Effects of Misleading Postevent Information and Weapon Focus on Eyewitness Memory

Sarah Steiner

San Jose State University
Abstract

Misleading postevent information and the presence of a weapon may affect eyewitness memory of a crime. One hundred and one adults viewed a slide show with or with out the presence of a weapon in the final slide, then listened to a misleading narrative, half following along by reading. Correct responses to a combination of multiple choice and open-response questions measured memory. Participants who read the misleading narrative while it was read to the group gave fewer correct responses. Contrary to predictions, participants who saw a non-traditional weapon responded with more correct responses than the group viewing a neutral object. There was no significant interaction between these two factors. The results supported the impairing effects of misleading postevent information and raised questions about the nature of the weapon focus effect in the context of a non-traditional weapon.
Effects of Misleading Postevent Information and Weapon Focus on Eyewitness Memory

Study of the interaction between weapon focus and the misinformation effect on eyewitness memory holds great importance. Eyewitness testimony often acts as the only compelling evidence available in a criminal proceeding. Yet memory is imperfect and subject to forgetfulness. Memory also grows. Upon each recollection, memory is reconstructed and blended with new information, suggestions and understanding (Loftus, E., 2005). Precise memory is important within the context of criminal proceedings. Exonerations of falsely convicted defendants have become commonplace in cases of rape and murder since the introduction of DNA identification technology. Despite the lack of a national database, between 1989 and 2003 at least 328 defendants were found to be falsely convicted after cumulatively serving 3400 years in prison. Of these, 81% had convictions based on eyewitness misidentification (Gross, Jacoby, Matheson, Montgomery, & Patil, 2005). Study of eyewitness memory holds great potential for practical application within criminal proceedings. No dominant theory for eyewitness memory formation currently exists (Well, & Olson, 2003; Ayers, & Reder, 1998). Further research is necessary to compile a comprehensive understanding of underlying mechanisms (Ayers, & Reder, 1998). Continued efforts to focus on the variables that distort eyewitness memory may lead to methods of minimizing and eliminating influence on testimony collection.

Episodic memory is a type of long-term memory and subject to the same basic processes of memory formation and retrieval as all types of long-term memory. During retrieval, information flows from long term to short term memory. Factors influencing long term memory can potentially impact at any point of this process (Butters, Delis & Lucas, 1995).

Episodic memory has its own unique characteristics, containing information within the context of time and place. Episodic memory requires autonoetic awareness, the ability to
Effects of Misleading and Weapons

perceive events in one’s life as belonging to the concept of subjective time. This includes
distinguishing between recalling past events, imagining future events, and experiencing events in
the present. Episodic memory also requires conceiving oneself as a being separate from the
“memory world”, while existing in subjective time (Tulving, 2002).

Eyewitness memory is a kind of episodic memory, referring to memory of specific events
viewed by a person often within the context of a crime. Research into eyewitness memory mostly
explores its unreliability and malleability. Memory declines most sharply after the first 20
minutes of exposure. A forgetting curve displays the exponential drop in memory after initial
exposure to information (Loftus, G., 1985). Many variables affect eyewitness memory such as
exposure duration, weapon presence, seriousness of the crime, racial bias, time delay, and post-
event information. More study is needed to understand their effects on actual case data (Well &
Olson, 2003).

Research details the malleability of eyewitness memory (Loftus, E. & Palmer, 1974;
Loftus, E., 1975). Over time, eyewitness memory fades and becomes increasingly vulnerable to
suggestion and misinformation (Loftus, E., Miller, & Burns, 1978). Retroactive interference
affects the initial information processed from the event. Participants present misinformation as
part of their memory (Loftus, E., 2005). Participants confidently confuse suggestions as
eyewitnessed events (Zaragoza & Lane, 1994). The new memory may replace the original
memory, effectively overwriting the original information (Loftus, E., 1978). Both memories may
coexist and be accessible through specific types of questioning (McCloskey & Zaragoza, 1985).
Post event information may blend with the original memory (Allen & Lindsay, 1998).
Participants may hold the memories separately yet rely on the post event information since it is
newer and more easily accessed.
Exposure to *misleading postevent information* (MPI) after viewing an event leads to false reports of eyewitness memory (Allen, & Lindsay, 1998; Belli, 1989; Lindsay, 1990; Lindsay, & Johnson, 1989; Loftus, E., Miller, & Burns, 1978, Loftus, E., & Palmer, 1974; McCloskey, & Zaragoza, 1985; Zaragoza, & Lane, 1994). Eyewitness memory is especially susceptible to decay due to limited exposure of initial event information (Loftus, G., 1985). MPI may be introduced following a witnessed event utilizing a variety of methods such as leading questions, a spoken or written narrative, group discussions, use of a confederate or exposure to unrelated information (Belli, 1989; Eakin, Schreiber, & Sergent-Marshall, 2003; Echterhoff, Hirst, & Hussy, 2005; Gabbert, Memon, & Allan, 2003; Gabbert, Memon, Allan, & Wright, 2004; Lindsay, 1990; Lindsay, Allen, Chan, & Dahl, 2004; Loftus, 1975; Lotus, & Palmer, 1974; McCloskey, & Zaragoza, 1985; Roediger, Jacoby, & McDermott, 1996; Zaragoza, & Lane, 1994).

Controversy abounds in regards to whether misinformation permanently alters an original memory or simply decreases accessibility to it (Belli, 1989; Loftus, E., 1975; Loftus, E. & Palmer, 1974; McCloskey, & Zaragoza, 1985; Zaragoza, & Lane, 1994). Thus far understanding of formation and alteration of eyewitness memory is not conclusively linked to a particular theory (Ayers, & Reder, 1998). Several factors relate to the misinformation effect such as means of exposure, time delay between exposure and recognition testing, type of test administered, or the presence of a confederate (Belli, 1989; Eakin, Schreiber, & Sergent-Marshall, 2003; Echterhoff, Hirst, & Hussy, 2005; Gabbert, Memon, & Allan, 2003; Gabbert, Memon, Allan, & Wright, 2004; Lindsay, 1990; Lindsay, Allen, Chan, & Dahl, 2004; Loftus, 1975; Lotus, & Palmer, 1974; McCloskey, & Zaragoza, 1985; Roediger, Jacoby, & McDermott, 1996; Zaragoza, & Lane, 1994).
Verbally introduced MPI interferes with visual recall. Participants blend details from a narrative summary into their reporting of a witnessed event (Allen et al, 1998). Suggestive wording strengthens the *misinformation effect*. Participants report the existence of objects not originally present when tested ten minutes after witnessing an event. The *misinformation effect* strengthens with time: participants respond with significant inaccuracy when tested one week after exposure to the event and MPI (Loftus, E., 1975).

The introduction of written MPI also increases the *misinformation effect*. Participants exposed to written MPI responded with significant inaccuracy on a forced choice recognition test after an event (Loftus, E., Miller, & Burns, 1978).

Studies using alternate measures showed mixed results. Subjects tested after an MPI narrative with a modified test showed a decreased *misinformation effect* and supported the theory that original event info can still be accessed (McCloskey, & Zaragoza, 1985). On a multiple choice test, after a delay respondents were no more likely to report seeing objects from the written event, but they failed to report the information as inconsistent with the witnessed event (Zaragoza & Koshmider, 1989).

Use of source monitoring tests showed some decrease in the *misinformation effect* depending on the degree of source discriminability. Participants instructed to attend to where the information had been introduced reported MPI less often than those not given the instructions (Lindsay, 1990).

The misinformation effect persists despite warning participants. When tested forty eight hours after exposure to verbal MPI, participants given instructions to ignore the MPI still integrated false information (Lindsay, 1990). When exposed to information that contradicted a witnessed event, participants recall the misinformation even when warned (Eakin, Schreiber, &
Sergent-Marshall, 2003). Warnings to ignore MPI given by a confederate significantly lowered
the misinformation effect. Participants who received social pressure to disregard MPI before
taking a recognition test showed a decreased *misinformation effect*. This effect was most
significant when social pressure was introduced before the test rather than before or after the
misinforming narrative. The most recent information introduced consistently was the most
accessible (Echterhoff, Hirst, & Hussy, 2005).

Social introduction of MPI increases the *misinformation effect* more than a written
source. Participants exposed to MPI by a confederate integrated more of the inaccurate
information (Gabbert, Memon, Allan, & Wright, 2004). Participants exposed to MPI
conversationally by a confederate incorporated false information into their responses despite
warnings given by researchers (Meade, & Roediger, 2002).

Another factor that influences eyewitness memory is the presence or absence of a weapon
at a crime scene. During a crime involving a weapon eyewitnesses focus their attention on the
weapon and pay less attention to the perpetrator and other details of the scene. This results in
enhanced memory for the weapon but impaired memory for the perpetrator’s appearance or other
scene details (Loftus, E. Loftus, G. & Messo, 1987). The phenomenon is called the *weapon focus
effect*. Many details other than the weapon are simply not encoded in memory due to a failure to
adequately attend to them during the original events of the crime (Pickel, 1999).

Recognition of a perpetrator from either a photo spread or a traditional line-up is a
common method used in the legal system for eyewitnesses to identify perpetrators. In
perpetrator-present recognition tasks, participants in weapon-absent conditions make correct
identifications significantly more often than participants in weapon-present conditions (Loftus et
al., 1987; Tooley, Brigham, Maass & Bothwell, 1987; O’Rourke, Penrod, Cutler, & Stuve, 1989;
Cutler & Stuve, 1989). Perpetrator-absent situations also yield a weapon focus effect, with higher rates of false identifications in the weapon-present condition (O’Rourke et al., 1989, Cutler et al., 1989). These recognition tasks show a modest yet distinct weapon focus effect (Steblay, 1992).

In weapon-focus studies multiple-choice questionnaires are often used to interview witnesses to elicit a description of the perpetrator. Participants in a weapon-present condition frequently perform significantly poorer on these perpetrator description tasks than weapon-absent controls (Pickel, Ross, & Truelove, 2006; Loftus et al., 1987; Hope & Wright, 2007; Kramer, Buckhout, & Eugenio, 1990). Participants’ performance on both recognition and description tasks of the perpetrator are impaired when a weapon is present and clearly visible at a crime scene.

In response to questions involving the object held by the perpetrator, participants in the weapon condition are better at recalling the object and able to remember more details about the object than participants in the control condition (Hope & Wright, 2007; Maass & Köhnken, 1989; Pickel et al., 2006).

The weapon focus effect generalizes in several ways. The effect appears to generalize across a wide age range, from children 4-8 years old (Pickel, Narter, Jameson, & Lenhardt, 2008) to older individuals up to 74 years old (O’Rourke et al., 1989). The effect appears stronger in staged enactment scenarios than in slide shows or video tapes, but is present in all formats (Steblay, 1992). The effect is present after a week long delay from witnessing the event as well as when measured the same day after a filler task (Steblay, 1992). The weapon focus effect generalizes to robbery and violent confrontation (Kramer et al., 1990; Pickel et al., 2006). Traditional weapons such as guns and knives elicit the weapon focus effect as well as some nontraditional weapons (Kramer et al., Maass & Köhnken, 1989). The weapon focus effect
generalizes to some auditory details of a crime scene as well; specifically, memory for the
semantic content of a perpetrator’s speech can be impaired in the presence of a weapon (Pickel,
French, & Betts, 2003).

No consensus exists regarding the underlying cause of the weapon focus effect. It is
usually attributed to Easterbrook’s cue-utilization hypothesis: arousal increases and attentional
focus narrows, so that important cues in a scene receive greater focus and peripheral details
receive less focus (Easterbrook, 1959). A weapon in a crime scene is perceived as important,
while information-providing cues and other details, such as the perpetrator’s appearance, seem
peripheral (Maass & Köhnken, 1989). The weapon focus effect also suggests a larger, more
general tendency for individuals to focus attention on unusual objects (Mitchell, Livosky, &
Mather, 1998). Weapons used in crimes are unusual when used in a typically safe setting and
draw attention. Unusual objects produce impaired memory for a perpetrator akin to the weapon
focus effect (Mitchell et al., 1998). If weapons as objects have truly unique effects on eyewitness
memory, it should be due to the combined aspects of threat and unusualness. Studies attempting
to disentangle the unusualness and threat aspects of weapon focus currently provide conflicting
evidence. Comparing a weapon condition with an unusual object condition, there sometimes is
no difference in memory performance between the groups (Pickel, 1998; Mitchell et al., 1998).
However, other studies support the idea that weapon threat is unique and distinct from object
unusualness (Pickel et al., 2006; Hope & Wright, 2007).

Although the study of weapons is intrinsic to research concerned with the weapon focus
effect surprisingly few studies use weapons other than a gun or blade. Studies using
nontraditional weapons such as a syringe or liquor bottle produced a weapon focus effect (Maass
& Köhnken, 1989; Kramer et al., 1990) Another study using a pair of scissors, a high-threat,
low-unusualness object, failed to find a weapon focus effect differing from an unusual but low-threat object condition (Pickel, 1998). The weapon focus effect should generalize to more nontraditional kinds of weapons.

Interaction

The exposure to MPI and the presence of a weapon during a witnessed crime both have clearly demonstrated effects on eyewitness memory. The manner in which these two effects interact with one another has not yet been established. When presented with MPI involving tools, participants gave distorted reports that favored misinformation (McCloskey & Zaragoza, 1985). Use of weapon has been suggested for a misinformation study but not yet pursued (Wright & Loftus, E., 1998). These two factors potentially co-occur for genuine eyewitnesses and study should be pursued.

Many factors influence the accuracy of eyewitness memory. Characteristics of the event, the witness, the testimony, instructions and method of testimony all affect the formation of memory. Misinformation influences eyewitness memory as well. Presuppositions, passage of time, social pressure, and suggestion increase the degree of misinformation integrated into a witnesses’ memory. A more nuanced understanding of the misinformation effect will improve the warnings given to eyewitnesses. The presence of a weapon distracts witnesses and impairs memory of the perpetrator and crime scene. Further research into nontraditional weapons can establish how well the weapon focus effect generalizes across weapon type, and may also help to clarify the roles that threat and unusualness play in the weapon focus effect. In both circumstances memory encodes incorrectly. Conflicting reports cause difficulty in determining whether accurate memories still exist or are permanently altered due to interference and distraction. More study is needed to determine the nature of these effects and to determine a
possible interaction between the misinformation effect and weapon focus.

Method

Participants

A sample of 101 undergraduate psychology students, ages 19-46, from San Jose State University (SJSU) volunteered to participate in this experiment in exchange for extra credit points. The sample was divided into four groups determined by pre-established class time. English was the first language of 71 participants. Fifty participants had previously witnessed a crime. Participant gender distribution was 31 males, 69 females and one who declined to state.

Materials

A sequence of 19 slides (see Appendix A) depicting common images from a grocery store was used. These images represent a frequently encountered setting. The nineteenth slide showed either a broken bottle as a non-traditional weapon held toward a cashier or a wallet as a neutral object. An MPI narrative was used (Appendix B) along with a background questionnaire (Appendix C).

The response sheet was a multi component recognition test (Appendix D). The recognition test was created as a combination of multiple-choice and open-ended responses in an attempt to avoid concerns raised by forced choice tests (Belli, 1989; McCloskey, & Zaragoza, 1985; Zaragoza & Koshmider, 1989). Multiple choice questions included specific correct questions to measure recognition memory accuracy, and misinformation questions to measure misinformation effects. To address the concerns for modified recognition tests, multiple-choice items included correct original information, suggested misinformation, and new unrelated information (Gobbo, 2000; Pezdeck & Roe, 1995). Items presented on the recognition test do not correspond to the order of items presented in the slide show.
Procedure

Participants received consent forms and were informed that their participation was optional and that they could leave at any time. Groups were divided according to four conditions. The first group, containing 19 participants, viewed the weapon in slide 19 and only heard the MPI narrative (weapon/verbal). The second group, containing 23 participants, viewed the weapon in slide 19 and read a copy of the MPI narrative as it was read aloud (weapon/dual exposure). The third group, containing 25 participants, viewed the wallet in slide 19 and only heard the MPI narrative (neutral/verbal). The final group, containing 34 participants, viewed the wallet in slide 19 and read a copy of the MPI narrative as it was read aloud (neutral/dual exposure).

In each group the participants were instructed to carefully watch each slide in anticipation of testing afterward. The slides were shown in a standard 50 capacity seat classroom, on a screen in the front of the room. Each slide was visible for 5 seconds. This interval was two seconds longer than slides were shown in previous study (Loftus, E., Miller, & Burns, 1978), allowing for more thorough exposure. After the slide show participants were instructed that they would be hearing a study guide to help prepare them for the memory test. Participants in the weapon/dual exposure and neutral/dual exposure groups were instructed to read along as the experimenter read the MPI narrative. The participants then received a nine-question background questionnaire and a 30-question recognition test. They had five minutes to complete as many items as possible. Participants were instructed to answer each question as best they could remember. When the tests were collected participants were given the opportunity to ask any questions they had about the experiment.

Design
Data collection occurred by using four conditions in a two-by-two factorial design. Independent variables MPI and Weapon Focus were tested as between-subject factors. Questions were designed to include correct, incorrect and misinformational choices. Both correct responses and misinformation responses were analyzed as dependent variables with ANOVA.

Responses were coded as correct, incorrect or misinformation. Of the total 30 questions, 15 covered topics where misinformation had been introduced.

**Measures**

The number of correct responses to the entire recognition test measured the strength of eyewitness memory in each of the four conditions. Correct responses were also used to determine the presence of a *weapon focus effect*. The strength of the *misinformation effect* was measured by analyzing the fifteen questions that included a misinformation response.

**Results**

This study evaluated the effects of misleading postevent information and the presence of a weapon on eyewitness memory.

**Main Effects of Misleading Postevent Information**

Participants exposed to only verbal MPI remembered more details correctly (M=11.84, SD=2.877) than those exposed to verbal and written MPI (M=10.96, SD=2.751). When tested with background data for gender there was a significant effect of MPI on the number of correct responses for the eyewitness memory task, $F(1,100)= 4.532, p< .036$. A separate analysis MPI with the background questionnaire factor English as first language confirmed a significant effect, $F(1,100)= 4.183, p< .044$. In an additional analysis of MPI with caffeine intake the significant effect of MPI was further confirmed, $F(1,100)= 4.428, p< .038$. Participants exposed to verbal
MPI only responded 39% correctly to the eyewitness memory task. Those exposed to verbal and written MPI responded correctly to 36% of the questions.

Participants exposed to verbal and written MPI remembered more (M=10.46, SD=3.054) misinformation than those exposed to verbal MPI alone (M=9.27, SD=4.228). When tested with gender there was a significant effect of MPI on the number of misinformation responses for the eyewitness memory task, $F(1,100)= 4.939, p< .029$. When averaging the means of all four conditions, MPI was reported 66% of the time to questions measuring misinformation.

**Main Effects of Weapon Presence**

Participants who viewed the slide showing a broken bottle as a weapon remembered more (M=11.85,SD=2.968) details correctly on the eyewitness memory task than those viewing the slide with the wallet as a neutral object (M=10.61,SD=2.458). The presence of a weapon had a significant effect on the number of correct responses to the memory task $F(1,100)= 4.871, p< .030$. When analyzed with MPI the effect of the weapon presence was confirmed $F(1,100)= 5.803, p< .018$. In an additional analysis with the background factor of witnessing a crime, the significant effect of weapon presence was again confirmed.

**Main Effects of Other Factors**

When the background factor of gender was analyzed for number of correct responses there was a significant effect $F(1,100)= 3.507, p< .034$. Males scored significantly more correct responses (M=12.23, SD= 2.334) than females (M=11.00, SD=2.951).

When the background factor of English as the first language spoken was analyzed for number of misinformation responses a significant relationship was found $F(1, 100)= 3.805, p< .054$. Participants who spoke English as their first language were more likely to report misinformation than those who spoke other languages first.
Interactions

The was no significance in the interaction between misinformation and weapon focus on the number of correct responses $F(1,100)= 1.120, p< .293$.

Analysis of the presence of a weapon with the background factor of witnessing a crime approached a significant interaction $F(1,100)= 3.122, p< .080$.

Figure 1 illustrates there was greater variance of mean correct responses among participants who had witnessed a crime and those who had not within the no weapon present condition. In the weapon present condition there was less variation of mean correct responses.

Analysis of other background factors yielded no significant results on the number of correct responses. The interaction between MPI and caffeinated beverage intake on correct responses yielded $F(1,100)= .941, p< .424$. The interaction between weapon focus and primary shopper status on correct responses was insignificant $F(1,100)= .1.482, p< .226$. Analysis of gender and MPI showed no significant interaction $F(1,100)= 2.397, p< .125$.

Discussion

This study investigated the effects of misleading postevent information and presence of a weapon on adult eyewitness memory. Previous study has documented the malleability of eyewitness memory (Allen, & Lindsay, 1998; Belli, 1989; Lindsay, 1990; Lindsay, & Johnson, 1989; Loftus, E., Miller, & Burns, 1978, Loftus, E., & Palmer, 1974; McCloskey, & Zaragoza, 1985; Zaragoza, & Lane, 1994). Both verbal and written exposure to MPI alters memory of a previously viewed event. Exposure to a weapon within the context of a crime can also alter memory of an event. The goal of this study was to examine the potential for interaction between
these effects by exposing participants to MPI after viewing slides that included a staged robbery using a broken bottle as a non-traditional weapon.

The main effects of MPI showed a statistically significant effect on participants’ ability to correctly remember events on the recognition test. The group exposed to verbal MPI scored 39% correctly while the group exposed to both verbal and written MPI scored correctly 36%. Previous studies have not compared these two means of exposure. However several studies have used verbal or written exposure.

In a study with written exposure alone, participants who viewed slides for three seconds before reading an MPI narrative scored correctly 55% (Loftus, E., Miller, & Burns, 1978). The present experiment showed a stronger misinformation effect despite the longer viewing time for slides. This more robust effect could be due to the different stimuli chosen, the difficulty of the recognition test or the strength of the MPI narrative.

Studies using verbal exposure to MPI have shown varying degrees of strength for the misinformation effect. In a study using verbally delivered misleading questions the false resupposition group had only 29% correct responses (Loftus, E., Miller, & Burns, 1978). Participants verbally exposed to MPI then tested a week later scored 42 % correct on items including misleading information (Lindsay, 1990). The strength of the misinformation effect in the present experiment fit between these two results and any differences are likely due to methodological differences. The present experiment used neither misleading questions nor time delay before testing.

When children were exposed to MPI verbally, then administered a test similar to that in this experiment, participants responded correctly to 46% of items including misinformation (Pezdeck & Roe, 1995). Differences in strength of the misinformation effect could be due to the
age of participants as the present experiment focused on an adult population.

Participants in another study using a modified recognition test after written exposure to MPI scored 37% correctly for misled items (McCloskey, & Zaragoza, 1985). The misinformation rates closely correspond to the present experiment due to similar methods and data collection.

When compared to these previous studies the *misinformation effect* for this experiment was quite robust. Participants had more time to view stimuli, and the suggestive effect of the MPI narrative led participants to incorporate significant amounts of misinformation into their responses to the recognition test.

The combined exposure to written and verbal MPI gives new insight into the misinformation effect. While both means of exposure are effective, the combined action of verbal and written MPI significantly increased the misinformation effect significantly more than verbal exposure alone. By providing two sources of information for simultaneous encoding, the suggested information becomes even stronger. This may be similar in nature to studies in which participants repeatedly exposure to MPI included more of the suggested misinformation in their responses. Researchers concluded that repeated exposure to misinformation facilitates creation of false memories (Zaragoza & Mitchell, 1996).

When compared with past studies the results of this experiment do not clarify what happens to the originally encoded correct memory. However this study strongly supports the suggestive power of misinformation in the formation of eyewitness memory. The strength of these memories may be due to the order of exposure (Loftus, E., 2005). Participants encoded the misinformation closer to the recognition test and may rely on the most recently encoded information due to ease of retrieval.
The lack of interaction between MPI and presence of a weapon suggests that these factors operate independently. The possibility remains that there may be an interaction between MPI and presence of a weapon in an experimental design that utilized a traditional weapon. The present study only examined one particular component of the weapon focus effect and probably cannot be generalized to other settings.

The body of research for these two factors builds towards a more compelling understanding of the nature of eyewitness memory. Both MPI and presence of a weapon produced significant effects. The powerful *misinformation effect* reinforced findings that suggestion can lead to false memories. Future research should further investigate how variation in presentation of MPI exposure can alter the strength of the effect. This knowledge can lead to better understanding of how false memory creation can be avoided in real world situations, especially within the criminal justice system. Additional study into the generalizability of the weapon focus effect and non-traditional weapons can lead to a better understanding of the nature of this effect. Currently very specific objects have elicited the *weapon focus effect* but further study may uncover a better understanding of which items generalize to the weapon focus effect and why. Future research could also look into factors such as gender and first language spoken. The present experiment did not focus on these factors but more study is merited based on the significant results found. The information derived from previous research on eyewitness memory provides a great starting point, but there is much to be understood about both of these effects. The proper functioning of our criminal justice system and the lives of innocent defendants require a better understanding of the factors that alter eyewitness memory.
References


Appendix A: Stimuli
Appendix B: MPI narrative

We just examined 19 slides showing a grocery store shopping experience. Here is a review of some of the items viewed.

The customer parked his orange SUV next to a tree.

A table with 4 chairs sat outside the store. Behind the table was a bike rack holding 2 bicycles.

Pumpkins displayed outside the store were orange, white and yellow.

There were 3 shelves of Doritos.

Bags of hanging candy included Lifesavers, Red Vines, Jolly Ranchers and Swedish Fish.

On the soda aisle, the Tropicana lemonade came in 2 varieties.

The laundry display held bottles of Clorox, Tide, All and Cheer.

In the slide showing yogurt, 2 shelves had single serving sizes.

The first fruit table had a display with bagged apples, oranges, lemons and limes.

The second fruit table showed pineapples with celery in the background.

The third fruit table showed apples on sale for $1.79 per pound.

The fourth fruit table showed watermelons on the right side of the slide and a table of tomatoes right behind them.

Hanging in front of chocolate candies were toy tennis, soccer and basketballs.

The next slide showed Corn Flakes with a flag on the front and Treetop apple juice.

The Green Giant canned corn was next to canned chilli.

Lagunitas IPA sat between Samuel Adams light and Sierra Nevada Pale Ale.
The groceries on the belt included 2 apples, Odwalla bars, ice cream bars and a 6 pack of beer.

The customer in line had on a red shirt with black writing. His purchases were bagged in 2 paper bags.

The cashier wore dangling red earrings.
Appendix C: Background Questionnaire

Background Questionnaire:

Please answer all questions. Your responses are anonymous.

Gender_________________
Age_______________
Occupation______________
Education level_______________
Is English your first language?_____________________
Have you ever witnessed a crime?_____________________
How many hours did you sleep last night?______________
How many caffeinated beverages have you consumed today?______________
Are you the primary shopper in your household?___________________
Appendix D: Recognition Test

Directions

Please circle the best answer to the following questions; only circle one answer per question. For questions that have a blank line, please write in your answer.

The following questions relate to the man standing first at the checkout line.

1.) What color was the man’s shirt?  a. black  b. blue  c. grey  d. red
2.) What was the color of the man’s hair?  a. brown  b. red  c. black  d. grey
3.) What was the man’s ethnic background?
   a. African American  b. Asian  c. Caucasian  d. Hispanic  e. Other
4.) What was the man’s approximate height?  a. short  b. average  c. tall
5.) What type of bags were the groceries in?  a. plastic  b. paper  c. both
6.) Did the man have any facial hair?  a. yes  b. no
7.) Did the man have any visible tattoos?  a. yes  b. no
8.) What kind of pants was the man wearing?
   a. khakis  b. jeans  c. sweat pants  d. slacks
9.) Did the man have any piercings?  a. yes  b. no
10.) What was the color of the pants the man was wearing?
    a. black  b. white  c. blue  d. brown
11.) What color was the writing on the man’s shirt?
    a. grey  b. blue  c. white  d. black
12.) Was the man holding something in his left hand? If yes, please write in the name of the object.

__________________________________
13.) Was the man holding something in his right hand? If yes, please write in the name of the object.

_________________

14.) Did the man wear anything on his left hand or wrist?  a. yes  b. no

15.) Did the man wear anything on his right hand or wrist?  a. yes  b. no

The following questions relate to other details in the slide show.

16.) What type of vehicle was parked in front of the tree?
   a. SUV  b. truck  c. sedan  d. hatchback

17.) A table with 4 chairs sat outside the store. Behind the table was a bike rack holding how many bicycles?

18.) Which type of candy was **NOT** visible in the slide of hanging bags of candy?

19.) Which brand of laundry detergent was **NOT** visible in the laundry display?

20.) The slide showing yogurt had how many shelves with single serving containers?

21.) The fruit display with watermelons was on which side of the slide?
   a. left  b. right

22.) What color of shirt did the cashier wear?
   a. grey  b. black  c. green  d. khaki

23.) In the slide with the boxes of Corn Flakes, bottles of chocolate syrup and bottles of apple juice, what was the brand of apple juice?
a. Treetop  b. Mott’s  c. Welch’s  d. Minute Maid

24.) The groceries on the conveyor belt included Odwalla bars, ice cream bars, a 6-pack of beer and how many apples?

25.) How many shelves had Doritos?
   a. one  b. two  c. three  d. four

26.) What color were the dangling earrings the cashier wore?
   a. purple  b. red  c. gold  d. silver

27.) Which type of beer sat next to Lagunitas IPA on the beer aisle?
   a. Sierra Nevada Anniversary Ale  b. Coors Light
   c. Sierra Nevada Pale Ale  d. Fat Tire

28.) What sat above the Green Giant canned corn?
   a. chili  b. asparagus spears  c. yams  d. sweet peas

29) What vegetable sat behind the pineapple?
   a. potatoes  b. corn  c. celery  d. lettuce

30.) What color of pumpkin was not shown outside the store?
   a. orange  b. white  c. yellow  d. beige