MEMORY, 1998, *6* (3), 277–295

Unusualness and Threat as Possible Causes of "Weapon Focus"

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In two experiments exploring possible causes of the "weapon focus" effect, undergraduates viewed videotapes depicting interactions in business establishments. The target character was either empty-handed or held different objects that varied in both threat and unusualness. Witnesses attempted to describe the target's features and clothing, identify the object held by him (if any), and identify him in a photo line-up. The accuracy of witnesses' descriptions was affected by unusualness but not threat. Identification accuracy did not differ by condition. Witnesses had difficulty remembering the low-threat, non-unusual object; many either failed to identify it (Experiment 1) or reported seeing no object (Experiment 2). The results of both experiments imply that weapon focus, when it occurs, may do so because weapons are unexpected.

INTRODUCTION

For years, researchers interested in eyewitness memory have studied the "weapon focus" effect. The effect occurs when the presence of a weapon in the hands of the perpetrator of a crime somehow adversely affects witnesses' ability to remember important details about the crime, such as the perpetrator's face or clothing. A classic demonstration of weapon focus was conducted by Loftus, Loftus, and Messo (1987). They showed college students a slide sequence depicting customers in line at a fast-food restaurant. In the experimental version of the slide sequence, a male target confronted the cashier with a weapon (a gun), and she gave him some money. In the control condition, the target held an object (a bill) that was not a weapon. While they watched the slides, the witnesses' eye movements were recorded using a corneal reflection device.

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I am very grateful to Andrea Breech, Niccole Etchison, Brian Lerner, and Jennifer Klimek for their assistance with data collection. I would also like to thank Mark Buckley, Niccole Etchison, Natalie Goeke, Tracy Headley, Ken Hiscox, Ray Moeller, Kelly Porter, Tony Proudfoot, and David Upchurch for helping to prepare the stimulus materials. Finally, thanks to Diana Heise and four anonymous reviewers for providing helpful comments on an earlier draft of this article.

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Later, the witnesses completed a 20-item recognition test and attempted to identify the target person in a 12-person target-present photo line-up. The results revealed that witnesses looked longer and more often at the gun than at the bill. In addition, witnesses who saw the gun performed more poorly on the line-up task and (in one of the two experiments) on the recognition task than did witnesses who saw the bill.

Other studies have also shown that witnesses are less able to identify a target person when a weapon is present as opposed to absent (e.g. Maass & Kohnken, 1989; Tooley, Brigham, Maass, & Bothwell, 1987). Furthermore, increased visibility of the weapon results in worse identification performance (Cutler, Penrod, & Martens, 1987) and poorer recall of the target's physical features (Kramer, Buckhout, & Eugenio, 1990). In her meta-analysis of studies in which the presence of a weapon or its visibility was manipulated, Steblay (1992) found weapon focus to be a reliable effect, occurring in response to a variety of stimuli (slide sequences, videos, and staged events), when both target-present and target-absent line-ups were used, and with various retention intervals. She further concluded (1992, p. 420) that:

> although the overall effect size generated for lineup accuracy is not of great magnitude [mean effect size using Cohen's (1977) coefficient was .13], it is well within a theoretically consistent range given that weapon absence or presence is only one of many variables that investigators recognize as influential in lineup identification accuracy.

The effect size for accuracy of memory for the target's features was moderate (.55).

It is not known why weapon focus occurs. It could be that, for some reason, witnesses visually attend to weapons more than to other details in a scene. Because the other details receive relatively little (or no) perceptual processing, they are poorly remembered later. Alternatively, witnesses could perceive weapons and other details equally well but demonstrate superior memory for the weapon when tested later, perhaps because memory for the weapon remains particularly strong over time, or because memory for other details deteriorates more easily. So far, researchers seem to endorse the former mechanism rather than the latter (Kramer et al., 1990; Loftus et al., 1987).

But what is it about weapons that enables them to attract attention? One possible explanation is that weapons produce their effect through their threatening nature: if the perpetrator is armed, either the witness or another bystander might be injured or killed. This explanation can be understood in terms of Easterbrook's (1959) cue-utilisation hypothesis. The idea is that the presence of a threat would naturally increase a witness's level of emotional arousal, which in turn would decrease his or her attentional capacity. The witness would have to focus his or her attention more narrowly, concentrating on central rather than peripheral cues.

It seems reasonable to assume that the witness would consider the weapon to be an important, central cue. As Kramer et al. (1990, p. 182) pointed out, ''during a real crime, the weapon may be the ultimate source of information. The information sought may be, What is it? Is it pointed at me? Is it about to be used?'' Therefore, it follows from Easterbrook's hypothesis that the witness should later remember the weapon relatively well but should remember less about other details in the visual scene than he or she normally would.

The threat explanation has not fared particularly well in empirical tests. Some relevant studies have focused on arousal, rather than threat *per se*. If threat produces its effect by increasing arousal, then manipulating arousal levels should bring about much the same result as should manipulating threat. Tooley et al. (1987) showed college students photos of target persons who held either weapons or other objects. The researchers manipulated arousal during the viewing of the stimuli by presenting bursts of white noise to students in the experimental condition and leading them to believe that they might receive an electric shock. (Although the shock manipulation is clearly a threat, the researchers' stated purpose was to examine the effects of arousal, not threat.) Students in the control condition did not receive white noise bursts or a warning that they might be shocked. The researchers also manipulated attentional focus, instructing different participants to look at different areas of the photos. Drawing on Easterbrook's hypothesis, they predicted that increased arousal would improve participants' memory for the details on which they focused their attention while decreasing their ability to remember other information. The results did not support the prediction. A main effect of arousal was obtained such that the hit rate for identifying targets decreased with high arousal. However, d' was not affected. It is worth emphasising that in Tooley et al.'s study, the source of arousal was the white noise and the electric shock warning, not the weapon or any visible information in the photos. The effects of arousal may be different if its source is part of the to-be-remembered information. As Christianson (1992, p. 285) noted, ''in an eyewitness situation, the issue of interest is what an eyewitness remembers about a traumatic event, not what the witness is able to remember in the midst of the traumatic experience''.

Kramer et al. (1990) found that, when a weapon in a scene was plainly visible as opposed to mostly hidden, witnesses not only remembered less about the target person but also reported higher levels of arousal. The researchers conducted a series of follow-up experiments in order to determine whether heightened arousal necessarily accompanies the weapon focus effect, and they discovered that it does not. Kramer et al. obtained the effect even when neutral, non-arousing stimuli were used and witnesses' self-reported arousal was low. Thus, this study provides no support for the hypothesis that increased arousal causes weapon focus.

In contrast to the studies just discussed, Steblay (1992) reported some evidence that arousal or threat may be related to the strength of the weapon

focus effect. In her meta-analysis, she grouped together seven studies in which a weapon was visible but no crime occurred, or the target character in the scenario carried an object that could be dangerous but was not a prototypical weapon. Steblay considered the scenarios in these studies to be less arousing than scenarios involving prototypical weapons, crimes in progress, or ''real-life'', staged scenarios. However, they could also be seen as less threatening, if threat is defined as the possibility that either the research participant or a character in the stimulus videotape could experience physical injury or pain. The results of the meta-analysis showed a smaller weapon focus effect in the seven low-arousal, low-threat studies compared to the other research analysed.

In another study, Maass and Kohnken (1989) directly manipulated threat (which was directed towards the research participants). Participants were approached by a confederate who carried either a syringe (considered a weapon) or an ink pen (not a weapon). The confederate either did or did not lead subjects to believe that they would receive an injection as part of the experiment (this was the threat manipulation). Dependent measures included recognition of the confederate and recall of the confederate's features. The authors found no main effect of threat of injection and no interaction between threat and presence of the weapon. Although the results of this study do not support threat as an explanation for weapon focus, perhaps this explanation should not yet be abandoned. Maass and Kohnken reasoned that they could use a syringe to create a situation that would be threatening to participants because injections make many people nervous or fearful, and injections can briefly cause pain. However, this situation differs from the situation experienced by a witness to a crime: guns and knives can cause permanent harm or death, whereas injections are often associated with medical benefits. It would be useful to examine the effects of threat when threat is defined as the potential for physical injury or death to a witness or another bystander rather than the potential for pain.

Tollestrup, Turtle, and Yuille (1994) examined the reports of individuals who observed actual robberies and may have been in real fear for their lives. If perceived threat has any effect, that effect should be more pronounced in these observers than in laboratory research participants. Tollestrup et al. grouped the robberies according to whether a weapon was present (either visible or implied) or absent, and categorised the observers as either victims or witnesses. Witnesses did not remember more information or more accurate information than did victims. This result may suggest that level of perceived threat did not matter, as the victims quite possibly felt more threatened than did the witnesses. On the other hand, one can not be certain how either group of observers felt. The researchers also found that the presence of a weapon did not reduce the number of details provided by observers or the accuracy of the details, but did decrease identification accuracy. In trying to explain why the results involving the descriptions differed from typical laboratory results, Tollestrup et al. argued that the method of questioning lab participants (cued recall) is not the same as the

method used by police officers (witnesses are asked to provide free recall). Another possibility that the researchers apparently did not consider is that being armed could make a perpetrator feel bolder or less hurried. Thus, in the Tollestrup et al. study, the perpetrators with weapons might have been observed for a longer time or at a closer distance than were weaponless perpetrators, which could improve witnesses' ability to describe them. In this way, the weapon focus effect could have been attenuated, as well as any effect of threat that may have existed.

Besides threat, another possible explanation for weapon focus is that, to a crime witness, weapons may sometimes seem unusual within certain contexts in which they appear, and unusual objects attract attention. Although we all know that robberies sometimes occur, most of us do not really expect to see a customer in line ahead of us at a fast-food restaurant pull a gun out of his or her pocket. Therefore, we might fixate on the gun simply because it is unexpected. Citing research showing that viewers fixate on surprising objects in pictures (Loftus & Mackworth, 1978; Yarbus, 1967), Kramer et al. (1990, p.182) speculated that a weapon ''may lead to surprise in a witness, thus adding further to his or her tendency to stare at it''. One implication of this hypothesis is that any unusual object, whether it is a weapon or not, should produce the ''weapon focus'' effect. Loftus et al. (1987) suggested that a banana in the hand of the robber in the fast food restaurant might work just as well as a gun, although they did not test this possibility.

Shaw and Skolnick (1994) attempted what appears to be the only experimental test of the unusualness explanation thus far. In their study, college students watched a brief slide series depicting a target person in a university hallway. No crime was shown or implied. In different conditions, the target carried either a weapon (a handgun), one of four objects rated as unusual by pilot participants, or a magazine. Unfortunately, the unusualness explanation could not be evaluated, because the authors failed to obtain a weapon focus effect. They speculated that the simplicity and the non-arousing nature of the slide series may have contributed to the failure to find the effect. In any event, the results of this experiment do not rule out the possibility that weapon focus could be caused by the fact that weapons are unusual.

The purpose of the present study was to examine both threat and unusualness as possible explanations for weapon focus. In two experiments involving two different scenarios, participants watched one version of a videotape depicting a male target in a business establishment. In different conditions, the target carried different objects (and in one condition he carried nothing). The unusualness and threat associated with the objects varied independently. Threat was operationally defined as the possibility that physical harm or death would befall another character in the video. A limitation of this methodology is that the threat is not ''real'' in the sense that it is directed towards a character in a video rather than towards a real person. The threat would be more realistic if the research

participants themselves were threatened with injury or death as they viewed a staged event, but of course such a procedure would be unethical. Because previous researchers have successfully obtained the weapon focus effect using videotaped scenarios or slide sequences, it is clear that participants must be able to appreciate the threat involved, if it is in fact the threatening nature of weapons that produces the effect. Therefore, the procedure for manipulating threat in the present study may be seen as an acceptable compromise between what is methodologically optimal and what is ethical.

After watching the video, the witnesses tried to remember information from it, including what the target looked like. It was predicted that witnesses would remember less information about the target when he carried an unusual rather than a common object. Because previous research has examined arousal rather than threat or has defined threat differently from in the present study, no specific prediction was made about whether the level of threat would affect memory for the target when threat was defined as the potential for physical injury or death.

EXPERIMENT 1

Method

Participants. The participants were 230 introductory psychology students at a medium-sized university in the Midwestern United States. They received course credit for participating. They were tested in groups of 3 to 10.

Materials. A videotape was created which was set in a hair salon. The opening scene showed the exterior of the building, including a sign identifying the business as a hair salon. In the interior shots that followed, a female receptionist was shown answering the telephone behind the front counter and writing down appointment information on a calendar. Another shot showed a female customer leafing through a magazine in the waiting area. Hair-care products were visible on shelves behind her. Following these scenes establishing the context, a male character (the target) approached the counter and spoke to the receptionist. She spoke to him in reply and handed him some money. (Viewers could not tell what was said because the video had no soundtrack.) He then walked out of the front door and got into the passenger side of a waiting car, which drove away.

In different conditions, the target was shown holding different objects that varied in both threat (which could be either high or low) and unusualness (which could also be either high or low). In an additional (''Empty'') condition, the target carried nothing. Pilot data were used to identify objects that participants would consider unusual and threatening within the context of a hair salon. Participants were asked to imagine sitting in the waiting area of a hair salon and seeing a man approach the receptionist while holding various objects. Using a 9-point scale, they rated either how unusual or how threatening each object would

seem. An unusual object was defined as one that was unexpected or out of place given the hair salon context. Threat was defined as the possibility that the receptionist would be physically harmed or killed.

After the pilot data were analysed, the following objects were chosen: the item high in threat and low in unusualness was a pair of scissors used for cutting hair; the item high in threat and high in unusualness was a handgun; the item low in threat and low in unusualness was a man's wallet; and the item low in threat and high in unusualness was a raw, whole chicken. Pilot participants rated the wallet and the chicken significantly lower in threat than the gun and the scissors, but the gun's ratings were not different from the scissors', and the chicken's ratings were not different from the wallet's. Similarly, the chicken and the gun were rated as more unusual than the scissors and the wallet, but the chicken and gun did not differ from each other, nor did the scissors and the wallet.

In the versions of the video that showed an object, the object was always plainly visible whenever the target was in the scene. When the target approached the counter to talk to the receptionist, he extended his hand (and also the object, except in the Empty condition) towards her. In the condition in which he held the scissors, the target gripped them with the blades facing downward, as one would if planning to use them to stab rather than to cut hair. This was done in order to increase the likelihood that viewers would see the scissors as threatening. Care was taken to ensure that the target's hand and body movements and facial expressions were the same in each condition. The target held each object with his right hand.

If the video had portrayed a scene that was obviously a robbery, viewers might have perceived the target's actions as threatening no matter what he did, and they might not have considered a gun to be out of context if they knew right away that they were witnessing the robbery of a business. Therefore, so that unusualness and threat could be manipulated, visual details that might have conclusively established the situation as a robbery were avoided. The target did not wear a mask or disguise, and the receptionist did not raise her hands in the air or react with fear when the target approached. Instead, the scenes depicted a typical day at a hair salon, at least until the target was shown walking up to the counter. At that point, it was up to the viewers to decide how to interpret the situation and to decide what they thought the target was doing in the hair salon.

Procedure. On arriving for the testing session, participants were told that they would watch a short videotape and were asked to pay close attention. Each group of participants was assigned randomly to one of the five conditions. The running time for each version of the video was approximately two minutes. After watching the video, the witnesses spent 10 minutes completing a filler questionnaire.

Next, the witnesses filled out a questionnaire requiring them to remember information from the video. The first section focused on the receptionist, who

served as the control person. The questions were a mixture of multiple choice and cued recall and asked about the receptionist's height, weight, hair length and colour, ethnicity, age, and clothing. The witnesses were also asked about other physical features such as spectacles, scars, or tattoos. Finally, they were given an opportunity to describe any other aspect of the receptionist's physical features or clothing that had not been specifically asked about already.

The second section requested similar information about the target. Finally, a series of three questions concluded the questionnaire. First, witnesses were asked whether the target was carrying anything in his hand as he approached the receptionist. Those who answered ''yes'' were asked to identify the object. Last, the witnesses were asked what they thought the target was doing in the hair salon.

After completing the questionnaire, the witnesses individually attempted to identify the target in a five-person, target-present photo line-up. The males shown in the photos were dressed alike and were similar in terms of height, weight, and physical features. The photos were randomly arranged in a row on a desk. Witnesses were instructed to point to the photo that showed the man seen earlier in the video, if he was in fact present in the line-up. Witnesses were explicitly told that the man might not be in any of the photos, and they could point to an index card labelled ''not pictured'' if they wished. After making a selection, witnesses were asked to use a 7-point scale to rate their confidence that the selection was accurate. Finally, the witnesses were thanked and debriefed.

Results

The memory questionnaires were evaluated by two judges working independently. For each witness, separate scores were calculated that reflected the number of items accurately remembered about the receptionist and the target. The judges also determined whether the witnesses had correctly answered the questions about the object carried by the target, and they categorised witnesses' answers regarding what the target was doing in the hair salon as either committing a robbery or engaging in any other activity.

Memory scores for Control and Target Persons. Because witnesses were given ample time to view the receptionist (the control person) before seeing the scenes that included the critical objects, it was expected that memory for the characteristics of the receptionist would not be affected by either the unusualness manipulation or the threat manipulation. That expectation was supported. A one-way analysis of variance showed no difference between any of the five conditions, $F(4,225) = .41$, $P = .80$. The mean recall score for all witnesses was 9.93.

However, memory for the target's characteristics did vary by condition. In order to determine whether any main effects or an interaction occurred, a two-way analysis of variance was performed on the memory scores from all conditions except the Empty condition. A significant main effect of unusualness was found (see Fig. 1), $F(1,181) = 8.41$, $P = .004$. Witnesses remembered less about the target if they saw one of the two unusual objects (the gun or the chicken; $M = 7.52$) rather than one of the two non-unusual objects (the scissors or the wallet; $M = 8.33$). There was no main effect of threat. The witnesses remembered about the same amount of information regardless of whether they saw a threatening object (the gun or the scissors) or a low-threat object (the chicken or the wallet). Furthermore, no interaction between threat and unusualness was obtained.

A one-way analysis of variance was used to discover whether the Empty condition differed from any of the other four. A significant effect was found, $F(4,225) = 5.40$, $P < .001$. A post hoc Newman-Keuls test revealed that witnesses in the Empty condition ($M = 9.02$; $n = 45$) remembered more than did those who saw either the gun ($M = 7.83$; $n = 46$) or the chicken ($M = 7.21$; $n = 47$). In

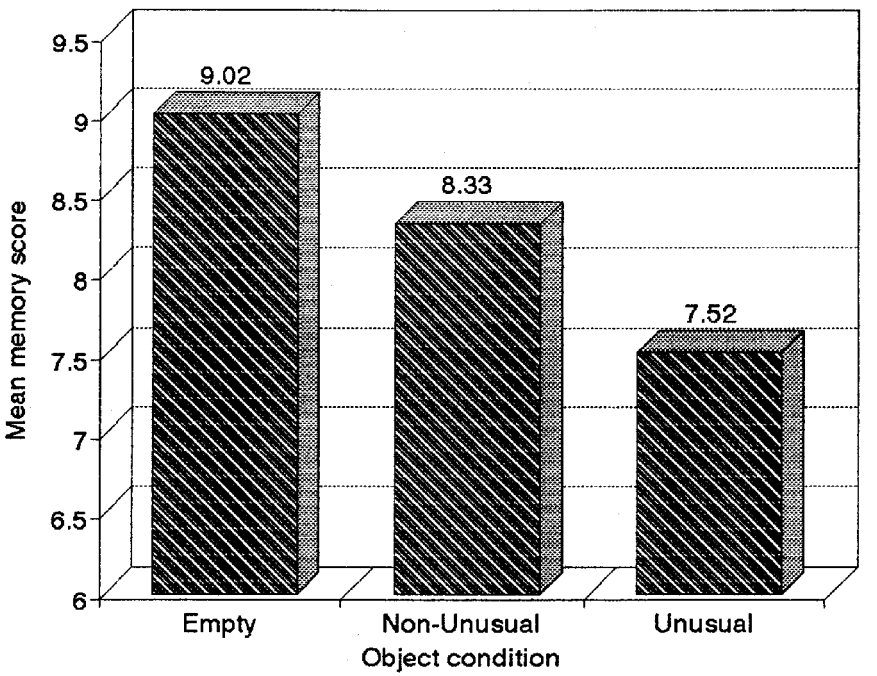

FIG. 1. Experiment 1: Descriptive information remembered by witnesses as a function of unusualness.

addition, the witness who saw the chicken reported less information than did those who saw the wallet ($M = 8.53$; $n = 43$). The number of details remembered by the witnesses who saw the scissors ($M = 8.14$; $n = 49$) did not differ from the means of any of the other conditions.

Line-up. The percentage of witnesses who correctly identified the target in the photo line-up did not vary by condition; overall accuracy was 39%. Witnesses who made a correct identification were more confident in the accuracy of their choice ($M = 4.20$) than were those who made incorrect identifications ($M = 3.44$), $t(228) = 3.62$, $P < .001$. A *t*-test was used to determine whether the accuracy of witnesses' identification of the target was related to the amount of information they remembered about him, but no significant difference was found.

Because witnesses performed the line-up task individually, chi-square analyses were conducted to rule out the possibility that the first witnesses to attempt an identification were more accurate or reported higher confidence than did witnesses tested later. The results revealed that testing order was unrelated to witnesses' identification accuracy or confidence ratings.

Memory for the Object. The vast majority of the witnesses in all conditions (98% overall) knew whether the target was carrying anything; furthermore, a chi-square test revealed that there was no difference in accuracy across the five conditions. However, witnesses who saw the wallet (in the low-threat, non-unusual condition) were less likely to remember what the object was, $\chi^2(3, N = 185) = 83.64$, $P < .001$. Only 45% (19 of 42) of the witnesses correctly identified the wallet, whereas identification was nearly perfect in the other three conditions: 98% (46 of 47) correctly identified the chicken, 100% (49 of 49) identified the scissors, and 100% (46 of 46) identified the gun. None of the witnesses who saw the wallet misidentified it when asked what it was; instead, those who failed to identify it tended to write ''I don't remember'' or to leave the question blank.

Interpretation of the Scenario. Witnesses were asked to speculate about what the target was doing in the hair salon. Almost all of them, in all conditions, proposed a plausible interpretation of the scenario rather than failing to answer the question or writing that they had no idea what was happening. Responses were coded as either reflecting the opinion that the target was robbing the business or that he was engaging in some other activity, such as paying for his haircut and getting change back, or borrowing money from the receptionist, who might be a friend of his. Witnesses' interpretations of the scenario varied by condition, $\chi^2(4, N = 230) = 46.54$, $P < .001$. All of the witnesses (100%) who saw the target carrying a gun thought a robbery was taking place, compared to 60% who saw the chicken, 55% who saw the scissors, 49% who saw the wallet, and 33% who saw the target empty-handed.

It is especially important to examine the interpretations of witnesses who saw the unusual object that was not a weapon, because of the concern that these witnesses may have considered the scenario to be unrealistic or bizarre. The responses of these witnesses reveal that most of those who saw the chicken and who did not believe the scenario depicted a robbery found an interpretation that apparently seemed reasonable to them. Many of them speculated that the target had intended to give the chicken to the receptionist or sell it to her. Only two witnesses said they did not know how to interpret the scenario.

A *t*-test was conducted to examine the possibility that witnesses who interpreted the scenario as a robbery would remember less information about the target than would witnesses who interpreted the scenario differently. No significant difference was found. In addition, a chi-square test revealed no relationship between witnesses' interpretations of the scenario and the accuracy of their line-up identification.

Discussion

The results suggest that, even when threat is explicitly defined as the possibility that someone may be injured or killed, weapon focus does not depend on threat. The threat manipulation did not affect the amount of information witnesses correctly remembered about the target or their ability to identify him in a line-up. Furthermore, if threat played a role in weapon focus, we might expect witnesses who interpreted the scenario as a robbery to remember less about the target than would witnesses who interpreted the scenario differently. The basis for this expectation is that a robbery is a threatening situation; it is more likely to lead to violence than is a business transaction or a conversation between friends. However, memory for the target's features was not related to witnesses' interpretations of the scenario.

On the other hand, unusualness did have a significant effect. Witnesses remembered less information about the target if he carried an object that was unusual given the context. It may be that weapons, due to their unusualness, attract visual attention. Loftus et al. (1987) found that witnesses who viewed the fast-food restaurant scenario spent more time looking at the weapon than at the more common item, the bill. Similarly, witnesses in the present study may have looked more at the object carried by the target if it was unusual rather than expected. Although data on witnesses' eye movements and fixations were not collected, it is interesting to note that less than half of the witnesses who saw one of the non-unusual objects, the wallet (but almost all the witnesses in the other conditions), were later able to identify what they had seen. This pattern, which matches the results of Loftus et al. (1987) but not Johnson and Scott (1976), could have occurred because these witnesses only glanced briefly at the wallet, whereas witnesses in other conditions gazed longer at the objects they saw. Of course, there could be other explanations for the result; for example, for some

reason the wallet could have been more forgettable compared to the other objects. It must also be noted that the other non-unusual object, the pair of scissors, was remembered well by witnesses.

Another finding was that weapon focus was obtained only with witnesses' descriptions of the target, and not with line-up identification. Consistent with this finding, Steblay (1992) reported that her meta-analysis revealed a stronger weapon focus effect when the dependent variable was feature accuracy rather than identification accuracy. Also, Wells (1985) found that the quality of a witness's description of a particular face is not a good predictor of the same witness's ability to identify the same face in a line-up. Memory for descriptive information is a more sensitive measure than line-up identification; in the present study, some of the questions assessing feature memory involved recall, whereas the line-up task required recognition. In addition, the range of possible scores was greater in the feature memory task. These differences may explain why the presence of a weapon can influence line-up accuracy more than descriptive accuracy.

EXPERIMENT 2

The results of Experiment 1 imply that weapons attract attention because they are surprising, not because witnesses are concerned about the possibility that someone may get hurt or killed. However, it is important to verify that the results can be generalised to other contexts and were not obtained simply because of some peculiar aspect of the stimulus scenario. The main purpose of Experiment 2 was to replicate the first study, using a different scenario and different objects. A secondary purpose was to incorporate a manipulation check in order to confirm that witnesses' perceptions of the unusualness and amount of threat associated with the different objects were consistent with the ratings given by pilot participants. After viewing the scenario, witnesses who reported seeing an object were asked to rate the unusualness and amount of threat associated with that object.

Method

Participants. The participants were 256 introductory psychology students attending the same university at which Experiment 1 participants were enrolled. They received course credit for participating. They were tested in groups of 3 to 12.

Materials. The stimulus was a videotaped scenario set in a shop where electronic equipment is repaired. At the beginning of the video, the exterior of the building was shown, including a sign identifying the business by advertising ''radio and TV service'' and naming a well-known television brand. In the interior shot that followed, a female receptionist was seen seated behind a desk.

Stereo equipment and a television were visible at one end of the desk. A female customer entered the shop carrying a VCR. She spoke with the receptionist, signed a form, and walked out, leaving the VCR behind. In the final part of the video, the male target approached the receptionist and spoke to her. She replied and gave him some money. He left the shop, got into a car, and drove away. As in the previous experiment, the situation depicted in the video was ambiguous rather than obviously a robbery. The target's relationship to the receptionist and his purpose for being in the shop were never made explicit. The video did not include a soundtrack.

As in Experiment 1, there were five different versions of the video. The target was shown either empty-handed or carrying one of four different objects that varied in both threat and unusualness. Pilot data were used to identify objects that would be considered unusual or threatening within the context of a TV/radio repair shop (both unusualness and threat were defined as in Experiment 1). Participants were asked to imagine being in a TV and radio repair shop and seeing a man walk up to the counter to talk to the clerk while holding various objects. They used a 9-point scale to rate either how unusual or how threatening each object would seem.

The following objects were chosen: the object high in threat and low in unusualness was a large screwdriver; the object high in threat and high in unusualness was a butcher knife; the object low in threat and low in unusualness was a pair of sunglasses; and the object low in threat and high in unusualness was a toy Pillsbury doughboy figure. The sunglasses and the doughboy were rated significantly lower in threat than the knife and the screwdriver, but the knife's ratings were not different from the screwdriver's, and the doughboy's ratings were not different from those of the sunglasses. Similarly, pilot participants rated the doughboy and the knife as more unusual than the screwdriver and the sunglasses, but the doughboy and knife did not differ from each other, nor did the screwdriver and the sunglasses.

In the four conditions that included an object, the object was always plainly visible whenever the target was in the scene. When he approached the receptionist, he extended his hand (and also the object, except in the Empty condition) towards her. In order to increase the level of threat in the screwdriver condition, the target gripped it as one would to make a stabbing motion, not as one would to tighten a screw. The target's hand and body movements and facial expressions were held constant in each condition, and he held each object with his right hand.

Procedure. The procedure was the same as in Experiment 1. Each group of participants was assigned randomly to one of the five conditions. After viewing the video, witnesses completed a questionnaire asking them to remember the physical features and clothing of both the target and the customer who brought her VCR in for repair (she served as the control person). Witnesses were also

asked whether the target was shown holding any object, and if they answered that he was, they were asked to describe it. As manipulation checks, two new questions were added that were not asked in Experiment 1. Witnesses who reported that the target was carrying an object were asked to use a 9-point scale to rate (1) how unusual it was that the target was carrying the object, and (2) how threatening the object carried by the target seemed. Witnesses were told to skip both questions if they had previously reported that the target was not carrying anything.

Following completion of the questionnaire, witnesses attempted to identify the target in a five-person, target-present photo line-up. They subsequently rated their confidence in the accuracy of their choice on a 7-point scale.

Results

Witnesses' questionnaires were scored as in Experiment 1, by two judges working independently. For each witness, a memory score was calculated that reflected the amount of information the witness remembered about the target's features. The judges also evaluated witnesses' responses about the object carried by the target (if any) and categorised witnesses' answers regarding what the target was doing in the repair shop as either committing a robbery or engaging in some other activity.

Manipulation Check. Witnesses who were shown an object and who reported that the target was carrying an object were asked to rate how threatening and how unusual the object seemed. A total of 37 ratings were excluded from analysis because they were made by witnesses who did not correctly identify the object held by the target, which left a total of 166 ratings (sunglasses $n = 22$; screwdriver $n = 45$; doughboy $n = 49$; knife $n = 50$). A one-way analysis of variance showed that the threat ratings differed between conditions, $F(3,162) = 98.61$, $P < .0001$. A post hoc Newman-Keuls test verified that the manipulation was successful. The threat ratings for the two high-threat objects (the knife, $M = 7.76$; and the screwdriver, $M = 6.96$) were significantly higher than the ratings for the two low-threat objects (the doughboy, $M = 2.29$; and the sunglasses, $M = 1.59$). There was no difference between the two high-threat objects or between the two low-threat objects.

The unusualness ratings also varied by condition, $F(3,162) = 58.84$, $P < .0001$. A post hoc Newman-Keuls test showed that this manipulation was also successful. The two highly unusual objects (the knife, $M = 8.58$; and the doughboy, $M = 7.86$) were given higher ratings than were the two non-unusual objects (the screwdriver, $M = 4.22$; and the sunglasses, $M = 3.23$). No difference was found between the two highly unusual objects or between the two non-unusual objects.

Memory Scores for Control and Target Persons. Witnesses' memory for the features of the customer (who was the control person) did not vary by condition, $F(4,251) = .19$, $P = .95$. The mean recall score for all witnesses was 9.80.

However, there were differences in witnesses' memory for the target's characteristics. A two-way analysis of variance revealed a significant main effect of unusualness (see Fig. 2), $F(1,199) = 5.70$, $P = .02$. Witnesses remembered less about the target if they saw him holding one of the two unusual objects (the knife or the doughboy; $M = 6.63$) rather than one of the two non-unusual objects (the screwdriver or the sunglasses; $M = 7.41$). No main effect of threat was obtained; memory scores were about the same regardless of whether the objects were threatening (knife or screwdriver) or not (doughboy or sunglasses). There was also no interaction between unusualness and threat.

A one-way analysis of variance was used to compare the Empty condition to the other four. The analysis revealed a significant effect, $F(4,251) = 5.36$, $P < .001$. A post hoc Newman-Keuls test indicated that witnesses in the Empty condition ($M = 8.36$; $n = 53$) remembered more information than did those who

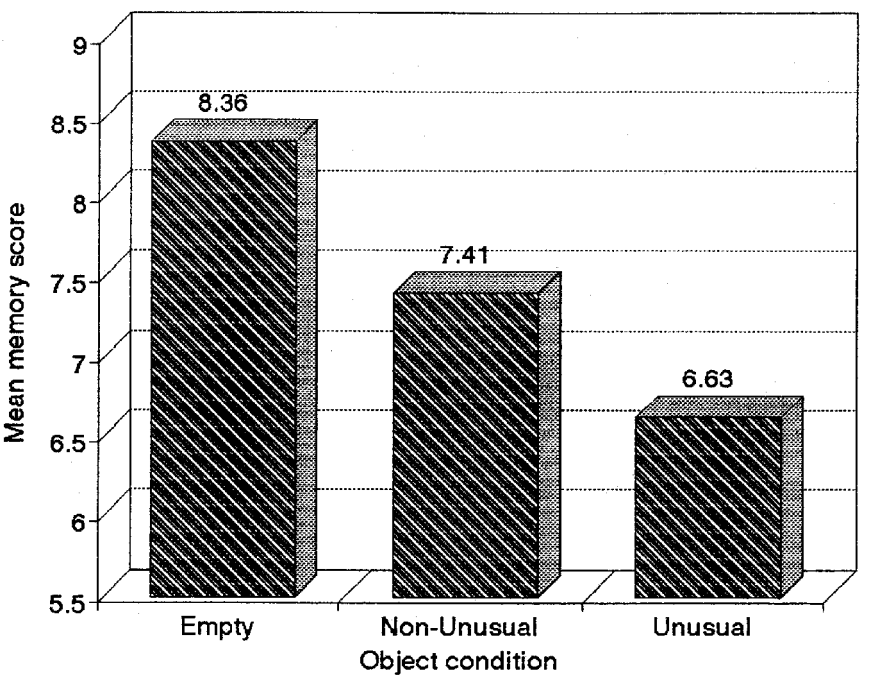

FIG. 2. Experiment 2: Descriptive information remembered by witnesses as a function of unusualness.

saw either the knife ($M = 6.71$; $n = 52$), the doughboy ($M = 6.55$; $n = 51$), or the screwdriver ($M = 7.00$; $n = 50$). Furthermore, the memory scores of the witnesses who saw the doughboy were lower than the scores of those who saw the sunglasses ($M = 7.82$; $n = 50$).

Line-up. The percentage of witnesses correctly identifying the target did not differ by condition. The overall accuracy rate was 23%. In contrast to the results of Experiment 1, witnesses who accurately identified the target were not more confident than were witnesses who made an incorrect identification. In addition, a *t*-test showed that identification accuracy was not related to the amount of information remembered about the target's features.

Chi-square tests were used to determine whether testing order was related to identification accuracy or witnesses' confidence ratings. The results were not significant.

Memory for the Object. Witnesses were asked whether the target was carrying anything. The percentage who responded correctly varied by condition, $\chi^2(4, N = 256) = 52.89$, $P < .0001$. Only 54% (27 of 50) of the witnesses who saw the sunglasses reported that the target was carrying something, compared to 100% (52 of 52) who saw the knife, 94% (47 of 50) who saw the screwdriver, and 94% (48 of 51) who saw the doughboy. In the Empty condition, 79% (42 of 53) of the witnesses correctly reported that the target carried nothing.

Of the witnesses who said the target was carrying something, almost all correctly identified the object, and there were no differences between conditions (percentage that correctly identified the knife = 100%; screwdriver = 96%; doughboy = 92%; sunglasses = 93%), χ^2 (3, $N = 174$) = 4.53, $P > .05$.

Interpretation of the Scenario. Some witnesses in each condition thought the scenario depicted a robbery, whereas others thought the target had come to the repair shop to borrow money from a friend or to complain about the service and get a refund. Witnesses' interpretations differed by condition, $\chi^2(4, N = 255) = 27.01$, $P < .0001$. In the condition in which the knife was visible, 48% of the witnesses interpreted the scenario as a robbery, compared to 20% of the witnesses who saw the screwdriver, 14% who saw the doughboy, 12% who saw the sunglasses, and 15% in the Empty condition. A *t*-test revealed that witnesses' interpretations were not related to the amount of information remembered about the target, and a chi-square test showed no relationship between interpretations and line-up accuracy.

As in Experiment 1, responses written by witnesses who saw the unusual object that was not a weapon were carefully examined. The purpose was to verify that these witnesses did not view the scenario as absurd. Of the witnesses who saw the doughboy and who did not interpret the scenario as a robbery, most either believed that the target was a customer bringing in or picking up

electronic equipment to be repaired, the clerk's friend or relative who was borrowing or requesting money from her, or a shop employee picking up his pay or a work order. Some mentioned that the doughboy was probably a gift for the clerk or some other person. Only two witnesses failed to answer the question, and one said that he or she did not know how to interpret the scenario.

Discussion

Most of the results obtained in Experiment 1 were replicated in Experiment 2. As before, witnesses' ability to remember the target's features depended on unusualness rather than threat. Not only was the threat manipulation ineffective, but in addition, interpreting the scenario as a robbery (i.e. as a threatening situation) did not lead to poorer memory performance. Thus, the results of Experiment 2 give weight to the hypothesis that the weapon focus effect is caused by the unusualness of weapons.

One difference in the findings of the two experiments concerns witnesses' memory for the low-threat, non-unusual object. In Experiment 1, witnesses who saw the wallet tended to report seeing an object but often failed to identify it correctly, whereas in Experiment 2, almost half of the witnesses who saw the sunglasses incorrectly reported that the target carried nothing, although most of those who reported seeing an object identified it. An explanation proposed for the Experiment 1 results was that witnesses may have spent relatively little time looking at the wallet, so that later they believed that they had seen something but were not sure what it was. The same explanation might account for the Experiment 2 findings as well. The witnesses may have spent very little time looking at the sunglasses (perhaps even less time than Experiment 1 witnesses spent looking at the wallet), and as a result, many of them later did not recall seeing anything at all. The data do not allow an opportunity to either support or refute this speculation. Future research could measure eye movements as a means of determining how unusualness affects looking time, and in turn how looking time may affect witnesses' ability to remember both whether they saw some object and what that object was.

GENERAL DISCUSSION

Taken together, the results of both experiments imply that, when the ''weapon focus'' effect occurs, it is caused by the unexpected nature of weapons rather than by threat. In both experiments, unusualness, but not threat, affected witnesses' memory for descriptive information about the target. The failure to find a main effect of threat extends previous work exploring the influence of various aspects of both threat and emotional arousal. It appears that neither of these variables is needed to produce weapon focus, regardless of whether the threat involves physical pain or uncomfortableness that the research participant may experience (e.g. Maass & Kohnken, 1989) or injury or death that may occur

to a crime victim or bystander depicted in a videotaped scenario, as in the present study.

It is necessary again to acknowledge a limitation of the present results, which is that the threat was directed towards characters in the videos, not towards the participant or a real person. If a character had been killed or injured, the situation might have seemed to participants like a movie, in which graphic violence can be portrayed, but no real harm is done; in this way, the effect of threat might have been reduced. However, as noted earlier, this problem does not severely reduce the validity of the present results. Several previous researchers have managed to obtain the weapon focus effect using videotapes or slide sequences as stimuli. Therefore, if threat is actually the cause of this effect, then threats directed at characters must be, in some sense, ''real'' to participants. As a result, the present findings should not be dismissed, even though they must be interpreted cautiously. Until researchers can devise a way to threaten real people with injury or death without violating ethical regulations, the study of weapon focus might be better advanced if researchers would concentrate on other possible explanations besides threat.

One such explanation is that weapons seem unusual within many of the contexts in which they appear, and this unusualness attracts the visual attention of the witness, causing him or her to gaze more at the weapon and less at other details (see Kramer et al., 1990). In fact, it may be that ''weapon focus'' has been defined too narrowly. Perhaps witnesses can be distracted by any unusual object that seems out of place given the context, whether that object is a weapon or not. Thus, when a target carries an object that one rarely sees in a hair salon, witnesses may spend relatively more time looking at it and less time looking at the target's features. Later, they will have trouble remembering those features, but can easily remember the unusual object. On the other hand, if the target is carrying a non-unusual, expected item, witnesses will spend less time looking at it and more time looking at the target's features. Later, they will recall the target's features relatively well, but they may not remember the non-unusual object. One implication of the unusualness explanation is that an object's ability to attract attention should change with context. A gun may be unexpected in a hair salon, but not at a shooting range. In the latter context, the ''weapon focus'' effect should not be obtained at all.

The results of this study should not be interpreted as suggesting that criminals commonly commit robberies armed with chickens or toy dolls, or that the results would generalise only to situations in which these particular objects are present. The point of including conditions in which the perpetrator carried these objects was to demonstrate that an effect that has been referred to in the literature for years as ''weapon'' focus can be produced by objects that are not weapons, possibly because unusualness is the causal factor. As a secondary point, however, it has been documented that various strange items have been used by criminals in place of actual weapons. These items include an egg, a bowling ball,

an artificial leg, a toilet seat, and, notably, a 21-pound turkey (Butler, Ray, & Gregory, 1995). Therefore, it makes sense that researchers should continue to investigate the effects of the presence of unusual objects in crime scenarios.

Manuscript received 25 November 1996
Manuscript accepted 27 March 1997

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