female witnesses subsequently correctly identified the suspect 66% of the time while male witnesses succeeded in only 33% of the cases, t (40) = 1.98, $p < .05$. (See Figure 7.)

Analysis of the confidence ratings obtained after the witnesses made their identifications failed to yield any significant results. Most of the ratings clustered at the midpoint with the overall mean being 55%. Mean ratings found in each condition are presented in Appendix G.

Errors of Commission

An error of commission refers to an incorrect inclusion of an item or description of an event, person, or situation. All of the experimental variables significantly influenced the incident of this type of error. Witnesses committed significantly more errors of commission after being exposed to the highly arousing event as compared to a low arousing event, F (1,40) = 23.25, $p < .01$, and female witnesses committed significantly more errors than did male witnesses, F (1,40) = 16.80, $p < .01$. Also, delaying the interrogation a week significantly increased the frequency of errors, F (1,40) = 25.63, $p < .01$. Finally the Arousal Level x Sex of Witness interaction was significant, F (1,40) = 4.70, $p < .05$. Only one test for simple effects

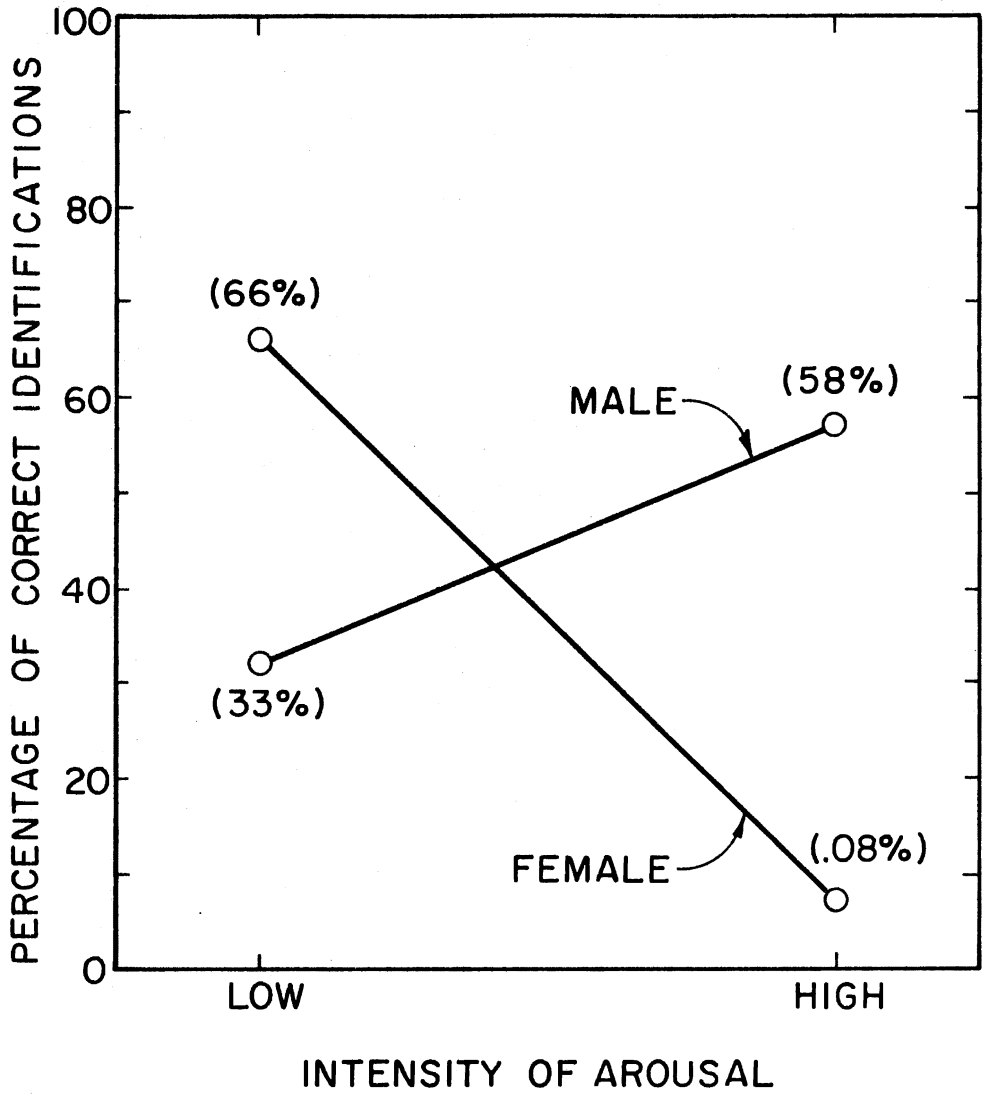

Figure 7. Arousal X Sex of witness Interaction for Correct Identification of Suspect

was statistically significant. Female witnesses produced significantly more errors than male witnesses when interrogated following a highly arousing incident, t (40) = 3.14, $p < .01$. These groups did not differ when exposed to a low arousing event (see Figure 8).

Error Analysis

Error analysis refers to the direction and extensiveness of a witness' miscalculations of the duration of their exposure to the suspect, the distance from him, his age, his height, and his weight. The sex of the witness was the dominant experimental variable which affected the nature of errors. Female witnesses overestimated the duration of their exposure to the suspect significantly more than male witnesses, F (1,40) = 19.66, $p < .01$. Females overestimated their exposure duration by 21 seconds, whereas males' overestimation was only three seconds. Since the duration exposure was actually four seconds, female witnesses reported they viewed the suspect for 25 seconds, whereas male witnesses' average estimation was only 7 seconds. Although the Arousal Leval x Sex of Witness interaction was not significant, the pattern of error is of interest. Even though female witnesses generally overestimated the exposure time, the largest margin of error occurred in the high arousal condition. Female witnesses' average estimates of the exposure time was nine seconds longer in this condition than in the low arousal condition (see Figure 9).

The difference between female and male witnesses' estimations of the suspect's height was significant, F (1,40) = 5.78, $p < .05$. Again, females were more inaccurate in their estimations as they generally underestimated the height of the suspect. No other main effects

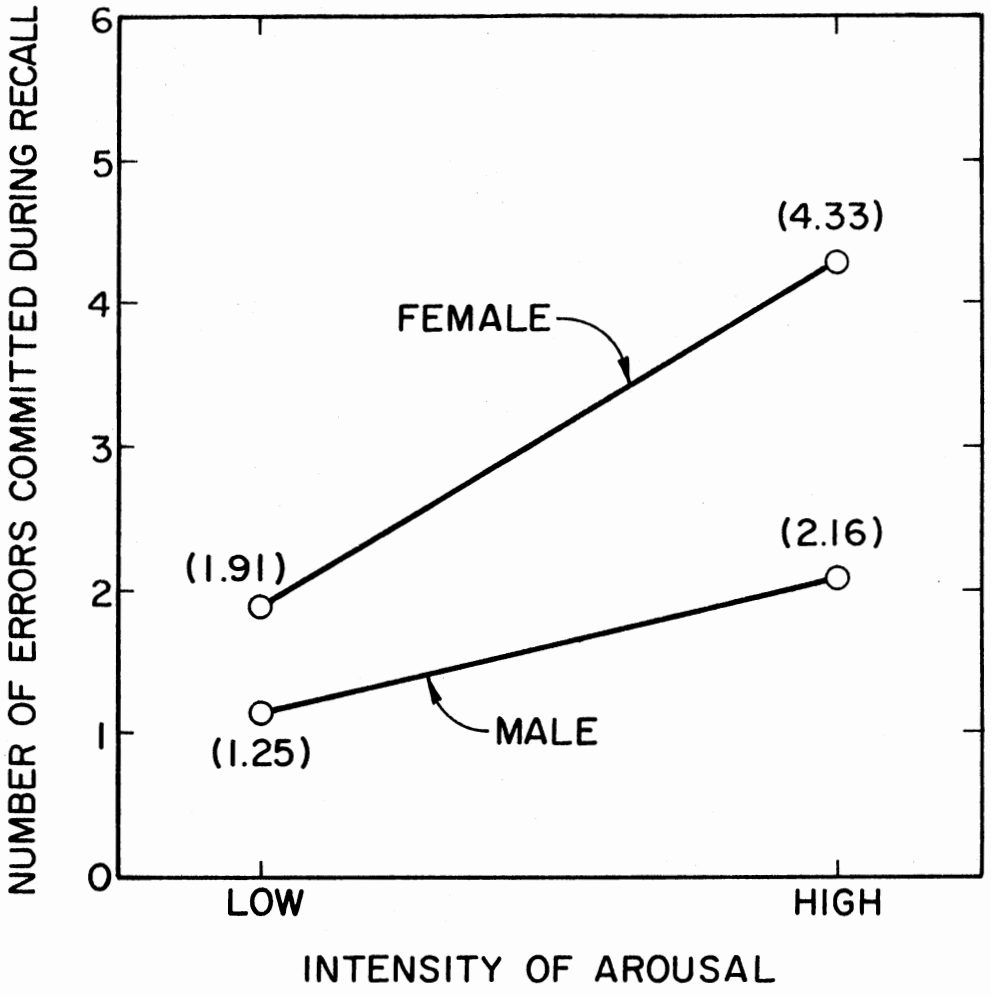

Figure 8. Arousal X Sex of Witness Interaction for Errors of Commission

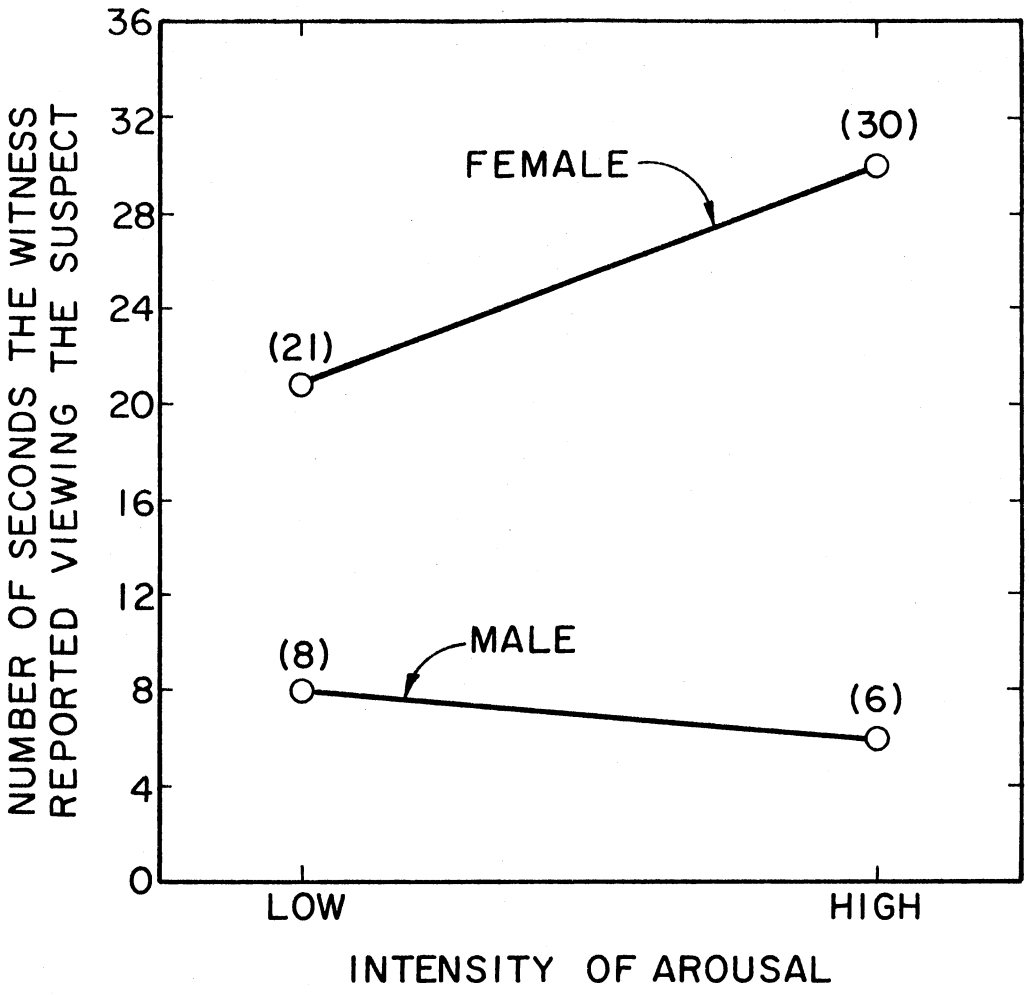

Figure 9. Arousal X Sex of Witness Interaction for Length of Exposure

were found to be significant. Apparently, the experimental variables did not affect the estimates of the suspect's age or weight.

None of the interactions for the five error dimensions was significant and only one approached significance. For estimations of the distance from the suspect, the Arousal Level x Sex of Witness interaction was marginally significant, F (1,40) = 3.23, $p < .10$. A test for simple effects indicated that female witnesses tended to underestimate the distance between themselves and the suspect more in the high arousal condition than in the low arousal condition, t (40) = 1.52, $p < .10$ (see Figure 10). Female witnesses' responses to the threat of the high arousal situation apparently has a significant effect on their estimates of both time and space. They evidently feel that the suspect is in the room longer than he in fact is, and that he is much closer to them than in reality he is.

Intercorrelational Analysis

Intercorrelational Matrix

Intercorrelational matrices of 13 dependent variables and both effectance arousal dimensions for each arousal level are presented in Appendix H and Appendix I. Some comments regarding the trends in these matrices are outlined briefly.

Effectance Arousal

In the low arousal condition positive effectance arousal significantly correlates with Free Recall, $r = .50$, $p < .01$, and the suspect's description, $r = -.36$, $p < .05$. In the high arousal condition this dimension significantly correlates with a description of the conversa-

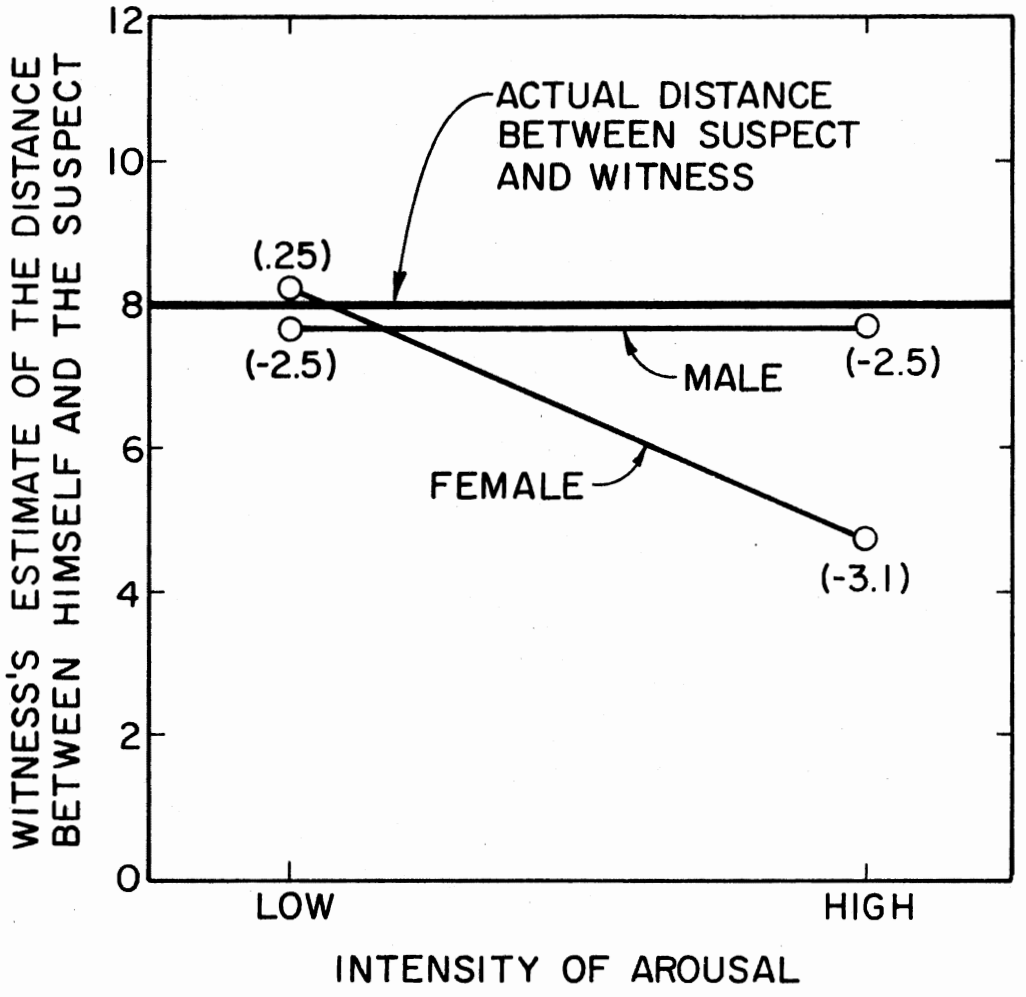

Figure 10. Arousal X Sex of Witness Interaction for Distance from Suspect

tion, r = .35, $p < .05$, and the commission of errors, r = -.35, $p < .05$. Thus, with the exception of describing the suspect under the low arousal condition, positive effectance generally facilitates performance or is unrelated to performance.

Negative effectance arousal correlates significantly only with the estimations of the suspect's exposure duration in the high arousal condition, r = .60, $p < .01$. The more aroused the witness, the greater his overestimation of the suspect's presence. Negative effectance does not correlate significantly with any variable in the low arousal condition. Negative and positive effectance arousal do not correlate significantly under either arousal level. These dimensions are considered theoretically to be independent.

Surprisingly, neither effectance dimension significantly correlates with other variables. Apparently, neither had a pervasive, general energizing effect on this set of variables. The differences reported for the various performance categories must not be due solely to arousal level as measured by the Byrne Effectance Arousal Scale.

Free and Event Categories

From the 20 correlations appearing the low and high arousal conditions for the five difference variables included in these categories, only five are significant. Free Recall and Conversation both correlate significantly and positively in the high, r = .67, $p < .01$, and low arousal conditions, r = .62, $p < .01$. In the former condition Conversation also correlates significantly with a description of the reception room, r = .34, $p < .05$.

The remaining two significant correlations involve the description

of the suspect's exit. Under low arousal, this variable correlates significantly with the description of the reception room, $r = .60$, $p < .01$; under high arousal, it correlates significantly with the description of the suspect's exit.

Since only 25% of the correlations are significant, the overall pattern suggests that information provided by a witness regarding the units of an episode are fairly independent. A good performance in one area does not necessarily indicate good performance in another. Also, a primary effect is somewhat evident. Four of the five significant correlations involve events which occurred early in the episode.

Confidence Ratings

The Confidence Ratings correlate significantly with the other 14 variables in only four of 28 instances for both arousal levels. Three instances involve physical characteristics of the suspect. In both the low, $r = .38$, $p < .05$, and high arousal condition, $r = .38$, $p < .05$, confidence and accuracy of weight estimations (smaller descrepancies) are positively correlated. Confidence also correlates significantly with estimations of the suspect's height, $r = .36$, $p < .05$. Finally, it correlates negatively with the accurate description of the overheard conversation in the high arousal condition, $r = -.34$, $p < .05$. This pattern of correlations suggests that the witness's confidence in his identification of the suspect does appear related to any objective measure of his performance. It becomes interesting, then, to speculate upon what set of experiences the witness draws when stating his confidence level. Perhaps his confidence level reflects to a greater extent his perception of his success in interacting with the interrogator.

In this framework it becomes influenced by the demand characteristics of the setting.

Errors of Commission

This variable correlates significantly in seven of the 28 instances involving the other 14 variables in both arousal conditions. It correlates significantly and negatively with the accurate description of the suspect's exit in low, $r = -.54$, $p < .01$, and high arousal conditions, $r = -.74$, $p < .01$. Apparently, the description of this event produces the most errors of commission which decreases its accuracy. This variable correlates significantly and negatively with the total details provided of the episode in both the low, $r = -.56$, $p < .01$, and high arousal conditions, $r = -.38$, $p < .05$. As accuracy of total details increases, errors of commission decrease. Finally, in the low arousal condition, this variable correlates negatively with the description of the reception room, $r = -.72$, $p < .01$, and positively correlates with the magnitude of incorrect estimation of the suspect's exposure duration.

Error Magnitude

Two consistent findings emerge from the intercorrelations of the variables reflecting magnitude of error. Incorrection estimations of the suspect's weight correlate significantly and positively with his age, $r = .54$, $p < .01$, and height, $r = 46$, $p < .05$, in the low arousal condition and with these same variables in the high arousal condition, $r = .69$, $p < .01$, and $r = .54$, $p < .01$, respectively.

CHAPTER VI

DISCUSSION

Results from this study essentially replicate the findings of Johnson and Scott (1974). The levels of arousal achieved through the experimental manipulation and the effects of that arousal were comparable to the previous study.

The hypothesis that more negative arousal would be experienced in the high arousal condition was confirmed. Also, overall, the levels of arousal did differentially affect performance. As predicted, identification and recall ability did vary as a function of the level of arousal and sex of the witness. The significant arousal by Sex of Witness interactions, especially for the variable suspect description and suspect identification, replicated previous findings that males perform better than females during highly arousing circumstances and that the difference in performance between the sexes reverses in lower arousal situations. This trend was consistent even in variables that failed to reach statistical significance.

The replication of this interactive effect lends support to Johnson and Scotts' explanation for the results. They propose that female witnesses have a lower threshold or tolerance for stimuli. Consequently, they require a less intense stimuli to achieve maximum performance with increasing arousal than do males. Male witnesses, on the other hand, may be able to tolerate more intense stimuli without

experiencing as much interference, but are less efficient at lower levels of arousal. The proposed relationship between sex, level of arousal and performance is presented graphically in Figure 11.

The negatively skewed leptokurtic curve for female witnesses indicates an arousal potential that is generally more reactive. Efficient processing and peak performance would occur at lower levels of arousal than for males. Therefore, interference and subsequent recall impairment due to aversive levels of arousal would occur sooner for females than for males. The curve for males appears more mesokurtic, indicating that male witnesses' arousal potentials would be less reactive. Their perfomances would be less efficient at lower levels of arousal than for female witnesses. This notion is further supported by incidental data obtained in the current study.

Although it was not statistically significant, female witnesses reported more negative arousal in the high arousal condition than male witnesses. In this condition they also grossly overestimated the time the suspect was in the room with them and significantly underestimated the distance he was from them. These results seem to indicate the female witnesses experienced a stronger reaction to the experimental manipulation than did the male witnesses. Also, throughout the experiment the confederate suspects were instructed to closely observe the witness' reaction to their entry. Their descriptions of these reactions, especially for the females, closely paralleled accounts of freeze-and-aovidance behavior in laboratory animals under threat. The confederates' observations of the witnesses in the neutral condition were equally supportive of the proposed curves. Male witnesses in this situation were reportedly inattentive and indifferent to the suspect's presence

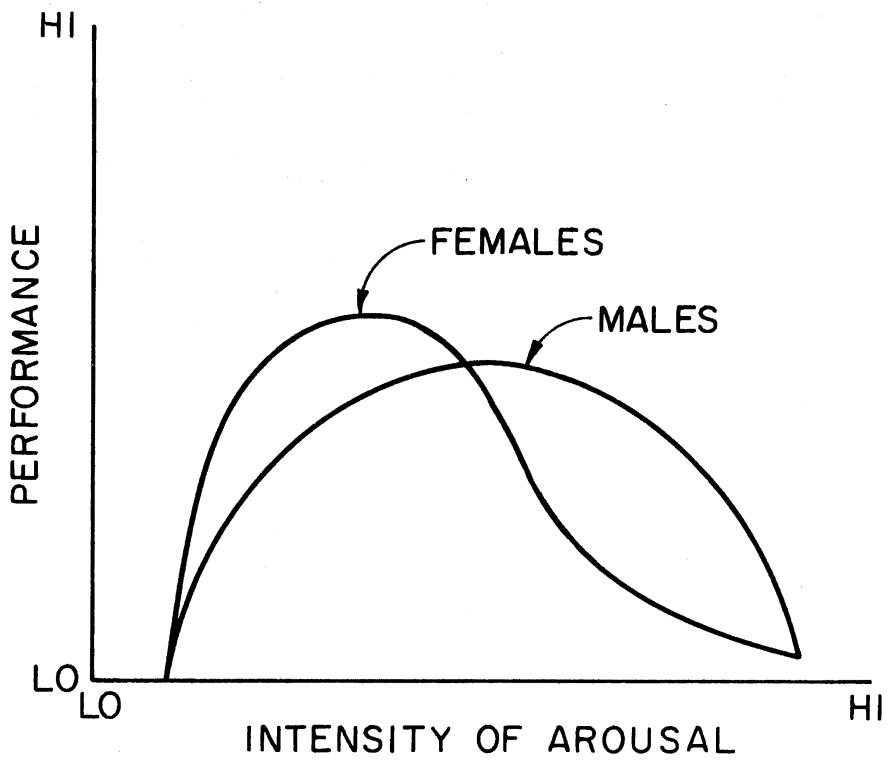

Figure 11: Arousal Performance Curves

while female witnesses were more alert. The relationships reflected in the curves offer a plausible explanation as to why the level of arousal and the sex of the witness interacted to affect performance.

As predicted, the overall performances of the witnesses were better in the arousal rather than the neutral condition except for the variables Suspect and Description and Suspect Identification. For these two variables performance was better in the low rather than the high arousal condition.

The reason for this shift in performance is once again related to the effect the arousal is having on perception and recall, and a related notion of attention deployment. Since the level of arousal varied with specific phases in the experiment, performance would be expected to vary accordingly. Initially, when the witness entered the reception area, the arousal was at an intermediate level for both sexes, which produced visual scanning and information processing. This assumption is supported by the lack of difference found in the recall of details about the situation from witnesses of either sex in either the high or low arousal condition. With the overhearing of the conversation in the laboratory, however, the level of arousal began to vary. The argument concerning shock in the high arousal condition heightened the arousal to a level which sharpened perceptual processes and facilitated recall for both sexes. The conversation in the low arousal condition, due to its uneventful content, did not elicit the same heightened level of arousal. Consequently, perceptual sharpening did not occur for witnesses of either sex. Following the argument in the high arousal condition the suspect burst into the reception area with a bloodied weapon in his hands. At this point the level of arousal created by

the experimental manipulation was maximum. Reactions to this momentary intervention were intially comparable for both sexes. As mentioned earlier the confederate suspects' descriptions of the witnesses' behaviors at this point indicated that freeze-and-avoidance behavior was occurring, especially for the female witnesses. Moreover, very little eye contact was reported between the witness and the suspect in the arousal condition, and only two of 24 subjects made any attempt to intervene or move from their chair, neither while the target was present or following his exit. In most cases, a full minute lapsed before the investigator entered the room. These general responses were not observed in the neutral condition. The confederates also reported that the witnesses' visions appeared to be exclusively directed toward the bloodied knife in their hands. This impression was supported by the recall data of the suspects exit. Twenty-three of 24 witnesses described some type of bloodied weapon and wires in the high arousal condition, whereas only three of 24 witnesses recalled the comparable items (axle grease, pen, tape) in the low arousal condition.

The intense arousal and freeze behavior generated in the high arousal condition produced what has been termed attention deployment. Apparently, in response to the threat of the knife and blood, both sexes fixated their attention on those peripheral items. This deployment evidently persisted for the female witnesses throughout the time the suspect was in the room with them. The result of this fixation of deployment was that they did not spend any time looking at the suspect proper, which significantly impaired their ability to describe and identify him. Male witnesses, on the other hand, were not deployed as long at the peripheral stimuli, which allowed them enough time to pro-

cess the suspect's appearance. Since little attention deployment occurred in the low arousal condition, overall, descriptions and identifications of the suspect, especially by the female witnesses, were superior to those in the high arousal condition. The incidental data and observations reported in this study are essentially identical to those found previously in the Johnson and Scott study (1974) and lend strong support to the notion of attention deployment.

The level of arousal also significantly affected the errors of commission. As predicted, more errors of commission were found in the high rather than the low arousal condition. It was also observed that female witnesses gave more erroneous testimony than did males especially in the high arousal condition. Over 80% of the errors committed were found in the suspect exit and suspect description category. The errors usually took the form of exaggerations of the comments made to the witness by the suspect, exaggerations of the weapon and amount of blood, and incorrect interpretations of who was hurt. As noted earlier, the level of threat for the females was extremely high at this point in the experiment, and it apparently impaired their ability to process the suspect's exit and appearance. In response to the investigator's questions, and in an effort to be good witnesses and citizens, however, they produced testimony. Unfortunately the attempt overstepped their recall abilities and they reported what might have happened rather than what truly happened.

The time of interrogation also affected the errors of commission. When the interrogations were obtained after a delay of one week, significantly more errors of commission were committed than when the interrogations were obtained immediately after the incident. During the

week interval, gaps developed in the witnesses' memory of the incident. Responding to the subtle pressure to give as complete a testimony as possible, the witnesses apparently filled in the memory gaps with information that they believed to be true, but in fact was not.

The hypothesis that identification and recall would vary as a function of the interaction between the level of arousal and the timing of the interrogation was not supported. Regardless of the level of arousal, immediate interrogations produced more complete and error-free testimonies than did delayed interrogations. These results were highly consistent except for a trend involving female witnesses in the high arousal condition. Inspection of the performance means for females in this condition revealed that delayed interrogations produced more detailed recall. There was a trade off, however, in that more errors were also produced when interrogations of females in the high arousal condition were delayed one week.

The reason that the predicted interaction did not replicate earlier findings on the relationship between arousal and retention of information (Kleinsmith & Kaplan, 1963-64; Levonian, 1967; Hockney, 1972) probably involves the nature of the experimental task. Previous studies were also conducted in high controlled laboratory settings using artificial means to create different levels of arousal in subjects. The arousal created in these studies probably was not comparable to the type and extent of arousal generated in the current study. Also, subjects in the previous studies were made aware of the task expected of them during the acquisition phase of the experiment. Subjects in this study were not afforded the benefit of that type of instructional set. A combination of these essential differences probably accounts for the unreplicated results.

The identification rates in the current study were comparable to those found inthe Johnson and Scott study (1974). Regardless of the arousal level, accuracy rates never exceeded 66%. The best recognition rates were prdduced by female witnesses in the low arousal condition (66%) and male witnesses in the high arousal condition (58%). The poorest performance was by female witnesses in the high arousal condition where their identification rates were less than 10%. Female witnesses in this condition also had the highest number of false identifications (50%).

The analysis of the overall reliability of the witnesses indicated that on the average they were able to recall 43% of the information from the different phases of the experiment. Ten percent of this figure was produced by free recal l and 90% by probe questions. Forty-nine percent of the information was accurately recalled in the high arousal condition as compared to 38% in the low arousal condition. Overall the recall rates for males and females was comparable. Males were able to recall 44% of the information and females 43%. Finally, 46% of the information was recalled when interrogations were obtained immediately after the incident as compared to 40% when the interrogation was delayed for a week.

In conclusions, the overall reliability of eyewitness reporting continues to be disappointing across a variety of experimental manipulations and settings. The accuracy rates involving identification and recall rarely exceed 50% and only occasionally approaches that figure. Despite the continuing demonstration of the unreliability of eyewitness reporting, it is likely that this form of testimony will continue to be utilized in the courtroom.

These studies do, however, allow us to make specific recommendations to the courts and police bureaus that will hopefully help minimize future breaches of justice due to inaccurate eyewitness testimony. Unquestionably the relationship between the level of threat in the situation and the sex of the witness should be considered. Female testimony and identifications in high threat situations should be held suspect as should male testimony and identifications in more neutral types of incidents. Any evaluation of female testmiony concerning what happened under high threat should also be sensitive to the extent and type of errors that occur in remembering the events of the situation. Female estimates of time and distance should also be seriously questioned, especially under these circumstances. When possible, interrogations should be scheduled within 24 hours of the occurrence of the incident. This is true except for female witnesses who have experienced a high level of arousal. The interrogation of these witnesses should be delayed up to a week. However, when obtaining delayed testimony from female witnesses who were involved in high threat situations, investigators should be alert to the fact that more errors are generally produced under these circumstances. Finally, it is recommended that judges instruct jurors as to the demonstrated reliability of eyewitness testimoney based on these studies. This is especially true for cases in which such testimony is uncorroborated.

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APPENDICES

APPENDIX A

NEUTRAL CONVERSATION SCRIPT

Experimenter: Ok, that takes care of the first part of the experiment. By the way, you really did well.

Confederate: Thanks, it wasn't too bad.

Experimenter: Now for the second part of the experiment I am going to ask that you learn another set of associations similar to the first set. This time, however, you will be punished each time that you miss an item.

Confederate: Punishment. . . what kind of punishment?

Experimenter: That is what this machine is for over here. Would you mind coming over and having a seat?

Confederate: Hey this looks pretty complicated. What are all the dials for?

Experimenter: It's not as complicated as it looks. During this phase of the experiment I will once again give you a list of associations to learn. After you have had time to look them over I will begin giving you the cues as before. However, on these trials, each time that I give you a cue, two numbers will flash on the screen. The number on the right will indicate how many points you will receive if you answer correctly. The number on the left indicates how many points you will lose if your reply is wrong.

Confederate: And this panel is where the points are tallied?

Expimenter: That's right, and the object is to amass as many points as possible.

Confederate: Hey this looks like it will be a little more interesting.

Experimenter: Another thing that I would like to do, if you don't have any objections, is to attach these wires to your forearms. These are hooked to this machine and give us some indication of what is occurring physiologically when you make a response.

Confederate: Sure, that's ok.

Experimenter: Ok. let me turn this on and see if it is working. There seems to be some problem. . . hold on, I think it will only take a minute to repair.

Confederate: Do you have a lot of trouble with this equipment?

Experimenter: We have been lately. This plug is usually the problem. Yes, it's alright now. Well, now that that is fixed let's get started with the task. Remember, you have only 30 seconds to learn it. Do you have any questions before we start? Good... . ready, go.

Experimenter: Ok, times up. Are you ready for the first item?

(Several word associations ensue.)

Confederate: Hey, I think something is wrong with the machine again, the lights are not working.

Experimenter: Let me take a look. I'm sorry but we are not going to be able to continue because of the machine. I really appreciate your participating and I will be sure that you get your credit.

Confederate: Thanks alot.. I'm sorry the machine broke; it was becoming fun. Perhaps we can complete the experiment later.

Experimenter: That would be nice. I will call you if it is possible.

APPENDIX B

AROUSAL CONVERSATION SCRIPT

Experimenter: Ok, that takes care of the first part of the experiment. By the way you did well.

Confederate: Thanks, it wasn't too bad.

Experimenter: Now for the second part of the experiment I am going to ask you to learn another set of associations. This time, however, you will be punished each time you miss an item.

Confederate: Punishment. . . what kind of punishment?

Experimenter: That is what this chair is for; would you mind coming over here and having a seat.

Confederate: That doesn't look very comfortable, what are the wires for?

Experimenter: The wires are hooked to a generator here. During this phase of the experiment each time that you miss an item you will be shocked as a form of punishment.

Confederate: How much shock?

Experimenter: It is not enough to cause you any harm, but it is enough to be uncomfortable.

Confederate: Hey, I'm not sure I want to be a part of this. I'm not too crazy about being shocked, besides, they didn't say anything about being shocked when I signed up for this experiment.

Experimenter: I'm sorry, something should have been mentioned, but how about letting me finish attaching the wires and then see what you think?

Confederate: Ok, but I'm not too excited about this.

Experimenter: Yes, I can see that. Ok, be real still for a second. . . there that should do it. Let me turn this on and see . . . on no!. Don't tell me it's not working again.

Confederate: Oh great'. That's just what I need, an equipment failure while I'm wired up like this!

Experimenter: Relax, I'll have it fixed in a minute.

Confederate: Do you have a lot of equipment problems?

Experimenter: We have been lately. There, that seems to be the problem. Yes, it seems to be alright now. Ok, here is the list. Remember, you have 30 seconds to learn it. Do you have any questions before we get started? Ready. . . go.

(30 second pause)

Experimenter: Your time is up. Here is the first item.

(Several word associations ensue. Finally the confederate misses an item and is shocked.)

Confederate: Hey, that really hurt! How about turning it down a little?

Experimenter: Can't, it has to stay the same. Here is the next item.

(wrong response)

Confederate: Sorry, but I have had enough of this. I want to stop.

Experimenter: Hey, look you have already committed yourself, besides the wires are attached and everything is working alright. Just sit still.

Confederate: Committed, the hell with committment! This isn't worth any two points. I'm getting out of here.

Experimenter: Hey, sit still, you're tearing the wires out!

Confederate: The hell with the wires, I said let me up!

Experimenter: Come on, you're tearing the place up!

(chair falls and bottle breaks)

Confederate: Get out of my way!

Experimenter: Look out. . . where did you get that?

APPENDIX C

EFFECTANCE AROUSAL SCALE

IMPORTANT: Complete this 16 item inventory on the basis of how you were feeling at the time the suspect was in the room with you.

---

1. Entertained (check one)

__1__ Not at all entertained
_____ Slightly entertained
_____ Moderately entertained
_____ Entertained
__5__ Quite entertained

2. Disgusted (check one)

__1__ Not at all disgusted
_____ Slightly disgusted
_____ Moderately disgusted
_____ Disgusted
__5__ Extremely disgusted

3. Unreality (check one)

__5__ Strong feelings of unreality
_____ Feelings of unreality
_____ Moderate feelings of unreality
_____ Slight feelings of unreality
__1__ No feelings of unreality at all

4. Anxious (check one)

__1__ Not at all anxious
_____ Slightly anxious
_____ Moderately anxious
_____ Anxious
__5__ Extremely anxious

IMPORTANT: Complete this 16 item inventory on the basis of how you were feeling at the time the suspect was in the room with you.

---

5. Bored (check one)

__1__ Extremely bored
_____ Bored
_____ Moderately bored
_____ Slightly bored
__5__ Not at all bored

6. Uneasy (check one)

__1__ Not at all uneasy
_____ Slightly uneasy
_____ Moderately uneasy
_____ Uneasy
__5__ Quite uneasy

7. Confused (check one)

__1__ Not at all confused
_____ Slightly confused
_____ Moderately confused
_____ Confused
__5__ Quite confused

8. Curiosity (check one)

__5__ Strong curiosity
_____ Curiosity
_____ Moderate curiosity
_____ Slight curiosity
__1__ No curiosity

9. Confident (check one)

__5__ Not at all confident
_____ Slightly confident
_____ Moderately confident
_____ Confident
__1__ Extremely confident

IMPORTANT: Complete this 16 item inventory on the basis of how you were feeling at the time the suspect was in the room with you.

---

10. Intellectually challenges (check one)

__5__ Stongly challenges intellectually
_____ Intellectually challenged
_____ Moderately challenges intellectually
_____ Slightly challenges intellectually
__1__ Not at all challenges intellectually

11. Stimulated (check one)

__1__ Not at all stimulated
_____ Slightly stimulated
_____ Moderately stimulated
_____ Stimulated
__5__ Extremely stimulated

12. Interested (check one)

__5__ Extremely interested
_____ Interested
_____ Moderately interested
_____ Slightly interested
__1__ Not at all interested

13. Alert and eager (check one)

__5__ Not at all alert and eager
_____ Slightly alert and eager
_____ Moderately alert and eager
_____ Alert and eager
__1__ Extremely alert and eager

14. Depressed (check one)

__1__ Not at all depressed
_____ Slightly depressed
_____ Moderately depressed
_____ Depressed
__5__ Extremely depressed

IMPORTANT: Complete this 16 item inventory on the basis of how you were feeling at the time the suspect was in the room with you.

---

15. Aroused (check one)

__1__ Not at all aroused
_____ Slightly aroused
_____ Moderately aroused
_____ Aroused
__5__ Extremely aroused

16. Disturbed (check one)

__1__ Not at all disturbed
_____ Slightly disturbed
_____ Moderately disturbed
_____ Disturbed
__5__ Extremely disturbed

APPENDIX D

INVESTIGATION REPORT

Date _____ Name _____ Subject #_____

Condition: Sex of S

male female

Motivation

neutral arousal

Scheduling of Interrogation

immed delayed

Comments:

Subject # _____

Please describe in as much detail as possible what happened to you after you entered the reception area.

Subject # ____

(Situation)--Please describe in as much detail as possible the room and furnishing that you were in.

Probe:

furniture

# of door

signs

color of walls

sources of light

# of windows

window covers

arrangement: draw room and identify flow of action

Subject # _____

(Conversation)--Please describe in as much detail as possible what happened in the other room.

Probe:

How many people were in the other room?
age sex

What were they talking about (what was the experiment about)?

What was the tone of their exchange (did it change throughout the experiment)?

Did there seem to be an argument--was there any use of foul language?

What did the argument seem to be about?

How did it start?

How did it end?

How long did it last?

Did there seem to be any physical violence?

Subject # _____

(Suspect exit)--Please describe in as much detail as possible what happened when the suspect came out of the room.

Probe:

Was anything said?

What was said?

Were they carrying anything?

Did they make any movement toward you such as an attack?

How long did you get to see them?

Who was responsible for the violence (arousal condition)?

What were you thinking?

Subject # _____

(Suspect description)--Please describe in as much detail as possible the physical characteristics of the person.

Probe:

Sex

Age

Race

Height

Weight

Body build

Color of hair

Style of hair facial hair

Length of hair

Clothes (mode of dress)

Distinguishing characteristics

Please rank in order the features of the face that you used to identify the person.

hair ____
eyes ____
nose ____
ears ____
mouth ____

teeth ____
complexion ____
shape of face ____
chin ____
lips ____
other ____ (describe)

APPENDIX E

POST TASK QUESTIONNAIRE

Were you comfortable working with the experimenter? Yes ____ No ____

Were you serious in your answers? Yes ____ No ____

Describe the experiment in which you just participated by circling the number which corresponds to your feeling or impression about it.

interesting ... dull
1 2 3 4 5 6 7 8 9

worthwhile ... not worthwhile
1 2 3 4 5 6 7 8 9

not pleasant ... pleasant
1 2 3 4 5 6 7 8 9

not valuable to science ... valuable to science
1 2 3 4 5 6 7 8 9

soothing ... threatening
1 2 3 4 5 6 7 8 9

arousing ... not arousing
1 2 3 4 5 6 7 8 9

	QUESTION NUMBER					
	1	2	3	4	5	6
male arousal	1.45	1.58	6.12	7.91	5.20	2.58
female arousal	1.08	1.66	5.74	7.83	6.07	2.16
male neutral	2.07	2.33	7.91	7.91	3.82	3.74
female neutral	1.78	2.06	8.24	6.78	4.01	3.87

APPENDIX F

FOLLOW-UP QUESTIONNAIRE

If you were serving as a member of a jury in the future, how would you regard eyewitness testimony?

__1__ Extremely reliable

_____ Reliable

_____ Slightly reliable

_____ Slightly unreliable

_____ Unreliable

__6__ Extremely unreliable

Do you feel you would be better prepared to be an eyewitness, if the occasion arose, as a result of participating in the experiment?

__5__ Definitely yes

_____ Yes

_____ Uncertain

_____ No

__5__ Definitely no

Please explain.

Did you learn anything about yourself as a result of participating in the experiment? Please explain.

Again, thank you for your cooperation and assistance!

POST EXPERIMENTAL QUESTIONNAIRE MEAN TABLE

If you were serving as a member of a jury in the future, how would you regard eyewitness testimony?

1 Extremely reliable
2 Reliable
3 Slightly reliable
4 Slightly unreliable
5 Unreliable
6 Extremely unreliable

		MALE	FEMALE
AROUSAL	Immediate	3.5	3.5
	Delay	3.0	3.7
NEUTRAL	Immediate	3.6	3.5
	Delay	3.2	3.4

Do you feel that you would be better prepared to be an eyewitness, if the occasion arose, as a result of participating in the experiment?

1 Definitely yes
2 Yes
3 Uncertain
4 No
5 Definitely no

		MALE	FEMALE
AROUSAL	Immediate	2.5	1.75
	Delay	2.5	1.75
NEUTRAL	Immediate	2.4	2.5
	Delay	2.0	2.0

APPENDIX G

MEAN TABLE FOR ANALYSIS OF VARIANCE

	A AROUSAL		B SEX OF WITNESS		C SCHEDULING OF INTERROGATION	
	(L) Low	(H) High	(M) Male	(F) Female	(I) Immed	(D) Delay
FREE RECALL	5.91	8.95	8.04	6.83	7.54	7.33
EVENT RECALL						
Situation	11.79	11.83	12.25	12.37	12.79	9.83
Conversation	10.29	16.41	13.12	13.58	13.83	12.87
Suspect Exit	1.66	4.37	3.38	2.67	3.29	2.75
Suspect Description	8.20	7.91	8.25	7.83	8.37	7.70
TOTAL DETAILS	37.83	49.08	44.62	42.29	46.83	40.08
SUSPECT IDENTIFICATION						
Correct Identification	.50	.33	.45	.37	.41	.41
Confidence Rating	.60	.51	.60	.51	.59	.52
ERRORS OF COMMISSION	1.58	3.25	1.70	3.13	1.54	3.29
ERROR ANALYSIS						
Length of Exposure	10.83	14.33	3.37	21.79	12.16	13.00
Distance from Suspect	0.0	-1.70	-.25	-1.4	-.58	-1.13
Age of Suspect	-1.54	-1.29	-.95	-1.87	-1.08	-1.75
Height of Suspect	.16	-.83	.25	-.91	-.37	-.29
Weight of Suspect	-4.37	-5.20	-2.08	-7.50	-5.83	-3.75
AROUSAL SCALE						
Positive	296	368	349	305		
Negative	176	287	217	247		

MEAN TABLE FOR ANALYSIS OF VARIANCE

	A X B				A X C				B X C			
	AROUSAL		SEX OF WITNESS		AROUSAL		SCHEDULING OF INTERROGATION		SEX OF WITNESS		SCHEUDLING OF INTERROGATION	
	Low ML	High MH	Male FL	Female FH	Low IL	High IH	Immed DL	Delay DH	Male IM	Female IF	Immed DM	Delay DF
FREE RECALL	6.50	9.58	5.33	8.33	6.58	8.50	5.25	9.41	7.83	7.25	8.25	6.41
EVENT RECALL												
Situation	12.16	12.33	12.41	12.53	14.75	12.83	8.83	10.83	14.75	12.83	9.75	9.91
Conversation	10.00	16.25	10.58	16.58	10.83	16.83	9.75	16.00	14.16	13.50	12.08	13.66
Suspect Exit	1.75	5.00	1.98	3.75	1.91	4.66	1.41	4.08	3.75	2.83	3.00	2.50
Suspect Description	6.66	9.83	9.66	6.00	8.75	8.00	7.58	7.83	8.58	8.16	7.91	7.50
TOTAL DETAILS	37.08	52.16	38.58	46.00	42.83	50.83	32.83	47.33	49.08	44.58	40.16	40.00
SUSPECT IDENTIFICATION												
Correct Identification	.33	.58	.66	.08	.50	.33	.50	.33	.41	.41	.50	.33
Confidence Rating	64.58	56.25	55.41	46.91	64.16	54.83	55.83	48.58	62.08	56.66	58.75	45.66
ERRORS OF COMMISSION	1.25	2.16	1.91	4.33	.83	2.25	2.33	4.25	.91	2.16	2.50	4.08
ERROR ANALYSIS												
Length of Exposure	4.08	2.66	17.58	26.00	9.00	15.33	12.66	13.33	3.50	20.83	3.25	22.75
Distance from Suspect	-.25	-.25	.25	-3.16	.33	-1.5	-.33	-1.91	.16	-1.33	-.66	-1.58
Age of Suspect	-1.41	-.50	-1.66	-2.08	-1.75	-.41	-1.33	-2.16	-.25	-1.91	-1.66	-1.83
Height of Suspect	.50	0.0	-.16	-1.66	.16	-.91	.16	-.75	0.0	-.75	.50	-1.08
Weight of Suspect	-3.75	-.41	-.50	-10.00	-3.33	-8.33	-5.4	-2.0	-.83	-10.83	-3.33	-4.16
AROUSAL SCALE												
Positive	321	377	251	360								
Negative	169	264	184	309								

MEAN TABLE FOR ANALYSIS OF VARIANCE

A X B X C

	AROUSAL		SEX OF WITNESS		SCHEDULING OF INTERROGATION			
	Low	High	Male	Female	Immediate		Delayed	
	LMI	LFI	LMD	LFD	HMI	HFI	HMD	HFD
FREE RECALL	6.00	7.16	7.00	3.50	9.66	7.33	9.50	9.33
EVENT RECALL								
Situation	15.00	14.50	9.33	8.33	14.50	11.16	10.16	11.50
Conversation	11.00	10.66	9.00	10.50	17.33	16.33	15.16	16.83
Suspect Exit	2.16	1.66	1.33	1.50	5.33	3.50	4.66	4.00
Suspect Description	6.83	10.66	6.50	8.66	10.33	5.66	9.33	6.33
TOTAL DETAILS	41.00	44.66	33.16	32.50	57.16	44.50	47.16	47.50
SUSPECT IDENTIFICATION								
Correct Identification	.33	.66	.33	.66	.50	.16	.66	.00
Confidence Rating	71.66	56.66	57.50	54.16	52.50	56.66	60.00	37.16
ERRORS OF COMMISSION	.50	1.16	2.00	2.66	1.33	3.16	3.00	5.50
ERROR ANALYSIS								
Length of Exposure	3.83	14.16	4.33	21.00	3.16	27.50	2.16	24.50
Distance from Suspect	-.16	.83	-.33	-.33	.50	-3.50	-1.00	-2.83
Age of Suspect	-1.33	-2.16	-1.50	-1.16	.83	-1.66	-1.83	-2.50
Height of Suspect	.50	-.16	.50	-.16	-.50	-1.33	.50	-2.00
Weight of Suspect	3.33	-10.00	-10.83	0.0	-5.00	-11.66	4.16	-8.33

APPENDIX H

INTER-CORRELATIONS FOR VARIABLES IN
HIGH AROUSAL CONDITION

	Free Recall	Situation	Conversation	Suspect Exit	Suspect Description	Suspect Identification	Confidence Rating	Errors of Commission	Length of Exposure	Distance from Suspect	Age of Suspect	Height of Suspect	Weight of Suspect	Positive Arousal	Negative Arousal	Total Details
Free Recall	1.00	.19	.67	.31	.08	-.16	-.08	-.26	.02	.03	-.26	-.03	-.31	.32	.31	.81
Situation		1.00	.34	.25	-.04	-.04	-.03	.16	-.41	-.09	-.07	-.20	-.28	-.01	-.14	.61
Conversation			1.00	.25	-.06	-.14	-.34	-.19	.07	-.23	-.27	-.22	-.59	.35	.21	.79
Suspect Exit				1.00	.38	.25	-.07	-.74	-.58	.45	-.07	.06	-.17	.16	.31	.47
Suspect Description					1.00	.26	.18	-.32	-.27	.57	.39	.53	.21	.06	.08	.22
Suspect Identification						1.00	.91	-.22	-.42	.13	.30	.68	.35	.01	-.29	-.09
Confidence Rating							1.00	-.30	-.10	.16	.30	.36	.38	.06	-.29	-.14
Errors of Commission								1.00	.28	-.32	-.05	-.16	.10	-.35	.22	-.38
Length of Exposure									1.00	-.29	-.03	-.20	-.03	.26	.60	-.22
Distance from Suspect										1.00	.32	.27	.43	.03	.01	.01
Age of Suspect											1.00	.42	.69	.08	.03	-.14
Height of Suspect												1.00	.54	.23	.03	-.06
Weight of Suspect													1.00	.10	.01	-.44
Positive Arousal														1.00	.24	.29
Negative Arousal															1.00	.09
Total Details																1.00

INTER-CORRELATIONS FOR VARIABLES OF
LOW AROUSAL CONDITION

	Free Recall	Situation	Conversation	Suspect Exit	Suspect Description	Suspect Id-entification	Confidence Rating	Errors of Commission	Length of Exposure	Distance from Suspect	Age of Suspect	Height of Suspect	Weight of Suspect	Positive Arousal	Negative Arousal	Total Deatils
Free Recall	1.00	.17	.62	.10	-.03	.17	.14	-.29	-.11	.27	.43	-.04	.06	.50	-.04	.70
Situation		1.00	.18	.60	.13	-.09	.28	-.72	-.20	.32	.01	-.01	.11	-.16	-.21	.67
Conversation			1.00	.20	.08	.17	.29	-.13	.02	.25	.52	.01	.35	.15	.27	.76
Suspect Exit				1.00	.08	.29	.26	-.54	-.54	.30	.31	.01	.26	-.19	-.06	.51
Suspect Description					1.00	.17	-.05	-.10	.23	-.04	-.06	-.30	.11	-.36	.23	.31
Suspect Identification						1.00	.15	.14	-.25	.22	.47	-.04	-.01	-.02	.12	.16
Confidence Rating							1.00	-.29	-.13	.18	.17	.07	.38	.12	-.18	.31
Errors of Commission								1.00	.49	-.17	-.11	.16	-.20	-.17	.29	-.56
Length of Exposure									1.00	-.18	-.38	-.01	-.12	-.27	.11	-.12
Distance from Suspect										1.00	.26	.29	.16	-.03	-.08	.37
Age of Suspect											1.00	.16	.54	.21	-.08	.39
Height of Suspect												1.00	.46	.10	.04	-.08
Weight of Suspect													1.00	.01	.18	.27
Positive Arousal														1.00	-.14	.08
Negative Arousal															1.00	.04
Total Details																1.00

APPENDIX I

NUMBER OF CORRECT INDENTIFICATIONS
FOR TARGET 1 AND 2

		MALE		FEMALE	
		High Arousal	Low Arousal	High Arousal	Low Arousal
TARGET 1	Immediate	2	1	0	2
	Delayed	1	0	0	1
TARGET 2	Immediate	1	1	1	2
	Delayed	3	2	0	3

VITA

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