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An Investigation of the Weapon Focus Effect and the Confidence–Accuracy Relationship for Eyewitness Identification☆

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Eyewitness memory can be negatively influenced by the presence of a weapon during a crime. We investigated the potential impact of weapon presence on the confidence–accuracy relationship. Additionally, we tested a concealed weapon condition, as it is common for criminals to verbally threaten a victim with a weapon, despite not showing one during a crime. In support of the weapon focus effect (WFE), correct identifications were lower, and false identifications were higher, for participants who saw the weapon. The concealed weapon did not create a WFE, even though the perpetrator attempted to draw attention to the gun in his pocket, and participants reported that he had a gun. Calibration analyses revealed that weapon presence, whether visible or concealed, did not negatively impact the confidence–accuracy relationship. In fact, participants were best calibrated when the weapon was clearly visible. We discuss implications of these findings for police and the criminal justice system.

General Audience Summary

We conducted a large experiment to investigate an important issue concerning eyewitness identification. When a culprit commits a crime with a weapon, it has been shown that eyewitnesses tend to focus on the weapon, thereby harming their memory for the perpetrator. However, it is not understood how confident eyewitnesses are when they make a lineup decision following a crime involving a weapon. It is possible that they could appreciate the fact that they were distracted by the weapon, and adjust their confidence accordingly. This would lead eyewitnesses to be well calibrated, insofar as their confidence could match up well with their identification accuracy. Though confidence is not a perfect indicator of accuracy, it does provide useful information. Prior work has shown that confidence recorded immediately after a lineup decision is moderately strongly correlated with accuracy, at least for fairly pristine encoding situations (e.g., a laboratory setting). We wanted to determine if this relationship is influenced by weapon presence during a mock crime.

We investigated eyewitness confidence and accuracy by presenting a mock crime video (purse-snatching) to a large group of undergraduate students as well as a representative sample of participants from across the country (total sample size of 1234). Each participant took part in the experiment online via a computer. Shortly after watching a mock crime in which a culprit either shows a handgun, has no handgun, or conceals the gun in his pocket, participants attempted to identify him from a lineup (which either contained his mugshot or not). Results indicated that confidence can meaningfully be used to distinguish between accurate and inaccurate

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eyewitnesses, and this relatively strong relationship between confidence and accuracy was present regardless of weapon presence or concealment. In other words, our participant–eyewitnesses who indicated high confidence after choosing from a lineup tended to be accurate, regardless of our weapon manipulations. In addition, the most calibrated participants were actually those who viewed the mock crime with the weapon visible. In conclusion, police should always collect confidence after an eyewitness's lineup decision, and might not want to devalue identifications after crimes involving a weapon, as long as these identifications are supported by high confidence.

Keywords: Eyewitness identification, Weapon focus effect, Weapon concealment, Confidence and accuracy

In terms of eyewitness identification, weapon involvement during a crime is important because eyewitnesses can be susceptible to a *weapon focus effect* (WFE), whereby their attention is drawn to a weapon rather than other details, such as the perpetrator's face (e.g., Loftus, Loftus, & Messo, 1987; see meta-analyses by Fawcett, Russell, Peace, & Christie, 2013; and Steblay, 1992). Weapon presence frequently weakens some memories for the crime, such as for perpetrator clothing and other peripheral contextual details. Lineup performance is less consistently impacted, with some studies finding no effect (e.g., Cutler & Penrod, 1988; Cutler, Penrod, O'Rourke, & Martens, 1986) and others showing lower accuracy (e.g., Carlson & Carlson, 2012, 2014; Erickson, Lampinen, & Leding, 2014; O'Rourke, Penrod, Cutler, & Stuve, 1989).

The present study focused on the confidence–accuracy relationship, comparing a visible weapon condition with both a weapon absent and a concealed weapon condition. The Federal Bureau of Investigations (2011) reported that, out of 5086 bank robberies, a weapon was threatened 2331 times, but only shown 1242 times. In other words, a perpetrator was almost twice as likely to imply that he had a weapon than to actually show it. This study serves as the first to assess the potential impact of weapon presence and concealment on the eyewitness confidence–accuracy relationship. Before we describe the current state of the literature regarding this relationship, we briefly discuss research on the WFE and previous manipulations of weapon visibility.

The Weapon Focus Effect

Loftus et al. (1987) conducted the first controlled experiment investigating weapon presence and eyewitness identification (cf. Johnson & Scott, 1976). Participants viewed a series of slides portraying individuals waiting in line at a fast food restaurant. Four critical slides showed either a person handing the cashier a check or pointing a gun at the cashier. After a brief retention interval, participants completed a questionnaire followed by a fair perpetrator-present 12-person lineup. In Experiment 1, memory was marginally worse, and the perpetrator was chosen marginally less, by those in the weapon condition. In Experiment 2, improved power revealed that those in the weapon condition indeed had worse memory than those in the control condition, indicated by both the memory questionnaire and lineup accuracy. Eye-tracking data from Experiment 1 revealed that participants fixated longer on the weapon than the check (see also Biggs, Brockmole, & Witt, 2013). In other words, additional visual attention on the weapon lowered time spent on other aspects of the crime, including the perpetrator's face.

In response to both types of evidence, Loftus et al. (1987) outlined two potential explanations for weapon focus: arousal and unusualness. The arousal hypothesis states that seeing a weapon increases physiological arousal and stress, which causes tunnel vision on the weapon, akin to Easterbrook's (1959) cue utilization theory. Peters (1988) found some evidence for this theory by showing that participants were worse at identifying a nurse who administered an injection to them (threat condition), compared to identifying a researcher who provided a questionnaire (but see Maass & Kohnken, 1989). In addition, the WFE appears to be larger under threatening or arousing circumstances (Fawcett et al., 2013). However, though there is evidence for an overall WFE across archival and field studies, the evidence is inconsistent across individual studies (Fawcett et al., 2013), leading several researchers to argue against the idea that lab studies can adequately replicate real world circumstances, including weapon presence (e.g., Cutshall & Yuille, 1989).

As an alternative to the arousal hypothesis, the unusualness hypothesis states that a weapon draws attention because it is unexpected within a given context. Pickel (1998, 1999) and others have found a weapon focus effect for objects that are unexpected in a given context, such as a feather duster in a bank (Hope & Wright, 2007), a stick of celery during a business transaction (Mitchell, Livosky, & Mather, 1998), and a raw chicken in a hair salon (Pickel, 1998). Additionally, the weapon focus effect can be eliminated by making a weapon more congruent with surrounding context, such as a gun presented at a shooting range compared to a baseball field (Pickel, 1999). The gun is expected at a shooting range, and because it is no longer unusual in this context, it does not draw more attention than other objects.

Manipulations of Weapon Visibility

Cutler, Penrod, and colleagues published several studies in the late 1980s investigating a large number of eyewitness identification variables, including weapon visibility (Cutler & Penrod, 1988; Cutler et al., 1986; Cutler, Penrod, & Martens, 1987a; Cutler, Penrod, & Martens, 1987b; O'Rourke et al., 1989; see also Kramer, Buckhout, & Eugenio, 1990). However, neither the WFE nor weapon visibility in particular was the primary focus of any individual study. Each experiment presented the same one or two mock crime videos, both involving a robbery. Evidence for an effect of weapon visibility was mixed. Two studies