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## The Role of Attention and Memory in Prospective Person Memory

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The Role of Attention and Memory in Prospective Person Memory

A dissertation submitted in partial fulfillment  
of the requirements for the degree of  
Doctor of Philosophy in Psychology

by

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## **Abstract**

I examined the role of memory and attention in prospective person memory. Prospective person memory involves being on the lookout for a person with the goal of completing some task (i.e., contacting the authorities) upon encountering the person. Success at prospective person memory tasks in lab and field based studies is rather low (i.e., less than 10% of people report encountering the person). In the current study the prospective person memory task involved a simulated search for a missing person. I manipulated attention to the missing person and strategic monitoring, which involves being in retrieval mode and searching for cues. Participants saw a mock missing person alert. Half of participants saw an alert (i.e., target alert) that featured a photo of a confederate that they would encounter later and the other half saw an alert that featured a photo of a description-matched (to the confederate) foil to control for guessing. A short time after seeing the alert participants encountered the confederate during a scavenger hunt that was staged as a separate experiment. If participants reported seeing the confederate they won a portion of a cash prize. I manipulated attention by having some participants interact with the confederate. I manipulated strategic monitoring by giving half of participants a reminder to search for the missing person while they were in the vicinity of the confederate. Participants who strategically monitored the environment were more likely to make a sighting than participants who were not instructed to strategically monitor. In addition, when participants were not instructed to strategically monitor those who had their attention drawn to the confederate were more likely to make a sighting than those who did not. Finally, participants who saw the target alert were more likely to make a sighting than participants who saw the foil alert.

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## Introduction

In 2005, 8-year-old Shasta Groene went missing from her home in Idaho (Harden, 2005). Her disappearance was widely publicized, including flyers and billboards placed around the area that she lived (Geranios, 2005). Geranios reported that Shasta's captor took her to a Denny's restaurant several weeks after her disappearance. It was at this Denny's that a waitress noticed Shasta, ultimately leading to her recovery. The waitress, Amber Deahn, later reported that "it clicked in my brain that she looks familiar" because she had previously seen Shasta's photo displayed in the media. More recently, in September of 2016, a massive search, including the release of an alert via New York City's emergency notification system, was under way for a man, named Ahmad Kahn Rahami, wanted for questioning in relation to the New York City and New Jersey bombings (Santora, Rashbaum, Baker, & Goldman, 2016). Santora and colleagues reported that a New Jersey bar owner, who had seen the coverage, came in to work one day and saw a man, who he initially thought was drunk, sleeping in the doorway of the bar. Eventually the bar owner recognized the man as the man whom he had seen in the wanted alerts and reported the sighting to police. The bar owner's sighting led to the man's eventual arrest.

Both of the instances described above are real-life cases of successful prospective person memory. *Prospective person memory* is a specific type of event-based prospective memory. Event-based prospective memory is remembering to perform some action in the future when a particular cue is encountered in the environment (Einstein, Holland, McDaniel, & Guynn, 1992; Einstein & McDaniel, 1990; Marsh, Cook, & Hicks, 2006; Maylor, 1996, 1998; McDaniel, Robinson-Riegler, & Einstein, 1998; Smith, 2003). Laboratory event based prospective memory tasks often involve presenting participants with a small set of target words (e.g., elephant, shoe, chair) with the instructions to press a particular key (e.g., press the ~ key) on a keyboard if one

encounters any of those words in a future task. Participants then engage in an attention-demanding ongoing task such as a lexical decision task. Typically, a large number of words are presented and the target words occur infrequently. Prospective memory performance is measured by the percentage of times the target word is correctly responded to. Prospective memory tasks require participants to delay an intention until the enabling conditions of the intention are present, retrieve the intention at the appropriate time, and then act on that intention.

In prospective person memory a person is on the lookout for another person in order to perform some behavior upon encountering the person (Lampinen, Arnal, & Hicks, 2009; Lampinen & Moore, 2016a). The task structure is similar to a standard event-based prospective memory task. The to-be-identified target is a particular person. The delayed intention typically involves alerting authorities. This task is embedded in simulated daily life activities. Research on prospective person memory has focused on scenarios in which a person is on the lookout for someone who is missing or wanted by the authorities, with the goal being to report to the authorities if this person is located.

Prospective person memory research has focused on understanding how people search for and identify missing or wanted persons because this is a large societal issue. In the United States in 2016 over 500 thousand people were reported missing (NCIC, 2016). At the end of 2016, there were approximately 88,000 active missing persons investigations in the United States (NCIC, 2016). Statistics are not kept on the number of wanted persons in the United States; however, the United States Department of Justice webpage currently lists approximately 268 fugitives wanted by the Federal Bureau of Investigation (DOJ's Identify Our Most Wanted Fugitives, 2017). The FBI page provides an indication that there are at least hundreds of people wanted by the FBI alone. Authorities and missing persons organizations often release



photographs of missing or wanted persons to the public to have citizens help search for them (Pashley, Enhus, & Leys, 2010). Examples of these campaigns include AMBER alerts (Gier, Kreiner, & Hundell, 2012), missing persons posters, missing pictures on milk cartons, and the FBI's most wanted list (FBI's Ten Most Wanted, 2017). According to NCEMEC's (2014) annual report (the most recent report where these statistics were available) in 52 cases of the 186 AMBER alerts issued in 2014 (27.96%), the child was recovered as a direct consequence of the AMBER Alert being issued. Of the recoveries, 11 (21%) of the resolved cases were due to an individual or member of law enforcement recognizing the child or the abductor. In addition, the FBI reports that 160 of the 482 "top ten" fugitives since the list's inception, or approximately 33%, who have been apprehended or located were found as a result of citizen cooperation, with some of these instances being due to prospective person memory (FBI's Ten Most Wanted Fugitives FAQ, 2017).

Prospective person memory has been studied using both field- and lab-based paradigms (Lampinen, Curry, & Erickson, 2015; Lampinen, Curry, Moore, & Erickson, under review; Lampinen & Moore, 2016b; Lampinen & Sweeney, 2014; Moore, Lampinen & Provenzano, 2016; Moore, Provenzano, & Lampinen, under review). Field-based paradigms involve an in-lab component to expose the participant to the missing or wanted person's alert and a field component wherein the participant is asked to be on the lookout for someone. The person the participant is asked to be on the lookout for is a confederate working for the researchers. In order to have participants take the alert seriously they are told the goal of the study is to assess the participant's media perceptions. In the lab, participants watch and rate a couple of news media clips including one mock missing or wanted person alert. After the participant views the mock alert they are debriefed and told that the person featured in the alert is not really missing or

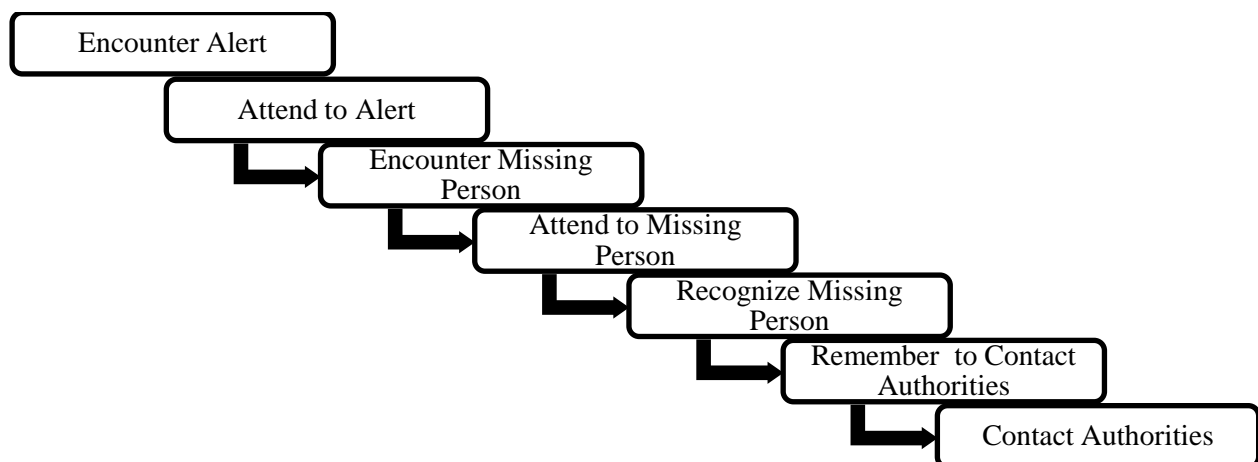
wanted but that if the participant encounters the person featured in the alert and report it that they could win a substantial amount of prize money (e.g., \$200). The confederate is then located either in a nearby hallway or someplace the participants are likely to be in the near future (e.g., cafeteria, classroom, university gym) (Lampinen et al., 2015; Lampinen et al., 2016; Lampinen & Moore, 2016b; Moore et al., 2016). These studies elicit a range of sighting rates with 0% to ~20% of participants making a sighting. In general, sighting rates tend to be low. The higher sighting rates in the reported range tend to occur in studies where the confederate shows up in close proximity to the participant and close in time to when the participant encountered the alert (Lampinen et al., 2015; Lampinen et al. 2016; Lampinen & Moore, 2016b; Moore et al., 2016).

In-lab studies participants are asked to perform a prospective person memory task while simultaneously completing an ongoing task. The purpose of this design is to mimic performing a prospective memory task in real life. Typically a person forms an intention to perform a behavior when some event occurs and then goes on about their daily life, which includes doing various tasks, until the cue is encountered. For example, participants may be asked to be on the lookout for target individuals while performing a simulated grocery shopping task. In one study the ongoing task was to sort individuals into teams while keeping the teams matched on gender and fabricated abilities (Lampinen & Sweeney, 2014). In these tasks participants are instructed to press certain buttons to perform the ongoing task and to press the 'h' button for 'help' if they encountered one of the missing or wanted individuals. Sighting rates in in-lab tasks tend to be much higher than field tasks, but overall participants still tend to perform rather poorly at the in-lab prospective person memory tasks.

For successful prospective person memory to occur a number of events must occur (Figure 1) (Lampinen & Moore, 2016a). First, a person must encounter a missing or wanted

person's alert to be aware that someone is missing or wanted. Second, the person must pay attention to the alert to encode the missing person's face, details about their appearance, and details about their last known or suspected whereabouts. Third, the person must encounter the missing or wanted person. Fourth, the person must attend to the missing or wanted person. Fifth and sixth, the person must remember the missing or wanted person's face and the intention to contact the authorities upon encountering the missing or wanted person. The seventh step is completing the intended action by alerting the authorities to the missing or wanted person's whereabouts. These conditions illustrate the complexity of prospective person memory tasks and indicate several places where the person may fail at the prospective person memory task.

*Figure 1.* The Process of Prospective Person Memory.



A number of field-based studies have been conducted to understand what role the steps in this process play in the recovery of a missing or wanted person. In these studies, a number of these steps are manipulated or controlled to test what role each of them plays in recovering a missing or wanted person. In field-based paradigms, researchers typically control for (1) people encountering alerts by showing all participants the alert and (2) for attention to the alerts by

having people watch the alerts in a distraction-free environment. In addition, (2) researchers check that participants pay attention by asking simple questions about the alert after participants view the alert. Field studies ensure that (3) people encounter the missing person by placing the person in the participant's vicinity. Therefore, in field-based studies the following steps are uncontrolled: (4) attending to the missing person, (5) remembering the missing person's face, (6) remembering the intention to contact the authorities upon encountering the missing person, and (7) deciding to take action to report the suspected sighting. The (5) memory for the missing person's face is estimated by asking participants to pick the missing person out of a line-up 24+ hours after viewing the alert, and (6) memory for the intent to contact the authorities is estimated with memory-based questions. Participants are asked to report (7) suspected sightings via email to win a portion of a cash prize. In addition, a follow up survey assesses whether (7) participants thought that they encountered the missing person but decided not to report it. Attention and memory may both play a role in whether a participant successfully completes a prospective person memory task. The goal of the current study was to determine what role attention and memory play in successful prospective person memory. I consider what we already know about the role of attention and memory in prospective person memory in the following sections.

### **Visual Attention**

Our ability to monitor ongoing events in our environment is limited. This is documented by a few well-known errors in attention. One such error is called inattention blindness (Mack & Rock, 1998; Rock, Linnett, Grant, & Mack, 1992; Simons & Chabris, 1999). Inattention blindness occurs when a person fails to notice something in their environment despite having the ability to notice it. One common instance of inattention blindness is not being able to find a condiment in your fridge despite the fact that it is in plain sight. Recently Hyman, Sarb, and

Wise-Swanson (2014) conducted a field experiment in which they placed money on a tree on a university campus. They found that many passersby did not notice the money on the tree even though they were able to avoid running into said tree while walking. One reason for this may be that passersby were engrossed in using their cell phones. Relatedly, people may suffer from inattention blindness during prospective person memory tasks; people may be engaged in other tasks and therefore fail to notice the missing person in their environment. For example, Lampinen et al. (2015) had a 'wanted person' visit a campus cafeteria and pass out flyers to participants. Despite the fact that some participants took a flyer from the man, many participants did not notice that the man passing out flyers was the wanted person. If attention is a limited resource that people must devote to other tasks in their day-to-day life, searching for a missing person may not receive the attention it needs for a missing person to be noticed. Existing research on the role of attention in prospective memory sheds some light on the role of attention in prospective person memory. In the next section, I review the theories that explain attention allocation in event-based prospective memory performance.

### **Prospective Memory and Attention**

Several theories have been put forth about the role of attention in successful prospective memory. These theories range from positing that attention is not needed for prospective memory to attention is always needed for prospective memory. Each of these theories may shed light on when or whether each attention process occurs in prospective person memory tasks.

The Preparatory Attention Model (PAM) of prospective memory posits that a person must use attention and monitoring to perform an intended behavior at the appropriate time (Smith, 2003; Smith & Bayen, 2004). In contrast, the Reflexive Association Theory posits that some prospective memory tasks are performed spontaneously (McDaniel & Einstein, 2000). In

other words, the Reflexive Association Theory suggests that a person does not have to be actively looking and devoting attention to the search for prospective memory cues to have successful prospective memory. This theory suggests that if a person forms an association between the cue to perform a behavior and the intended behavior, then encountering the cue will bring to mind the associated intended behavior. For example, a person may form an intention to buy a birthday card for a friend but forget to do so until they pass the card aisle in the grocery store or see balloons (i.e., cues that bring the intention to mind). The Multi-Process Theory (Einstein & McDaniel, 2005) suggests that the processes suggested by PAM and Reflexive Association Theory are both accurate under specific circumstances. The theory posits that for automatic retrieval of an intention to occur one of the following conditions should be present: the cue and target are closely related, the cue is salient, or other tasks being performed direct focus to cues. In support of this, research has found that participants perform more quickly and accurately on prospective memory tasks when participant's attention is drawn to cues than when it is not (Einstein et al., 2005). According to the Multi-Process Theory, in other circumstances a person may need to use attention and monitoring to successfully complete a prospective memory task.

The most widely accepted and supported theory is the Multi-Process Theory, which posits that prospective memory requires attention be devoted specifically to searching for cues in some circumstances but does not require attention in other circumstances (Einstein & McDaniel, 2005). As the multi-process theory suggests, each of these processes occur under different circumstances in prospective memory tasks (McDaniel & Einstein, 2007).

What does the research on the role of attention in prospective memory indicate about the role of attention in prospective person memory? Prospective person memory tasks are more

difficult than most other prospective memory tasks. For example, in prospective person memory tasks the prospective memory cue is usually an unfamiliar face. People are not great at identifying unfamiliar faces (Klatzky & Forrest, 1984). If it is difficult to remember the cue, such as a face, when a person encounters the person it may reduce the chances that they spontaneously recognize them. In addition, the search space for a cue in a prospective person memory task is unconstrained. In comparison, in most prospective memory tasks the search for a cue is typically rather constrained in terms of space and time. These factors suggest that prospective person memory tasks will be more difficult than prospective memory tasks and thus that attention and monitoring resources are more likely necessary to complete a prospective person memory task; however, research is required to verify or disconfirm this idea.

### **Prospective Person Memory and Attention**

Existing research provides some guidance as to the role of attention in prospective person memory. Lampinen et al. (2009) conducted a study to examine how grocery shoppers attended to missing persons' posters placed in the grocery store and their views on missing persons. Grocery shoppers leaving the store were asked to complete a survey about missing children. They also took a recognition memory test to see if they could recognize the children featured in the missing posters. Almost all of the customers (80%) rated the issue of missing persons as 'very important' or 'important'. Despite this, the majority of customers reported that they did not look at the posters or they only looked at the posters very briefly.

In a follow-up study, missing children's posters were placed at the cash registers in grocery stores to try to increase shoppers' attention to the missing children's posters (Lampinen et al., 2009). The reported rate of looking at the posters increased from approximately 30% of people to 75% of people when posters were placed at the cash registers. Additionally, shopper's

performance on the recognition test increased to better than chance under these conditions.

Therefore, making materials more readily available to be attended to, especially when people are doing another task that requires little to no attention, may improve prospective person memory.

Relatedly, Lampinen, Peters, and Gier (2012) examined the effect of the number of posters viewed on people's attention to missing children's posters. Some shoppers reported that they did not look at missing children's posters because the number of posters presented was overwhelming (Lampinen et al., 2009). At the time, Walmart typically displayed 15 missing persons' posters at once. Participants saw 12 posters or 4 posters in the laboratory. Participants were asked to imagine that they were at a grocery store looking at a display of missing children posters. The experimenter measured the amount of time participants examined the posters and participants' memory for four of the posters. Participants in both conditions spent approximately 1 minute looking at all of the posters. Therefore, the participants in the 4 poster condition spent three times as long looking at each poster in comparison to the participants in the 12 poster condition. Participants in the 4 poster condition were also more accurate on the memory task than participants in the 12 poster condition.

These studies demonstrate how people allocate their attention to missing persons' alerts. If people do not attend to missing persons' alerts, they will not be aware that a person is missing or what the missing person looks like; therefore, they will not have a chance to succeed at recovering the missing person. In addition to attention to missing persons' alerts, attention to one's environment and the missing person also play a role in whether or not a missing person is recovered.

In one field-based study, Lampinen et al. (2015) controlled for or measured steps in the process of prospective person memory to determine the role of attention to the person. Attention



to the alert was controlled by showing participants a mock news story about a wanted man in a lab setting. Participants were debriefed and informed of the cash prize for sighting the wanted person. The researchers had previously obtained information about how often and when participants visited campus-dining halls. The ‘wanted’ person passed out flyers to students at the dining hall at a time when participants reported typically visiting the dining hall. The wanted person interacted with 112 participants. None of the participants reported sighting him. Despite this, many participants picked this man out of a lineup afterwards. This finding demonstrates that participants remembered the wanted man’s face but they did not notice him or recognize him in the dining hall. Therefore, attention to one’s environment and the missing or wanted person may be one reason why prospective person memory sighting rates are so low.

One reason people may fail to attend to a wanted or missing person in their environment is because they do not expect he or she will be present in their environment. In the dining hall study, participants’ responses to how likely they thought it was that they would encounter the wanted person were correlated with the extent that they were planning on looking for him. Expectations of encounter were correlated with actual looking behavior, as measured by a self-report follow-up survey.

Additionally, in a survey about people’s experiences with missing persons and missing persons’ alerts in the real world, 75% of participants indicated that it was ‘very unlikely’ that they would ever encounter a missing person (Moore & Lampinen, unpublished raw data). Most of the remaining participants indicated that it was ‘unlikely’. These estimates may be correct, but low expectations of encountering a missing person may be part of the reason people are unlikely to encounter a missing person. Specifically, expectations of encounter may influence how much attention a person pays to their environment, which will ultimately influence sighting rates.

In one field-based study participants were told that there was a 90% chance that they would encounter the wanted person (Lampinen et al., 2015). Using this paradigm there were 2 accurate sightings of 138 participants or 3% overall. In comparison, no participants identified the wanted man in an identical experiment wherein participants did not have any information about the chances of encountering the wanted person.

In a related study, expectations of encounter were manipulated by changing the number of missing persons' alerts viewed. Participants saw one missing person alert featuring one missing person or three missing persons' alerts, each featuring a different person each across the course of three days in the span of a week (i.e., Monday, Wednesday, and Friday) (Lampinen & Moore, 2016b). In the one-video condition and in the last day of the three-video condition, the missing person featured in the video was standing approximately 50 feet outside of the laboratory where the experiment took place. Participants who only saw one video reported more sightings of the missing person than participants who saw three videos over the course of a week, despite that both groups of participants had the same chance to encounter the missing person. In addition to this, participants who only saw one missing person video had a higher expectation of encountering the missing person than did participants who saw three videos.

Moore, Lampinen, and Provenzano (2016) manipulated expectations and attention via location-based information about the whereabouts of the missing person. Approximately half of participants were told that the missing person would be in the building they did the experiment in whereas the other half of participants were told she would be on campus. Approximately half of participants were told that the missing person would be around that day whereas the other half of participants were told she would be around that week. Location-based information affected accurate sightings and non-reported sightings such that participants who were told the missing

person would be in the building were more likely to make a sighting or a non-reported sighting than participants told she would be on campus. The relationship between location-based information and accurate sightings was serially mediated by participants' expectations of encountering the missing person, intention to look for the missing person, and actual looking for the missing person.

Existing research suggests a role for attention in prospective person memory. While researchers have examined the role of attention in prospective person memory they have not directly manipulated attention during a prospective person memory task. In the current study, I manipulated attention.

## **Memory**

In addition to paying attention to their environment, the person must remember the missing person's face, to look for the missing person, and the intention to contact the authorities upon encountering the missing person to be successful at prospective person memory. The large body of literature on face recognition suggests that people are often poor at recognizing faces of strangers who have been seen on only once (for a review see Hancock, Bruce, & Burton, 2000) although research also shows that there are individual differences in the ability to recognize unfamiliar faces (e.g., Bruce et al., 1999). In addition, people are sometimes prone to forgetting their intention to perform some behavior upon encountering a cue. In the current research, I reminded participants of their intention to search for the missing person and encouraged them to do so. This process of being in a state to recall one's intention and searching for cues to fulfill said intention has been called strategic monitoring (Guynn, 2003). This manipulation allowed me to estimate the role of face recognition in prospective person memory.

## Face Recognition

Even when a person attends to their environment or the missing person specifically, it is possible that they will fail to recognize the person as the missing person. Research has shown that simply identifying matching pictures of unfamiliar faces is a difficult task for people (Burton, White, & McNeill, 2010). For example, Bruce et al. (1999) found that even with high quality images, accuracy at matching a photo of a target face with another, in a set of 10 possible options including a not present option, was only at approximately 70%. This means that 30% of the time participants were not able to match two photographs of the same face out of a choice of 10 faces. Eliminating the not present option only increased accuracy from 70% to 80% accuracy (Bruce, Henderson, Newman, & Burton, 2001). Narrowing the face-matching task down to just pairs of faces does not seem to aid accuracy at all, with errors rates still at 10-25% (Clutterbuck & Johnston, 2002; Megreya & Burton, 2006, 2007). In prospective person memory tasks, participants are doing a task that may be more difficult than matching two photos of the same individual. In prospective person memory tasks, participants must match the representation of the face in their memory to a real life individual. In the real world it is possible that the participant may have access to a photo and thus may be attempting to match the face in the photo to a face in real life. In this case, people are attempting to match a photo to a live person. People are no better at this task than they are at matching unfamiliar faces in photographs (Davis & Valentine, 2009; Megreya & Burton, 2008). However, this research has found a variety of error rates. For example, in one study cashiers were asked to match photos on credit cards to their users (Kemp, Towell, & Pike, 1997). Cashiers accepted almost half of the cards featuring pictures that did not match their users. In another study, researchers tested passport officers, who have a lot of experience matching id-photos to faces, and found a 14% acceptance rate of passports with

photos that did not match the individual holding them (White, Kemp, Jenkins, Matheson, & Burton, 2014). Importantly, Burton, White, and McNeill (2010) found that unfamiliar face matching is correlated with recognition memory for faces. This finding indicates that research on the accuracy of face matching provides some idea of how well people are able to recognize faces.

### **Retrieval Mode**

Retrieval mode is a term used to describe the mental state a person is in while they are thinking back to and explicitly trying to retrieve some previously encountered information (Karpicke & Zaromb; 2010; Tulving, 2002). In terms of prospective memory, retrieval mode has been defined as a state in which a person treats any incoming stimuli as potential cues to perform the intended behavior (Einstein & McDaniel, 2005; Guynn, 2003). During a prospective memory task one possibility is that participants will maintain the goal of completing the behavior in working memory and will consider stimuli in their environment as potential cues. In this case the participant would place themselves in a retrieval mode. Existing research has found evidence for a two-process model of strategic monitoring in prospective memory that involves both checking for prospective memory cues and being in a retrieval mode (Guynn, 2003). When a participant forms an intention the intention is thought to remain represented in the participant's mind until their goal is complete (Goschke & Kuhl, 1993; 1996). If this is true, retrieval mode would persist until the participant performs the intended behavior. Alternatively, a participant may not prioritize or may forget the prospective memory task and thus not be in a retrieval mode. Researchers have found that successful prospective memory can occur even when a participant is not in retrieval mode under certain conditions (see discussion of multi-process theory above).

When it comes to searching for a missing person it is unclear whether searchers will maintain a retrieval mode until they encounter the missing person. I was interested in what percentage of participants in retrieval mode would report seeing the missing person. Presumably anyone who remembers the missing person's face and the intention to contact the authorities would recognize the missing person after being placed in retrieval mode and having their attention directed to the missing person.

### **Remaining Questions**

Existing research primarily elucidates the role of attention in prospective person memory. However, one limitation of existing field-based research is that the role of attention and memory may not be fully parsed given the post-hoc measurement of memory. The role of memory is estimated via line-up recognition 24 or more hours later but not all participants are able to accurately identify the missing person out of a line-up. This indicates that some participants have forgotten the missing person's face, thereby limiting the ability to attribute performance on this task to attention alone. Relatedly, identifying someone out of a line-up is a different task than identifying a person in the real world. In order to understand the role of both attention and memory in the process of prospective person memory, I isolated each of these factors. In the current study, I aimed to separate the roles of attention and memory at the time of encountering the missing or wanted person on prospective person memory. The current study was designed to determine the role attention plays in sighting rates when participants who remember the missing person have a chance to recognize her face. In addition, the current study will determine whether attention to the missing person outside of the context of the missing person search (i.e., spontaneous retrieval) is sufficient to induce recall of the intent to contact the authorities upon encountering the missing person or if the participant needs to be actively looking for the missing

person and in a retrieval mode to notice the missing person. Finally, the current study sought to determine whether spontaneous retrieval could occur or if resources were necessary for a prospective memory task when the ongoing task (i.e., scavenger hunt) was unrelated to the prospective memory task. In most studies, the prospective memory task is highly related (i.e., look for a word) to the ongoing task (i.e., make judgments about words). In prospective person memory, people may be going about their daily lives doing tasks that have little to no relation to the prospective person memory task; thus it is important to study prospective person memory under these conditions.

### **The Current Study**

In the current study, I was interested in determining the effects of attention and memory on successful prospective person memory in as naturalistic of a context as possible. Half of participants saw a missing persons alert that featured the confederate (i.e., target alert) and half of the participants saw an alert that featured a foil who matched the description and appearance of the confederate (i.e., foil alert). All participants had a chance to encounter the confederate after viewing an alert during a separate staged scavenger hunt experiment. Therefore, for half of participants the confederate served as a target individual (to-be-identified) and for half of the participants the confederate served as a foil. I manipulated whether participants had a chance to encounter the person featured in their alert. Specifically, some participants encountered the person that was featured in the alert they viewed and others encountered a description and appearance matched foil. I did this to control for sightings that occurred for reasons other than recognizing the person featured in the alert. I manipulated participant's attention to the confederate and retrieval mode while they were in the vicinity of the confederate. I manipulated attention by having half of participants interact with the confederate while the other half of

participants did not. In addition, half of participants were reminded to and asked to search for the missing person while the confederate was in their vicinity (i.e., strategic monitoring) and half of participants were not.

Hypothesis One: Reminders will increase sightings. I expect that participants who received reminders to strategically monitor would be more likely to make an accurate sighting than participants who did not receive a reminder. Previous research has found that people who successfully complete prospective memory tasks strategically monitor the environment (Guynn, 2003). In addition, prospective person memory research has found that as reported looking behavior increases so do the chances that a participant will make an accurate sighting (Moore et al., 2016). This indicates that searching plays a role in the completion of a prospective person memory task. Hypothesis Two: I expected the effect of reminder would enter into an interaction with attention. Specifically, attention will increase sightings when a reminder has not been issued. To the extent that participants follow the instructions in the reminder condition, I would expect an interaction between the attention and strategic monitoring conditions. I would expect for participants who did not receive a reminder that sighting rates would be higher when the participant attended to the missing person than when they did not (i.e. natural condition). If participants received a reminder to scan their environment for the missing person, I would expect sightings rates to be the same in the natural + reminder condition and interact + reminder condition. The reminder should be sufficient to allow participants who remember the missing person to notice her. If participants followed the instructions provided in the reminder they would attend to the confederate. Hypothesis Three: Participants who saw the confederate in the alert (i.e., target alert) would be more likely to sight the confederate than participants who saw a foil in the alert (i.e., foil alert). Given that participants remembered the confederate or foil's face



from the alert I expected at least some of the participants to be able to distinguish between the confederate and the foil even in the most suggestive of circumstances (which were not used in the current study).

Alternative Hypothesis 2: It is possible that participants did not follow the instructions in the reminder condition or that even after scanning their environment the participant was not confident in their sighting of the missing person. If this is the case then I would expect main effects of both strategic monitoring and attention, with reminder having a larger effect on sightings, such that the rate of sightings from highest to lowest would be: the interact + reminder condition, the natural + reminder condition, the interact + no reminder condition, and the natural + no reminder condition. The magnitude of the difference in sighting rates between conditions will depend on a) the possibility of spontaneous retrieval to occur to allow for a sighting and b) how many participants use resources to search for the missing person when they have not been explicitly instructed to do so. I did not expect that many participants would engage in the use of resources without being instructed to do so because participants chance to encounter the missing person occurred while they were completing a different resource demanding study.

## **Method**

### **Participants**

I conducted an a priori power analysis using GPower 3.1 (Faul, Erdfelder, Lang & Buchner, 2007; Faul, Erdfelder, Buchner, & Lang, 2009). The effect size used was taken from Lampinen and Moore (2016b) who tested the effect of multiple alerts on prospective person memory ( $w = .1$ ). The power analysis suggested a sample size of 857 people. In previous studies I collected 100 participants per cell. From this I derived the goal sample size of 800 participants.

Nine hundred and forty one college undergraduates participated in the current study; however, several participants' data were excluded from analyses for various reasons. The exclusion criteria regarding violations of manipulation checks were set before the study began. Two participants did not complete the second part of the study. Two participants participated twice-their second sets of data points were excluded. One hundred and one participants failed the attention variable manipulation check (74 interacted with the confederate when they were in the natural condition; 27 participants did not interact with the confederate when they were supposed to). In addition, research assistants failed to record whether 15 participants interacted with the confederate or not. Thirty one participants failed the reminder manipulation check (27 were given the reminder at the wrong time and 4 were not given a reminder when they should have received one). In addition, research assistants failed to record this data for 3 participants. Twenty participants knew the confederate in real life. One participant saw the wrong missing person's alert and one participant reported not having seen any alert. This led to the exclusion of 156 participants. Some of these participants were excluded due to more than one violation and thus the number of participants excluded is less than the number of exclusionary criteria that were violated. Specifically, 3 participants had three violations of different exclusionary criteria and 12 participants had two violations of different exclusionary criteria. The total sample size was 785 participants. I initially conducted the logistic regressions on the sighting variables excluding all of the above participants. However, I also conducted the logistic regressions on the sighting variables afterwards including participants who received reminders at the wrong time and did not interact with the confederate when they were assigned to the interact condition. I then conducted the logistic regressions on the sighting variables including all of the participants who violated the manipulation checks for attention and reminders. The pattern of results was the exact same for all

three sets of analyses. I conducted all three sets of analyses because participants were differentially excluded from certain conditions (e.g., many more participants were excluded from the reminder conditions than the no reminder conditions).

## **Design**

The study was a 2 (attention: natural, interact (drawn)) x 2 (strategic monitoring: no reminder or reminder) x 2 (alert: target or foil) between subjects design. The levels of the independent variables were randomly assigned to participants. In addition, two different confederates acted as missing persons. Participants were assigned a target or foil according to the time of their scheduled session. This manipulation was not intended as an independent variable but rather was necessary in terms of (wo)man power to complete the study in the available time frame. The target or foil that the participant was assigned to did not affect whether they reported a sighting of the target or the overall sighting rates (non-reported and reported sightings).

## **Materials**

**Videos.** Four missing persons' alert videos were constructed. The videos differed in the photographs that they featured. Each video featured one photograph of a woman. Each video featured a photograph of a different woman. Two of the videos featured the research assistants who acted as confederates for the study. The other two videos each featured a description-matched foil for the confederate. The people whose photos were featured in the foil alerts were former research assistants who had graduated. I used photographs of alumni to ensure that participants would not encounter the foil. Each video featured a written description of the woman whose photograph was featured in the video. Other than this the videos were identical. The video consisted of professional voice-overs describing the circumstances under which a person went missing, information about the person including their last known whereabouts, and information

about their appearance were included. The missing person was stated to have been missing from the local town. She was stated to have worked at a pizza chain restaurant in the town but that her roommates had last seen her after she left for work and she never returned home. The voice over stated that anyone who encountered the missing person should contact local police. All of the videos consisted of a news-like background with a photo of the ‘missing person’ featured. The words ‘missing person’ appeared across the bottom of the screen. Text detailing the appearance of the ‘missing person’ was shown on the screen towards the end of the video. The video was approximately 25 seconds in duration and the ‘missing person’s’ photo was displayed for approximately 20 seconds.

**In-Lab Survey.** A survey was constructed consisting of videos and questions about the videos (see Appendix B). The survey was constructed and administered on Qualtrics and the videos were embedded in the survey. At the beginning of the survey I provided information about when the videos supposedly originally aired. The first video embedded in the survey was a university student news story about on-campus coffee shops releasing fall flavored beverages, like pumpkin spice lattes, earlier in the season than usual. The video was approximately 44 seconds in duration. After the first video were questions asking for a summary of the main points of the video and when the video first aired. Then, questions about how important the information in the video was, how concerning the news story was, the degree to which the participant experienced various emotions while watching the news clip, and how well the journalist presented the news story appeared. After this, one of two (either the target or foil alert matched according to the confederate on schedule for that session) randomly assigned professional quality mock missing person’s alerts was displayed. The same questions that followed the news story were presented after the missing person’s alert. Next, the survey displayed text that said that the

missing person featured in the alert was not actually missing but that if the participant encountered the person and reported the encounter to [missing@xxx.edu](mailto:missing@xxx.edu) they would win a portion of a cash prize. Following this were a series of questions designed to ensure that the participant understood that the person was not actually missing, that they knew how to contact the experimenters in the event of a sighting, and that they knew they could win a cash prize if they encountered the missing person and reported a sighting. The survey concluded with questions asking about the participant's expectations of encountering the missing person and intentions to look for the missing person.

**Confederates.** Two research assistants served as confederates in the scavenger hunt portion of the experiment. Both research assistants were women in their early twenties. These women's photographs appeared in one of the target alerts.

**Scavenger Hunt Form.** I constructed a form that the research assistants who ran the scavenger hunt portion of the study filled out (see Appendix C). The form had a place to indicate the number of people passed during the scavenger hunt and their gender. The form had a place to indicate whether the research assistant and participant passed anyone who looked like the confederate and how many people, if any, the participant interacted with during the scavenger hunt and their gender. The form had a place to indicate whether participants in the reminder condition received the reminder before they encountered the confederate, and whether they scanned the environment upon receiving said reminder. The form had a space for the research assistant to detail anything else important or out of the ordinary during the session. The form contained a number of questions pertaining to the scavenger hunt including whether the participant recorded the word from each flyer, if they completed the scavenger hunt, if they put together the sentence, and whether the participant remembered the color of the flyers.

**Follow-Up Survey.** A follow-up survey was constructed to assess whether participants encountered anyone they thought was the missing person and how hard they looked for the missing person (see Appendix D). Participants were asked how much they looked for the missing person on a 4 point scale (i.e., 1 ‘not at all’ to 4 ‘very much so’). They were also asked whether they thought they saw the missing person at any point. If the participant said ‘yes’ to this question, a series of follow-up questions about the sighting were asked. The questions asked for a description of the sighted person and the sighted person’s clothing. Additionally, there were questions about where the participant spotted the person, when the participant spotted the person, if there was anything that helped the participant spot the individual, how confident the participant was that the person they saw was the missing person, whether anyone told them the location of the missing person, and whether they told anyone the location of the missing person. The survey contained questions about the missing person’s alert to test participants’ memory of the alert. Following this, a six person target-present simultaneous lineup was presented with instructions indicating that the participant should select the missing person from the set of faces shown. There were two different line-ups one for each set of confederates/foils. Both the confederate and their description-matched foil were present in the line-up. Therefore, there was a correct answer for all participants. Next, a series of questions appeared that assessed how well the person remembered the mock missing person alert, the email address to report sightings to, and whether they were at all suspicious about the scavenger hunt. If the participant indicated that they thought the two studies were connected in some way or if they indicated that they were suspicious they were asked to answer an open-ended question explaining a) how they thought the two studies were connected and/or b) what made them suspicious.

**Sighting Survey.** A sighting survey was constructed using Qualtrics (Appendix E). This survey consisted of the same questions that participants answered on the follow-up survey if they indicated that they saw the missing person.

### **Procedure**

Participants completed the first portion of the study on a computer in a laboratory. Participants were told that the experiment was designed to examine media perceptions. Participants were told that I was allowing another professor to collect data for a separate experiment (the second portion of the study) because my experiment (the first portion of the study) was short in duration. Experimenters introduced participants to the task (i.e., watching videos and answering questions about them). Participants then completed the in-lab survey. At the conclusion of the in-lab survey, the experimenter reminded the participant to contact the specified email address if they encountered the missing person for a chance to win a cash prize.

Next, the experimenter told the participant that this portion of the experiment was over and that it was now time to complete the other experiment. At this time the participant was escorted by the experimenter into another room with a different experimenter. This was done to increase believability in the second part of the experiment being a different experiment. In addition, participants signed a separate consent form that had another principal investigator's name listed on the form before completing the second portion of the study. The second experimenter explained to the participant that this study was designed to assess problem solving and visual spatial skills. The experimenter read instructions about how to complete the scavenger hunt to the participant. The experimenter told the participant that they would complete a scavenger hunt-like task that would involve finding flyers using a series of hints about the location of the flyers in the psychology building and recording the word printed on each of these

flyers to form a sentence. The experimenter informed the participant that they needed an unobstructed view of the flyers to complete the task and so if anyone was blocking a flyer the participant should politely ask the person(s) to move out of the way of the flyers.

The experimenter accompanied the participant throughout the task to ensure the participant completed the task and to monitor what occurred during the task. The experimenter recorded how many people they passed by or interacted with during the task on the scavenger hunt survey. The actual goal of the second study was to give participants a chance to encounter the confederate from the target alert in the first part of the study. The confederate was nearby or blocking one of the flyers the participant needed to view. If the participant was in the interact condition, the confederate was stationed in front of the flyer and the participant had to interact with the confederate (i.e., ask them to move from blocking the flyer), thus attracting their attention to the confederate, to view the flyer. In the natural condition, the confederate sat near the flyer but did not obstruct the view of the flyer. The experimenter recorded whether the participant interacted with the confederate as a manipulation check.

Participants in the reminder condition received a reminder from the experimenter when the participant was in the vicinity of the confederate. The reminder involved the experimenter telling the participant that the first experimenter, the one who ran the media perceptions study texted them saying she/he forgot to tell the participant that they should periodically scan their environment for the missing person and that they should do so now for practice. Issuing the reminder in this way ensured that I had control over when the reminder was issued and that the participant received a reminder without blowing the cover story of the scavenger hunt being a separate experiment. The experimenter recorded whether or not the participant received the



reminder while in the vicinity of the confederate and whether the participant appeared to scan the environment after the reminder was issued.

All participants had a chance to encounter the confederate during the experiment. For half of participants the confederate was the person featured in the target alert. For the remainder of participants the confederate was a description-and-appearance-matched foil for the person they saw in the alert (i.e., foil alert). Some participants were assigned to encounter a foil alert to estimate whether participants reported the confederate as the missing person for a reason other than remembering her face. Any sightings of the confederate by participants who saw the foil alert would occur due to reasons other than accurately recognizing the confederate as the person featured in the alert. At the end of the second study the experimenter ensured that the participant had completed the task (i.e., asked the participant to report the sentence that the words on the flyers formed) and asked the participant whether he or she remembered the color of the flyers.

Participants received a follow-up survey to complete online, outside of the lab, approximately 24 hours after their in-lab session that asked each participant if they encountered the missing person. Participants were asked whether they were on the lookout for the missing person and whether they were suspicious of the scavenger hunt study.

I checked with each confederate weekly about sightings made outside of the scavenger hunt task to make sure that recent whereabouts were reported as accurately as possible.

## **Results**

### **Memory for the Alert and Contest Rules**

I estimated the percentage of participants who recalled that the news alert was about a missing person and recalled when the missing person's alert aired. A large majority of participants (97.8%, N=768) correctly indicated that the alert was about a missing person. The

majority of participants (78.1%, N=613) correctly indicated that the missing person alert aired one to a couple of days before their session.

**Emotional Reaction to the Videos.** To the extent that participants took the missing persons alert seriously, they should consider it to be more important and more emotionally disturbing than the video about local pumpkin spice lattes. To test this proposition, I conducted a series of paired samples t-tests to compare the emotional reactions to the news video to the emotional reactions to the missing person’s alert (Table 1). I used Bonferroni corrections to determine the significance level of these analyses (i.e., 11 analyses,  $.05/11=.005$ ). The significance value was set at  $\alpha = .005$ . All of the tests were significant at  $p < .001$ . People found the missing person’s alert to contain more important information and to be more concerning than the pumpkin spice video. Participants were more anxious, frightened, angry, surprised, interested, disgusted, sad, hopeful, and less happy in response to the missing person’s alert in comparison with the pumpkin spice video.

*Table 1.* T-tests on Emotional Reaction to the Videos

	Pumpkin Spice Video Mean (SD)	Missing Alert Mean (SD)	t	p
Importance of Information*	2.21 (1.03)	5.77 (.64)	84.88	<0.001
Concern*	1.6 (.98)	5.06 (.89)	75.36	<0.001
Anxious	1.06 (.29)	2.12 (.86)	33.14	<0.001
Happy	1.94 (.81)	1.02 (.15)	31.34	<0.001
Frightened	1.01 (.14)	2.06 (.86)	33.74	<0.001
Angry	1.03 (.18)	1.36 (.67)	13.61	<0.001
Surprised	1.62 (.75)	1.98 (.73)	9.56	<0.001
Interested	1.93 (.73)	2.80 (.83)	23.68	<0.001
Disgusted	1.05 (.30)	1.32 (.66)	10.64	<0.001
Sad	1.02 (.66)	2.44 (.95)	41.25	<0.001
Hopeful	1.24 (.52)	2.04 (.98)	20.88	<0.001

\*6 point scale

**Believability of the Mock Missing News Alert.** A large minority of participants reported that they believed the news stories were real news stories (44.3%) and that the person in the video was actually missing (47.2%). A majority of the participants (71%) reported believing that the person was in at least a small amount of danger while watching the video. These estimates may have been affected by hindsight bias as we asked participants to respond to these questions after they were debriefed.

**Manipulation Checks.** The majority of participants (98.6%) correctly reported the email address we asked them to contact us at to report encountering the missing person at the end of the first phase of the experiment.

**People Passed and Interacted With.** The majority of participants passed 5 or fewer women ( $N = 570$ ), 5 or fewer men ( $N = 668$ ), interacted with no men ( $N = 720$ ) or women ( $N = 698$ ; not including the confederate). On average, participants passed 3.09 men ( $SD = 3.12$ ; range = 0-28), 4.53 women ( $SD = 4.58$ , range = 0-34), did not interact with any men ( $M = .10$ ,  $SD = .41$ , range = 0-7) or women ( $M = .13$ ,  $SD = .41$ , range = 0-4). My research assistants recorded that there was one person who looked like the confederate during the scavenger hunt session for approximately 13 participants, there were two confederate look-a-likes for 2 participants, and there were three confederate look-a-likes for 2 participants.

### **Prospective Person Memory**

I assessed whether each sighting was of a confederate by examining the information reported from the sighting survey for reported sightings and the follow-up survey for non-reported sightings. Sightings made outside of the experiment were confirmed or disconfirmed with the confederate based on their reported whereabouts.

**Reported Sightings.** Approximately 14% (N = 110) of participants reported a sighting via email. Overall 15.9% of these email reports were from participants who had seen the target alert whereas 11.8% of the email reports were from participants who had seen the foil alert. Ninety percent (N = 99) of the participants who reported a sighting via email filled out a sighting report survey, which allowed us to verify or disconfirm the accuracy of their sighting. With regard to the sightings reported via email only, in some cases the information the participants provided in their email was enough to judge whether their sighting was of one of the confederates or not but in other cases there was not enough information provided in the email to determine the veracity of the sighting. If there was not enough information the sighting was deemed inaccurate. Ninety percent (N = 99) of the sightings were of a confederate. Only one of the confederate sightings was made outside of the staged area where the confederates sat during the scavenger hunt. A total of 12.61% of participants made and reported a sighting of one of the confederates. Approximately 15.2% of participants who saw the target alert reported a sighting of a confederate whereas 9.8% of participants who saw the foil alert reported a sighting of a confederate.

Two dependent variables were constructed from the reported sightings. I tested both using logistic regression. The first dependent variable was all of the reported sightings. Some of these sightings were of the confederate and some were of other people who participants mistakenly thought was the missing person. The second dependent variable was only reported sightings that were of the confederate. The first dependent variable allowed me to assess whether any of the independent variables affected sightings in general and the second dependent variable allowed me to assess whether any of the independent variables affected sightings of the

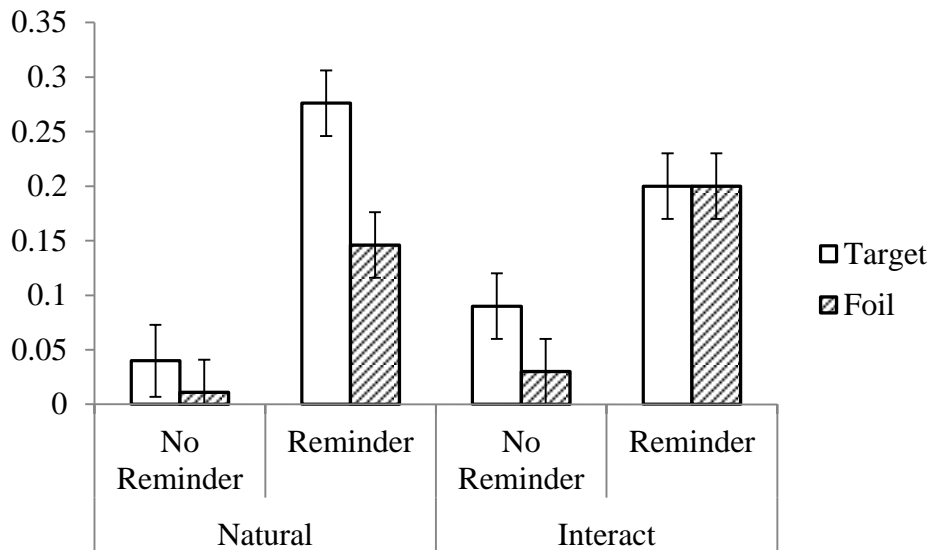
confederate. The same dependent variables were constructed and the same analyses were conducted for the non-reported sightings.

I conducted a logistic regression to test the effects of presence, attention, and strategic monitoring on all of the reported sightings to see if these factors had an effect on the first dependent variable, people's willingness to make a report (whether accurate or not). A test of the full model was significant,  $\chi^2 = 55.77$ ,  $df = 6$ ,  $p < .001$ . SPSS took 6 iterations to converge on a solution. The goodness of fit test was not significant,  $p = 1.00$ . The effect of strategic monitoring was significant,  $b = -.82$ ,  $S.E. = .14$ ,  $Wald \chi^2(1) = 36.94$ ,  $p < .001$ ,  $OR = .44$ ,  $CI 95\% [.34 - .57]$ . Participants who received a reminder to strategically monitor ( $M = .22$ ,  $SE = .06$ ) were more likely to report a sighting than participants who did not ( $M = .06$ ,  $SE = .02$ ).

I conducted a logistic regression to test the effects of presence, attention, and strategic monitoring and their interactions on reported sightings of the confederate (i.e., second dependent variable) (Figure 2). A test of the full model was significant,  $\chi^2 = 63.81$ ,  $df = 7$ ,  $p < .001$ . SPSS took 7 iterations to converge on a solution. The goodness of fit test was not significant,  $p = 1.0$ . The effect of presence was significant,  $b = -.42$ ,  $S.E. = .17$ ,  $Wald \chi^2(1) = 5.58$ ,  $p = .018$ ,  $OR = .66$ ,  $CI 95\% [.47-.93]$ . Participants who saw the target alert ( $M = .15$ ,  $SE = .02$ ) were more likely to report a sighting of one of the confederates than participants who saw the foil alert ( $M = .10$ ,  $SE = .02$ ). The effect of strategic monitoring was significant,  $b = -.99$ ,  $S.E. = .17$ ,  $Wald \chi^2(1) = 31.71$ ,  $p < .001$ ,  $OR = .37$ ,  $CI 95\% [.26-.52]$ . Participants who received a reminder to strategically monitor ( $M = .21$ ,  $SE = .02$ ) were more likely to make a sighting than participants who did not receive a reminder ( $M = .04$ ,  $SE = .02$ ). The effect of attention was not significant. The interactions between attention and presence, strategic monitoring and presence, attention and strategic monitoring, attention, strategic monitoring, and presence were not significant. Given

that two different people served as confederates it was important to determine if sighting rates differed as a function of who served as the confederate. I tested a model with confederate as a variable and the effect of confederate was not significant.

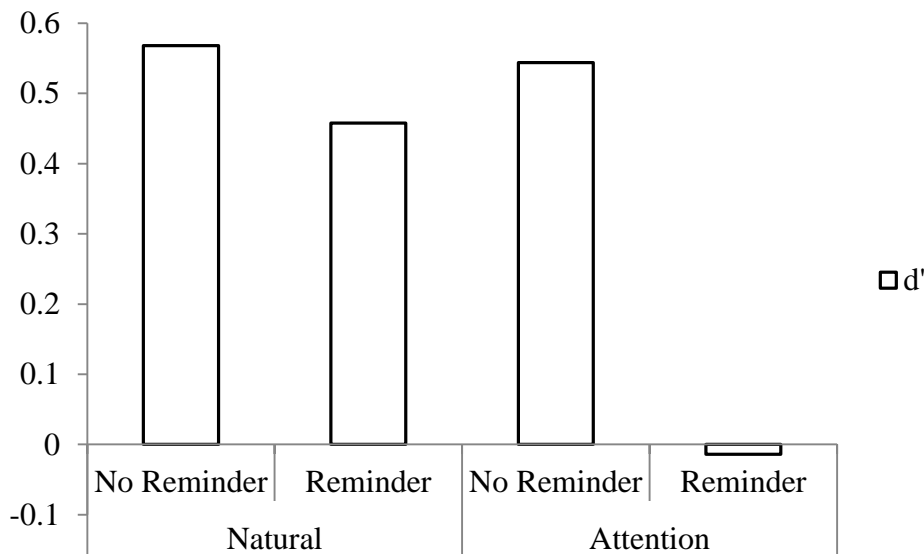
Figure 2. Reported Sightings of Confederate.



I used signal detection theory to understand how well participants were at discriminating whether the confederate was the person that the participant had seen in the alert or not (Tanner & Swets, 1964). Specifically, I was interested in whether participants' ability to discriminate differed depending on what levels of the independent variables they experienced (Figure 3). Gourevitch and Glanter (1967) put forth a significance test for testing differences in  $d'$ , a measure of discriminability, between two conditions when each participant contributed only a single response (or non-response). I used this test to analyze my results. I conducted pairwise comparisons between each of the 4 conditions. This led to a total of 6 pairwise comparisons. I used Bonferroni corrections and set the alpha level at  $(.05/6) = .008$ . These analyses were conducted for non-reported sightings, reported sightings, and overall sightings. In signal detection, there are four outcomes: hits, misses, false alarms, and correct rejections. I will

describe how each of these terms was defined in the current data set. A *hit* was defined as an instance wherein participants, who saw the target alert, sighted the confederate. A *miss* was defined as an instance wherein participants, who saw the target alert, did not sight the confederate. A *false alarm* was defined as an instance wherein participants, who saw the foil alert, incorrectly sighted the confederate. A *correct rejection* was defined as an instance wherein participants, who saw the foil alert, did not identify the confederate as the missing person. None of the pairwise comparisons were significant. This indicates that discriminability did not vary based on the manipulations of attention or reminder. Given that there were variations in sighting rates based on manipulations this indicates that discriminability was not the mechanism that caused changes in attention or reminders. An alternative is that participants shifted their response criterion as a result of the attention and/or reminder manipulations.

Figure 3.  $d'$  for Reported Sightings for each condition.



**Non-Reported Sightings.** Non-reported sightings occurred when a participant reported encountering someone who they thought was the missing person on the follow up survey but did not report it to [missing@xxx.edu](mailto:missing@xxx.edu). The majority of participants (97.1%) completed the follow-up

survey. Participants completed the follow-up survey on average 48 hours after their in-lab session ( $SD = 2$ , Range = less than 1 hour to 28 days). Approximately 23.4% ( $N = 184$ ) of all participants made a non-reported sighting. Of the non-reported sightings 19 of them were redundant with actual sighting reports. The redundant non-reported sightings were excluded from the non-reported sighting analyses. After excluding the redundant non-reports, approximately 21.02% ( $N = 165$ ) of all participants, 24.44% of the participants who did not make a sighting report made a non-reported sighting. Approximately half of these sightings were made by participants who saw a target alert and half were made by participants who saw a foil alert. Of the 165 non-reports, 105 (63.63%) were sightings of one of the confederates. More of the non-reports of confederates were made by participants who had seen the target alerts (14.4%) than by participants who had seen the foil alerts (12%).

I conducted a logistic regression to test the effects of presence, attention, and strategic monitoring on all of the non-reported sightings to see if these factors had an effect on people's willingness to make a non-report (whether of the confederate or not). A test of the full model was significant,  $\chi^2 = 78.82$ ,  $df = 6$ ,  $p < .001$ . SPSS took 5 iterations to converge on a solution. The goodness of fit test was not significant,  $p = .70$ . The effect of strategic monitoring was significant,  $b = -.84$ ,  $S.E. = .11$ , Wald  $\chi^2(1) = 63.43$ ,  $p < .001$ ,  $OR = .43$ ,  $CI\ 95\% [.35-.53]$ . Participants who received a reminder to strategically monitor ( $M = .33$ ,  $SE = .02$ ) were more likely to make a non-reported sighting than participants who did not ( $M = .09$ ,  $SE = .02$ ). There was a marginally significant three way interaction between attention, strategic monitoring, and presence,  $b = .21$ ,  $S.E. = .11$ , Wald  $\chi^2(1) = 3.77$ ,  $p = .052$ ,  $OR = 1.23$ ,  $CI\ 95\% [1.00 - 1.52]$ . In order to explore this interaction, I conducted follow-up logistic regressions at each level of the strategic monitoring condition. When a reminder was not issued there was no interaction

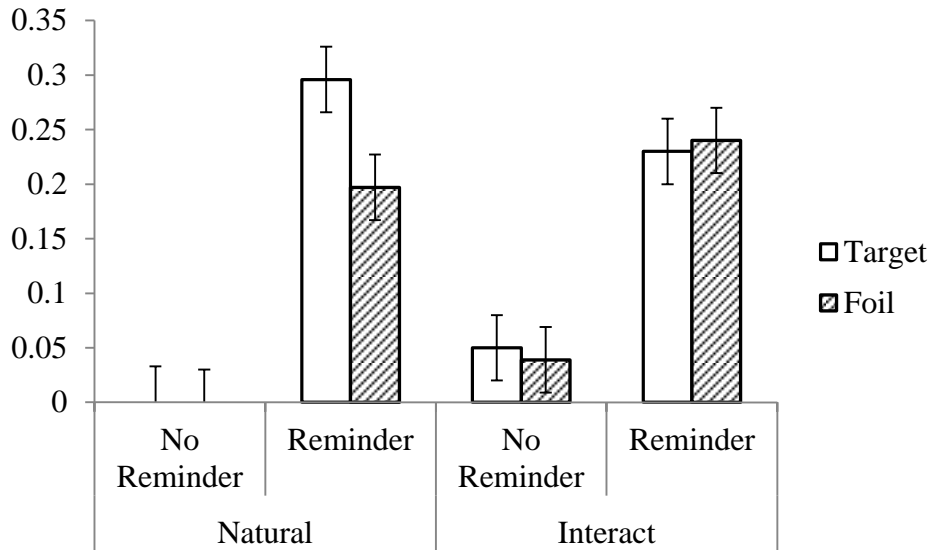


between attention and presence. When a reminder was issued there was an interaction between attention and presence,  $b = .23$ ,  $S.E. = .11$ ,  $Wald \chi^2(1) = 4.68$ ,  $p = .03$ ,  $OR = .79$ ,  $CI 95\% [.64-.98]$ . Therefore, I examined the effect of attention at each level of reminder and presence. Attention was not significant at any of the levels but it was marginally significant when a reminder was issued and the target alert had been viewed,  $b = .27$ ,  $S.E. = .15$ ,  $Wald \chi^2(1) = 3.05$ ,  $p = .081$ ,  $OR = 1.30$ ,  $CI 95\% [.97-1.76]$ . The participants in the natural condition were more likely to make a non-reported sighting than the participants in the interact condition. In addition there was a marginally significant effect of presence for participants who received a reminder and did not have their attention directed,  $b = .26$ ,  $S.E. = .15$ ,  $Wald \chi^2(1) = 2.92$ ,  $p = .087$ ,  $OR = .77$ ,  $CI 95\% [.57-1.04]$ . Participants who saw the target alert were more likely to make a non-reported sighting than those who saw the foil alert.

I conducted a logistic regression to test the effects of presence, attention, and strategic monitoring and their interactions on non-reported sightings of the confederate (i.e., second dependent variable) however SPSS was unable to converge on a solution after 20 iterations (Figure 4). This was due to the fact that there were two cells in which there were no sightings of the confederate (i.e., natural and the no reminder conditions). In order to analyze the other effects I tested a model using logistic regression that collapsed across strategic monitoring and attention conditions (i.e., I removed the attention x strategic monitoring interaction and the three way interaction between attention, strategic monitoring, and presence). A test of the full model was not significant,  $\chi^2 = 8.6$ ,  $df = 6$ ,  $p = .197$ . SPSS took 6 iterations to converge on a solution. The goodness of fit test was not significant  $p = .197$ . The effect of reminder was significant,  $b = -1.3$ ,  $S.E. = .18$ ,  $Wald \chi^2(1) = 52.61$ ,  $p < .001$ ,  $OR = .27$ ,  $CI 95\% [.19 - .39]$ . I also tested the simple effects of attention and presence when participants had received a reminder. A test of the full

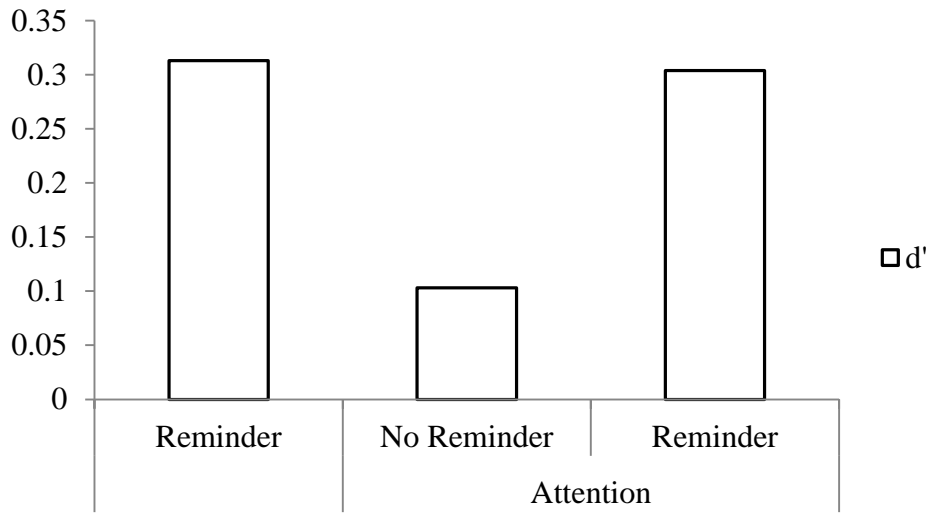
model was not significant,  $\chi^2 = 2.63$ ,  $df = 3$ ,  $p = .453$ . SPSS took 4 iterations to converge on a solution. The goodness of fit test was not significant,  $p = 1.0$ . None of the effects were significant.

Figure 4. Non-reported Sightings of Confederate



I calculated  $d'$  for the non-reported sightings for each of the conditions (Figure 5). I conducted pairwise comparisons to test for differences between the conditions. It was impossible to obtain parameter estimates and to do pairwise comparisons with the natural and no reminder condition because there were no instances of hits or false alarms. None of the remaining comparisons were significant at  $p = /< .008$ .

Figure 5.  $d'$  for Non-reported Sightings for each condition.

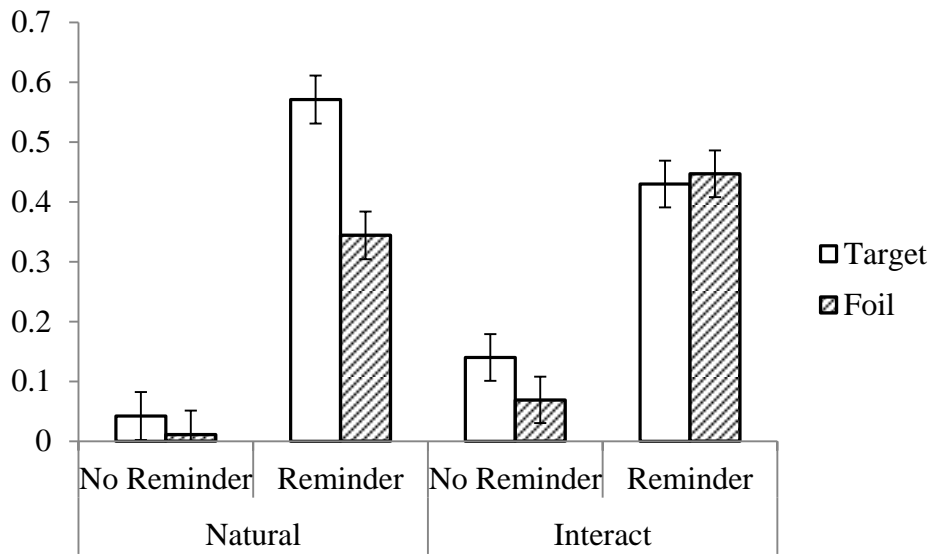


**Total Sightings.** Sightings and non-reported sightings of the confederates were combined to understand the overall number of sightings. This measure is of applied importance because it corresponds to total achievable recoveries. Overall, 90% of the reported sightings were sightings of the confederate whereas only 63.63% of the non-reported sightings were of the confederate. However, there were more total non-reported sightings of the confederate ( $N = 105$ ) than reported sightings of the confederate ( $N = 99$ ). A total of 204 participants (26%) made a sighting of the confederate. Of the participants who saw the target alert ( $N = 393$ ), 117 (29.77%) sighted the confederate when collapsing across non-reported and reported sightings.

I conducted a logistic regression to test the effects of presence, attention, and strategic monitoring and their interactions on overall sightings of the confederate (Figure 6). A test of the full model was significant,  $\chi^2 = 181.6$ ,  $df = 7$ ,  $p < .001$ . SPSS took 6 iterations to converge on a solution. The goodness of fit test was not significant  $p = 1.0$ . The effect of presence was significant,  $b = -.29$ ,  $S.E. = .14$ ,  $Wald \chi^2(1) = 4.62$ ,  $p = .032$ ,  $OR = .75$ ,  $CI 95\% [.57 - .98]$ . Participants who saw the target alert ( $M = .30$ ,  $SE = .02$ ) were more likely to make a sighting of the confederate than participants who saw the foil alert ( $M = .22$ ,  $SE = .02$ ). The effect of

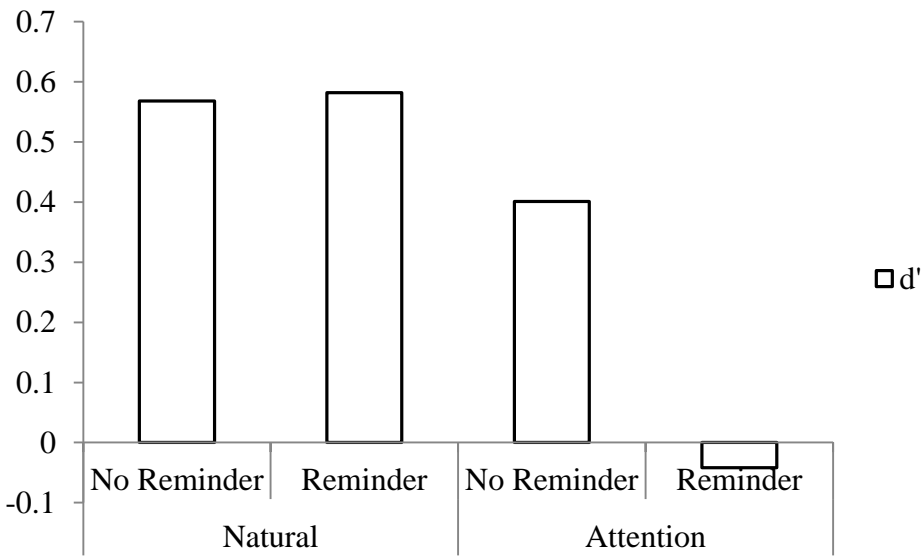
attention was significant,  $b = -.30$ ,  $S.E. = .14$ ,  $Wald \chi^2(1) = 4.82$ ,  $p = .028$ ,  $OR = .74$ ,  $CI 95\%$  [.57 - .99]. Participants who interacted with the confederate ( $M = .27$ ,  $SE = .02$ ) were more likely to make a sighting than participants who did not ( $M = .24$ ,  $SE = .02$ ). The effect of strategic monitoring was significant,  $b = -1.31$ ,  $S.E. = .14$ ,  $Wald \chi^2(1) = 93.5$ ,  $p < .001$ ,  $OR = .27$ ,  $CI 95\%$  [.21-.35]. Participants who received a reminder to strategically monitor ( $M = .45$ ,  $SE = .02$ ) were more likely to make a sighting than participants who did not ( $M = .07$ ,  $SE = .02$ ). The interaction between attention and strategic monitoring was significant,  $b = -.33$ ,  $S.E. = .14$ ,  $Wald \chi^2(1) = 6.00$ ,  $p = .014$ ,  $OR = .72$ ,  $CI 95\%$  [.55 - .94]. This interaction was caused by the fact that there was no effect of attention on sighting rates when participants received a reminder,  $p = .68$ , but when no reminder was issued participants in the interact condition ( $M = .11$ ,  $SE = .03$ ) were more likely to make a sighting than participants in the natural condition ( $M = .03$ ,  $SE = .03$ ),  $b = -.72$ ,  $S.E. = .25$ ,  $Wald \chi^2(1) = 8.09$ ,  $p = .004$ ,  $OR = .49$ ,  $CI 95\%$  [.3 - .8]. The interactions between attention and presence, strategic monitoring and presence, attention, strategic monitoring, and presence were not significant. Given that two people served as confederate it was important to determine if sighting rates differed as a function of who served as confederate. I tested a model with confederate as a variable and the effect of confederate was not significant.

Figure 6. Total Sightings of Confederate.



I calculated  $d'$  for the non-reported sightings for each of the conditions (Figure 7). I conducted pairwise comparisons to test for differences between the conditions. None of the comparisons were significant at the  $p = /< .008$  level.

Figure 7.  $d'$  for Overall Sightings for each condition.



**Expectations, Intent, and Looking Behavior.** Expectations of encounter were positively correlated with sighting reports indicating that participants with higher expectations of encounter were more likely to report a sighting,  $r = .1, p = .006$ . Participants' expectations of encountering the missing person were negatively correlated with non-reported sightings of the confederate,  $r = -.08, p = .028$ . This may be because participants who expected to encounter the missing person were more likely to make a reported sighting and thus unlikely to have a non-reported sighting. Participants' intention to look for the missing person did not correlate with any of the three confederate sighting variables (non-reported confederate sightings, confederate sightings, or total confederate sightings). Intent to look for the missing person was positively correlated with the first dependent variable for reported sightings, overall reported sightings, indicating that participants with higher intentions of looking for the missing person were more likely to report a sighting whether of the confederate or not,  $r = .08, p = .019$ . Overall most participants who made an accurate sighting reported looking for the missing person somewhat (43.1%) or not at all (36.3%). Looking behavior was also correlated with whether participants reported a sighting at all,  $r = .22, p < .001$ , and whether they made a non-reported sighting or not,  $r = .12, p = .001$ . Looking behavior, a measure taken after the sighting measures, correlated positively with confederate sightings, second dependent variable,  $r = .18, p < .001$ .

**Line-up.** I tested participant's memory for the target's and/or the foil's face by presenting a forced-choice target-present simultaneous lineup to participants on the follow-up survey. Overall, 72.8% of people who saw the target alert identified the confederate, the person featured in the target alert, out of the lineup. The rates were 78.9% for one confederate and 66.8% for the other confederate. All of these percentages exceeded chance (16.67%). In contrast, only 15% of

participants who saw the foil alert, the alert featuring a description-matched-to-confederate foil, identified the confederate as the missing person. This rate was near chance levels.

I conducted a logistic regression on the accuracy of identifications based on the person the participants saw in the missing person's alert. Thus, the correct answer was different based on which alert the participant saw (i.e., target alert or foil alert). A test of the full model was not significant,  $\chi^2 = 10.28$ ,  $df = 7$ ,  $p = .17$ . SPSS took 4 iterations to converge on a solution. The goodness of fit test was not significant  $p = 1.00$ . The interaction between strategic monitoring and presence was significant,  $b = .21$ ,  $S.E. = .08$ ,  $Wald \chi^2(1) = 6.7$ ,  $p = .01$ ,  $OR = 1.23$ ,  $CI 95\% [1.05-1.44]$ . If the participant saw the foil in the alert, identification rates did not differ whether participants received a reminder ( $M = .67$ ,  $SE = .03$ ) or not ( $M = .74$ ,  $SE = .03$ ),  $p = .097$ . However, if the participant saw the target alert, they were more likely to make an accurate identification if they received a reminder ( $M = .77$ ,  $SE = .03$ ) than if they did not ( $M = .68$ ,  $SE = .03$ ),  $p = .043$ . This indicates that the reminder might have caused participants to strategically monitor motivating them to keep the image of the missing person in mind or that seeing the confederate may have provided another instance of encountering her face improving their identification rates later on.

## Discussion

In the current study I was interested in disentangling the role of attention and memory in prospective person memory. Many people fail prospective person memory tasks. It is important to separate the attention and memory components of prospective person memory to understand where the breakdown in the process occurs after a person has encountered a missing or wanted person. Participants came into the lab under the belief that they would be participating in two separate back-to-back experiments. The first experiment involved watching news stories,

including a mock missing person alert, followed by a debriefing, in which I informed participants that the person featured in the missing person alert was not actually missing. After the debriefing I informed participants that they should be on the lookout for the person featured in the missing person's alert over the next several days and that if they spotted her they could win a cash prize.

After completing the first part of the experiment participants were brought into a separate lab room with a second experimenter. This was done to perpetuate the idea that the second part of the experiment was a separate experiment. The second experimenter led the participant through a scavenger hunt task that involved finding flyers of various colors around the building. The purpose of the scavenger hunt task was to create a cover to allow the participant a chance to encounter the missing person. For each participant, a confederate was next to or in front of one of the flyers during the scavenger hunt task. I manipulated where the confederate was located as a manipulation of participant's attention to the missing person. Specifically, if the confederate was next to the flyer the participant may or may not have noticed her. However, if the confederate was in front of the flyer they had to notice her presence and they had to request that she move so they could see the flyer. I also manipulated participant's strategic monitoring by either providing participants with a reminder that induced strategic monitoring, to be on the lookout for the missing person and to scan their environment when the confederate was in the environment, or not. Finally, I manipulated the presence of the missing person to estimate for suspicion or guessing. Half of participants saw a mock missing person alert that featured the target (i.e., confederate) they would later encounter during the scavenger hunt. The other half of participants saw a foil alert that featured a person who looked like the confederate they encountered during the scavenger hunt. I measured whether participants noticed the confederate by having participants email in encounters that they made and fill out a sighting survey in



exchange for prize money. Participants were invited to complete a follow up survey approximately 24 hours after their in-lab session. One of the questions on the follow-up survey was whether the participant ever thought they encountered the missing person but chose not to report it to us via email.

Participants were much more likely to make a sighting report if they received a reminder to strategically monitor than if they did not. This supports the idea that paying attention and searching for the cue are important for prospective person memory. When I combined sightings and non-reported sightings of the confederate I found that attention had an effect on sightings of the confederate. Overall participants were more likely to make a sighting of the confederate if their attention was directed to the confederate than if it was not. This was only true when the participant did not receive a reminder. That indicates that drawing the participant's attention to the confederate after the participant received a reminder and scanned their environment did not provide any additional help. However, if the person did not receive a reminder then drawing the participant's attention to the confederate increased the rates at which they noticed the confederate. The effect of attention was not present in the reported sightings of the confederate but it was in the overall sightings. This indicates that while drawing participant's attention to the confederate caused them to notice her it did not always instill enough confidence in them to report said sighting.

In terms of sightings, participants who saw the target alert were discerning of the accuracy of their sighting. Participants who reported sightings were much more likely to have sighted the confederate than participants who made non-reported sightings. In addition, participants who saw the foil alert and reported a sighting were also much more likely to report seeing the confederate than another person in comparison to participants who made a non-

reported sighting. However, there were a number of sightings of the confederate that were reported only on the follow-up survey (i.e., non-reported sightings). In fact there were slightly more non-reported sightings of the confederate than there were reported sightings of the confederate. In addition, participants who saw the target alert were more likely to report the confederate as the missing person than participants who had seen the foil alert. In comparison with other studies on prospective person memory the sighting rates were quite high. Approximately 29% of people who saw the target alert sighted the confederate.

Overall the sighting rates of the confederate when the participant had seen the foil alert were quite high. The foil picture was chosen based on its match to the confederate. Therefore sightings of the foil are based on suspicion, guessing, and on the fact that the foil looks like the confederate. Participants who saw the target alert were more likely to report a sighting of the confederate than participants who saw the foil alert. However, participants who saw the target alert were just as likely to make a non-reported sighting of the confederate as participants who saw the foil alert. When I compiled non-reported sightings and reported sightings I found that overall, participants who saw the target alert were more likely to have sighted the confederate than participants who saw the foil alert. The high rates of sightings of the confederate by people who saw the foil alert could lead to concerns of suspicion causing sightings. If this was the cause for the high sighting rates in the foil condition I would expect that participants may not have a good memory for the foil's face or that their suspicion overrode their memory for the foil's face. To be able to attribute foil sightings to these factors I would expect that participants would report a) suspecting that the media perceptions and scavenger hunt studies were linked and b) that the confederate they saw during the scavenger hunt was the missing person (i.e, participants would later identify the confederate out of a line-up rather than the foil). Overall, 37.5% (N = 147) of

participants in the foil condition indicated that they thought there was something suspicious about the second study. Of these participants 5.1% (N = 20) indicated that they were suspicious because they thought they saw the missing person and 3.1% (N = 12) indicated that they were suspicious because they expected to see the missing person. Participants in the foil condition who received a reminder were more suspicious (51.8%) than those who did not receive a reminder. Of these participants, 31.2% indicated that the reminder made them suspicious. Overall 46.9% of participants in the foil condition indicated that they thought the two studies were linked in some way but only 17.6% (N = 69) of these participants correctly indicated that the link was the missing person. The majority of participants who saw the foil alert identified the foil from a target-present line-up approximately 48 hours after the in-lab session. This indicates that most participants were able to discern between the target/confederate and the foil. Overall these findings indicate that a small minority of the foil sightings were due to suspicion and that some may be due to mistaken identifications of the confederate during the scavenger hunt task as the person seen in the alert.

The results of this study indicate that a person who is strategically monitoring is much more likely to make a sighting than a person who is not. The downside to this is that, at least in the current study, foil sightings were as likely as target sightings. This was true in all conditions except for the natural + reminder (no attention) condition. In this condition participants who saw the target alert were much more likely to make a sighting than participants who saw the foil alert. In addition, the highest rate of sightings was made by participants who were in the natural + reminder condition and saw the target alert. Overall sightings of the confederate by participants in the foil condition were still higher in the natural and reminder condition than when participants did not receive a reminder ,though. In terms of recovering a missing or wanted

person, inaccurate reports may waste police or community resources but if they are ultimately accompanied by a simultaneous increase in accurate sightings that can lead to the recovery of a missing or wanted person they may be deemed worthwhile.

I was also interested in whether there was a quantitative difference in discriminability, people's ability to discriminate between whether the confederate was the missing person featured in the alert or not. The analyses testing discriminability found that there were no differences in discriminability across conditions for any of the sighting variables. This indicates that changes in discriminability did not cause the changes in sighting rates across conditions. Instead, participants may have adopted different response criteria, willingness to say 'yes' that the confederate is the missing person, depending on their condition. If the attention and reminder manipulations caused changes by adjusting participants' response criterion this suggests that these manipulations will not only increase accurate sightings but will also increase false alarms or inaccurate sightings to people who very much resemble the missing person. This fits with our results. It is important to note that the false alarms in this study were to people who matched the description and appearance of the missing person. In comparison, the reminder manipulation did not affect participants' false alarms of other individuals. This indicates that participants may have been making educated guesses based on the appearance of the description-and-appearance-matched foil. It is not completely clear what affect increasing attention and strategic monitoring might have on false alarms to people who resemble the missing person less or not at all. It is also unclear how many, if any, missing person look-a-likes a person might encounter when on the lookout for an actual missing person. This indicates that there are costs and benefits to increasing attention and strategic monitoring while looking for a missing person. The benefits are that more accurate reports of missing people will occur and the costs are that more inaccurate reports will

also occur. Whether or in what cases the costs outweigh the benefits is ultimately a decision that has to be made when considering these methods. In terms of eyewitness identification, the cost to an erroneous identification can be rather high (i.e., an innocent person being convicted of a crime that they did not commit). In terms of the search for missing or wanted persons, the cost of a mistaken sighting is the use of police resources. Given that resources are available to be devoted to investigating these sightings the cost of a mistaken sighting of a missing or wanted person is rather low. However, if police resources are limited then police may be following erroneous leads when they could be solving other crimes.

Prior research suggests that the prospective person memory process often failed, if it was going to fail, at the step of noticing the missing person. In the current study I devised a scenario wherein participants' attention was drawn to the missing person. When compared to participants who did not have their attention drawn to the confederate those who had their attention drawn were more likely to sight the confederate. However, the difference between these two groups was small (i.e., 10% difference between conditions). This suggests that failure to notice the missing person may account for a relatively small portion of the variance with regards to failures in prospective person memory. This finding indicates that attention is helpful but not sufficient to complete the process of prospective person memory. This raises the question of where else failures in the process of prospective person memory occurred.

The current research sheds light on the role of strategic monitoring in the process of prospective person memory. Participants who strategically monitored their environment were much more likely to make a sighting than those who did not. Another place where failures in prospective person memory could have occurred is in recognition of the missing person. The majority of participants, 72.8%, who saw the target alert, were able to identify the confederate

out of a line-up when they completed the follow-up survey (on average 48 hours after their in-lab session). This indicates that forgetting or not remembering the missing person's face may be one reason that some participants did not sight the missing person. Given that 72.8% of participants were able to identify the missing person out of a photo line-up, on average 48 hours after their in-lab session and the guessing rate of a six person lineup (1/6) is 16.67 we can determine the percentage of participants who correctly chose the confederate from the line-up as a result of recognizing her.

$$72.8 = M + (1-M)*16.67$$

In this formula, M is recognition memory. When this equation is solved for M we find that  $M = 67.36$ . Therefore I would expect that 67.36% of participants had a memory of the missing person's face that might allow them to identify her in real life if they noticed her in their environment. With the strategic monitoring and attention manipulations I created a condition in which participants were reminded to be on the lookout for the missing person and were asked to scan their environment (where the confederate was present) for the missing person. I hypothesized that these conditions would allow participants who remembered the confederate's face to sight the confederate. The highest overall sighting rate I found in any one cell was 57% (i.e., reminder and natural). This finding indicates that most but not all of the participants who recognized the missing person's face from a line-up approximately 48 hours after the in-lab session were able to identify the person in real life.

Why, given that participants met all of the necessary pre-conditions (i.e., reminder and attention), would the sighting rates not match the rates at which participants recognized the missing person's face? There are a few potential reasons for this discrepancy. First, recognizing a 2D photograph of an individual after only having prior experience with seeing a photo of the

individual may be easier than mapping that photograph onto an actual face in real life. Research indicates that there is a rather high error rate of matching photographs to people's faces, but in this research memory is not involved, people are simply attempting to determine if the face in a photo matches a person they are currently viewing (Davis & Valentine, 2009; Kemp, Towell, & Pike, 1997; Megreya & Burton, 2008). When memory is involved the task is even more difficult. Second, participants may have opted out of strategic monitoring even though I attempted to create the best possible conditions for strategic monitoring to occur. For example, although the scavenger hunt experimenter did her best to ensure the participant scanned their environment not all participants scanned their environment after receiving the retrieval mode instructions. Overall though, research assistants reported that only 7 participants (1.8% of reminder sample) did not scan their environment at all. Therefore, most participants at least went through the motions of scanning the environment. Third, it may be possible that the participant looked at the confederate and interacted with her and still did not attend thoroughly enough to her face to recognize her as the missing person. This would be a very selective form of inattention blindness. Relatedly, Hyman et al. (2016) found that participants were able to avoid running into a tree while on their cell phone and yet did not notice that there was money on the tree. In addition, Lampinen et al. (2015) found that no one sighted a wanted person although they took a flyer from him. Fourth, it is possible that some participants noticed the missing person and recognized her or found her face to be familiar but still did not report the sighting either via email or in the follow-up survey. I would expect that failure to sight in these instances would be due to a) lack of motivation, b) lack of confidence in sighting, c) forgetting about the suspected sighting, or d) failure to complete the follow-up survey (2.9% of all participants).

It was also surprising that the sighting rates of the confederate when participants had seen the target alert, were higher in the natural + reminder condition than the interact + reminder condition. I hypothesize that there are a few potential reasons for this discrepancy. First, the reminder and drawing participants' attention to the missing person may have induced reactance in participants. It is possible that these two factors (i.e., attention and reminder) in combination made participants especially suspicious. However, given that the attempt to draw participants' attention to the missing person worked and reactance was occurring, I would expect that there would be a decline in reported sightings but I would still expect participants to admit a suspected sighting on the follow-up survey (i.e., non-reported sighting). This did not fit with our pattern of results. Second, participants may have opted out of strategic monitoring when they realized the confederate was blocking the flyer. Specifically, the participant may have strategically monitored until they realized there was someone blocking the flyer. The flyer represented the next task/goal in the scavenger hunt experiment and one in which participants had to politely ask people who were blocking the flyers to move. Therefore, it is possible that participants were distracted immediately after receiving the reminder. In this case, the reminder + attention condition would have functioned more as an attention condition. If this was the case for all participants I would expect there to be no differences in the attention conditions (attention + reminder vs. attention + no reminder); however, there were more sightings in the attention + reminder condition than the attention + no reminder condition. This indicates that it is possible that some but definitely not all participants were distracted by the confederate blocking the flyer.

The Multi-Process Theory of prospective memory suggests that under certain conditions (i.e., when the cue is focal to the ongoing task, when the cue and intended behavior are highly related, when attention is directed to the cue) people may recognize a cue to perform an intended



behavior when they are not strategically monitoring for cue in their environment (Einstein & McDaniel, 2005). In contrast, the Preparatory Attention Model of prospective memory posits that strategic monitoring is required to successfully complete prospective memory tasks (Smith, 2003; Smith & Bayen, 2004). Some of the participants in our study were asked to strategically monitor while others were not. Overall, participants who were asked to strategically monitor were more likely to be successful at the prospective person memory task than participants who were not asked to strategically monitor. However, the Preparatory Attention Model of prospective memory seems to indicate that the participants who did not strategically monitor should not have been successful at the prospective person memory task. And yet there were several participants who were not asked to strategically monitor who sighted the confederate. While these participants were not asked to strategically monitor it is possible that some of them induced strategic monitoring on their own. What evidence is there for or against participant's strategic monitoring of the environment? After the media perceptions experiment participants completely switched tasks and were led to believe that they now needed to complete a different and separate resource demanding study. I believe this makes it less likely that participants were strategically monitoring during the scavenger hunt. In addition, there were participants who reported that they had no intention to look for the missing person and did not look for the missing person at all and yet they made a sighting report. Given that these self-reports are accurate they negate the idea that strategic monitoring occurred in these circumstances or was necessary to sight a missing person. Overall these findings suggest that the reason for sightings in the non-reminder conditions was not due exclusively to strategic monitoring but rather due to spontaneous recognition of the missing person. This evidence, taken with the fact that participants who did strategically monitor were more likely to make a sighting, is in line with the

Multi-Process Theory of prospective memory. Strategic monitoring was not required for an accurate sighting to occur but strategically monitoring did benefit participants sighting rates.

In this study, I focused on understanding effects on prospective person memory in finding a missing person. However, another way that members of the public can help to recover a missing or wanted person is through retrospective person memory. Retrospective person memory refers to an instance wherein a person encounters a missing or wanted person before they encounter the alert notifying them that the person is wanted or missing. In a retrospective person memory task a person has previously encountered and attended to the missing person. They must encounter an alert and recognize the person featured in the alert as a person they have previously encountered. Finally, they must decide to alert the authorities to the suspected sighting. In retrospective person memory tasks, the person does not need to be on the lookout for the missing/wanted person. This seems to be a crucial place where many people fail prospective person memory tasks. Instead what must occur is that a person encounters a missing/wanted person and then an alert notifying them to be on the lookout for the missing/wanted person. Then they must recognize that the person featured in the alert is someone they have previously encountered. It is possible that when people see the alert they instantly recognize the person featured in the alert. These instances may be analogous to when people who say they were not searching spontaneously notice and recognize the missing person in prospective person memory tasks. Another alternative is that when the person views the alert they search their mind for previous encounters with other people and check whether any of these people are the missing/wanted person. It is clear that prospective person memory could be improved by increased attention and searching. Similarly retrospective person memory rates may also be improved if the person has previously been paying attention to their environment and if, upon

encountering an alert, the person searches their memory for any possible encounters of the missing/wanted person. Future research should test this idea.

In the current study, I set up a realistic search for a missing person. How generalizable are the results of the study to the actual search for missing or wanted persons? This study demonstrated that if a person attends to a missing person they are more likely to make a sighting of them. In addition, if a person is strategically monitoring in the presence of a missing person they are more likely to make a sighting of them. While it would not be feasible to apply the manipulations used in the current study in the real world it is feasible to induce attention and strategic monitoring in the real world. In the real world a person would have to have their attention drawn to the missing/wanted person for some reason (e.g., verbal interaction, recognizing their face, etc.), like in the current study, or would have to pay attention to people's faces in their environment. If people devote their attention to other people's faces this may increase the chances of a recovery because people will be exposed to more people's faces. In addition, people could induce strategic monitoring by not only paying attention to people's faces but also by checking to see if the person's face matches up with their representation of the missing/wanted person's face.

While the results of this study are generalizable in that if people use attention and/or monitoring in the real world they will be more likely to sight a missing/wanted person, they do still have some short-comings. In the current study we drew attention only to the missing person and we asked participants to strategically monitor only in the presence of the missing person. There were instances where the missing person was not the only other person in the environment the participant was asked to monitor. Unfortunately, we did not record how many people were in the vicinity the participant was asked to strategically monitor. Therefore it is currently unclear is

what, if any, effect attending to multiple faces after viewing an alert might have on sighting rates. In the current study we measured the number of people the participant passed by in the scavenger hunt study and the number of people, besides the missing person, that they interacted with but I do not have a direct measure of the number of these people that the participant attended to. One possibility is that participants only attended to the face of the scavenger hunt experimenter before encountering the missing person. Another more likely possibility is that participants attended to others faces in order to navigate their environment and that the number of faces attended to varied somewhat from one participant to another. I only drew attention to the missing person's face in this study. In the real world, however, it is much more likely that someone would attend to multiple people's faces after seeing an alert before they eventually encounter the missing person. It is unclear what the effect of searching for and thus attending to multiple faces might have on sightings of the missing person. Future research should tackle this question. On the one hand, having attention drawn to the missing person's face may be sufficient to allow people to recognize the missing person. On the other hand, there may be an effect of attending to other's faces in between seeing an alert and encountering the missing person. Attending to other's faces may induce interference or if the searcher has encountered others who resemble the missing person then the person may be more likely to doubt the veracity of an actual encounter.

It seems unlikely that in the real world a person would end up attending only to the missing person. Unless the person has a chance encounter with the missing person, the searcher may have to actually search for and/or attend to multiple people's faces to sight the missing person. The main problem is that people will not or cannot always engage their cognitive resources in a prospective person memory task. People need those limited cognitive resources for

other day-to-day activities like grocery shopping, working, remembering to pick up the kid's uniforms from dry-cleaning, getting dinner on the stove, and feeding the dog. This begs the question of whether it is possible to reduce or eliminate the load of prospective person memory tasks. In the current study there were some participants whose attention was not drawn to the confederate and who did not receive instructions to strategically monitor and yet they made sightings. In addition, some of these participants reported that they did not intend to look for the missing person and that they did not look for her. This indicates there are some cases in which the missing person can be sighted with little to no resources. It is imperative for future research to explore these conditions and determine if there are methods that allow for sightings without the devotion of these resources. Finding a less resource demanding way to complete the tasks could result in the recovery of many missing loved ones and wanted criminals.

The low sightings rates in this study may be interpreted as a limitation. The low base rate of instances (i.e., sightings) poses some experimental and statistical concerns and is unfortunate given the goal of recovering missing and wanted persons. However, while many sightings might be helpful to authorities in tracking someone down they may not be absolutely necessary. In some cases one sighting is sufficient to locate a person. For example, in the recent Cleveland Facebook killing, one civilian provided information about the suspect's whereabouts that led police to the suspect. In the current study, the first accurate sighting we received would have supplied us with the information necessary, given that we were able to deploy people in a decent amount of time, to locate the confederate. Increasing sighting rates increases the chances that police have to track down an individual and while it would be great for more people to sight a missing person when they come into contact with them it is certainly not always necessary for this to occur for a person to be recovered.

The prize money provided to participants was a real life motivator for searching for missing and wanted persons but also served as a proxy to other motivations. In the real world I expect that people may be motivated by several things, including reward, to help recover a missing or wanted person. A person may help search out of sympathy for the missing or their families (Batson, Duncan, Ackerman, Buckley, & Birch, 1981). They may help to search for a wanted person because of the desire of keeping their community safe. A person may help to search because of social norms. They may search for missing or wanted person to attain praise or fame as a result of recovering the person. Finally, they may be motivated by cash rewards or other rewards that are offered in some missing/wanted person's cases (e.g., see FBI's Ten Most Wanted, 2017). Research on altruism and prosocial behavior indicates that each of these things have motivated people to do prosocial behaviors (Eisenberg, Fabes, & Spinrad, 1998). In the current study, I wanted participants to know that the person featured in the missing person's alert was not actually missing before they left the lab. Therefore, I used the prize money as a motivator for the search for the missing person. The prize money is an ecologically valid motivator in-and-of itself and was also a proxy for any other motivations that people may have in searching for a missing person.

**Conclusions.** In the current study I controlled for the first few steps in the process of prospective person memory. I ensured that all participants encountered a missing person alert, controlled for and measured attention to the missing person alert, and ensured that all participants were in the vicinity of the confederate. The current study informed about the remaining steps including attention to the missing person, recognition of the missing person, remembering to contact the authorities, and decision to contact the authorities. This study indicates that each step after encountering the missing person is critical to the process of

successful prospective person memory. It also suggests recognizing the missing person and the decision to contact the authorities may play a larger role in failures of prospective person memory than previously thought.

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Appendix A. IRB Approval Letter.



Office of Research Compliance  
Institutional Review Board

September 19, 2016

MEMORANDUM

TO: Kara Moore  
Denise Beike  
James Lampinen

FROM: Ro Windwalker  
IRB Coordinator

RE: New Protocol Approval

IRB Protocol #: 16-09-070

Protocol Title: *Media Perceptions*

Review Type:  EXEMPT  EXPEDITED  FULL IRB

Approved Project Period: Start Date: 09/16/2016 Expiration Date: 09/15/2017

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (<https://vpred.uark.edu/units/rsop/index.php>). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

**This protocol has been approved for 2,000 participants.** If you wish to make any modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 109 MLKG Building, 5-2208, or [irb@uark.edu](mailto:irb@uark.edu).

Appendix B. In-Lab Survey.

<u>Question</u>	<u>Question Type</u>
<b>Mandatory Correct Answer Questions</b>	
Was the news story about the woman who was missing a REAL news story?	Yes/No
Is the woman who was shown in the final video really wanted by police?	Yes/No
If you see the woman who was shown in the final video what should you do?	Multiple Choice
What email address should you use to contact experimenters if you see this woman?	Open-Ended
If you spot the woman from the last video and contact the experimenters you could win prize money of up to _____ dollars?	Open-Ended
<u>Other Questions</u>	
Why should you not tell any of your classmates if you see the 'missing' woman? (select all that you believe are true)	Multiple Choice-Check boxes
Please summarize the main points made in this news story.	Open-Ended
Approximately how long ago did this story first air on television?	Likert-one day ago -- between six months to one year ago (7)
How important is the information that is being conveyed in this news story?	Likert-extremely unimportant-extremely important (6)
How concerned are you by the information conveyed in this news story?	Likert-not at all concerned-extremely concerned (6)
Indicate the degree to which you experienced the following emotions while watching the news clip-anxious	Likert-not at all-extremely (4)
Indicate the degree to which you experienced the following emotions while watching the news clip-happy	Likert-not at all-extremely (4)
Indicate the degree to which you experienced the following emotions while watching the news clip-frightened	Likert-not at all-extremely (4)

Indicate the degree to which you experienced the following emotions while watching the news clip-angry	Likert-not at all-extremely (4)
Indicate the degree to which you experienced the following emotions while watching the news clip-surprised	Likert-not at all-extremely
Indicate the degree to which you experienced the following emotions while watching the news clip-interested	Likert-not at all-extremely (4)
Indicate the degree to which you experienced the following emotions while watching the news clip-disgusted	Likert-not at all-extremely (4)
Indicate the degree to which you experienced the following emotions while watching the news clip-sad	Likert-not at all-extremely (4)
Indicate the degree to which you experienced the following emotions while watching the news clip-hopeful	Likert-not at all-extremely (4)
How good of a job did the student journalist do presenting this story?	Likert-extremely poorly-extremely well (6)
<b>Demographics</b>	
How old are you?	Open-Ended
What is your gender?	Open-Ended
How would you describe your race/ethnicity?	Open-Ended
When watching the final video, did you believe that the news story was an actual Northwest Arkansas news story?	Likert-absolutely certain yes-absolutely certain no (6)
When you were watching the final video, did you believe that the woman shown in the video was actually missing?	Likert-absolutely certain yes-absolutely certain no (6)
When you saw the last video, how much danger did you think the woman was in?	Likert-extreme amount of danger-virtually no danger (4)
How likely do you think that it is that, sometime in the next week, you will be in the same location as the woman you're supposed to be looking for?	Likert-very unlikely-very likely (6)
To what degree have you formed the specific intent to be on the lookout for this woman?	Likert-not at all-very much so (4)

Appendix C. Scavenger Hunt Form

<b><u>Question</u></b>	<b><u>Question Type</u></b>
Tally of people passed (those within 2-4 feet or those who are sitting down and you pass) Male	Open-Ended
Tally of people passed (those within 2-4 feet or those who are sitting down and you pass) Female	Open-Ended
Tally of people interacted with Male	Open-Ended
Tally of people interacted with (other than confederate) Female	Open-Ended
Tally of confederate lookalikes	Open-Ended
Reminder.	
Is the participant in one of the reminder conditions?	Yes/No
If yes, did they receive the reminder before/during the encounter?	Yes/No
Did they scan the environment?	Yes/No
If yes, was the confederate in the environment that they scanned?	Yes/No
Where was the confederate?	Multiple Choice
Did the participant interact with the confederate?	Yes/No
Did the participant complete the task (scavenger hunt task)?	Yes/No
If no, explain:	Open-Ended
Did the participant piece together the sentence?	Yes/No
Does the participant remember the color of the flyers?	Yes/No
If yes, what colors do they report (give them at most 60 seconds to do this):	Open-Ended



Appendix D. Follow-Up Survey

<b><u>Question</u></b>	<b><u>Question Type</u></b>
To what extent were you actively looking for the person during your day to day activities?	Likert-not at all-very much so (4)
Was there ever a point where you thought you saw someone who might be that person, but you decided not to report it?	Yes/No
If yes...	
Could you please tell us more about the circumstances in which you saw this person?	Open-Ended
Where did you see this person?	Open-Ended
On what date did you see this person?	Open-Ended
Approximately what time of day did you see this person?	Open-Ended
Why did you not report seeing this person?	Open-Ended
How confident are you that the person you saw is the missing person?	0-100 (100)
Please indicate the name of the missing person as provided by the mock news video.	Open-Ended
What did the video say about the reason the person was being sought by the police?	Multiple Choice (5)
What did the video say about where the person was last seen?	Multiple Choice (11)
What email address were you supposed to contact if you saw the person from the video?	Open-Ended
If you didn't spot the person from the video, why do you think you did not spot the person?	Open-Ended
Was there anything in particular that would have helped you spot the person from the video?	Open-Ended
Do you think there was any connection between the Media Perceptions study and the Scavenger Hunt study?	Yes/No
If yes...	

What do you think the connection was between these two studies?	Open-Ended
Did anything about the second study (i.e., the Scavenger Hunt) make you suspicious? If so, what	Yes/No/Open Ended
We would appreciate any other thoughts you have about our study.	Open-Ended

Appendix E. Sighting Survey.

<b><u>Question</u></b>	<b><u>Question Type</u></b>
Please indicate the name of the missing person as provided by the mock missing news video.	Open-Ended
Could you describe what the person looked like when you spotted this person?	Open-Ended
What was the person wearing when you saw this person? (Be precise, imagine you are telling the police so that they can look for the person).	Open-Ended
What was the person's location when you spotted the person? Your response needs to be specific enough that someone would be able to read your description of the location and go to that exact location. Lack of specificity may disqualify you from being eligible for the prize money. We need a specific answer so that we can confirm whether the person was really there.	Open-Ended
On what date did you spot this person?	Multiple Choice
Approximate time you spotted the person	Multiple Choice
What day did you see the missing person's video that contained this person's picture?	Multiple Choice
Approximately what time of day was it when you saw the video that contained the person's picture?	Multiple Choice
How confident are you that the person you saw is the missing person?	0-100
Was there anything in particular that helped you spot this individual?	Open-Ended
Did you spot the missing/wanted person on your own, or did someone tell you where the missing/wanted person was or point the person out to you (e.g., one of your classmates who was also in the study, or anyone else)?	Multiple Choice
Did you tell anybody else who is taking part in the study about the location of the missing/wanted person or point the person out to anybody else who is taking part in the study?	Multiple Choice
We would appreciate any other thoughts you have about the study.	Open-Ended