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# The Effect of Identification Style on Confidence Inflation in Eyewitness Testimony

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Abstract

The purpose of this study is to determine whether confidence inflation in eyewitness testimony can be altered by the effects of self-perception and public commitment, as manipulated by identification style.  In order to investigate these specific effects, identifications and confidence reports were made using both private and public methods.  Additionally, target-present and target-absent lineups were used in order to assess their relative effects and to control participant accuracy.  Results revealed that the best confidence-accuracy correlations, as determined by a comparison from pre-lineup measures, were a result of post-lineup, private identifications. This indicates that self-perception may be more responsible for confidence inflation than public commitment, and that higher confidence levels do not necessarily lead to poorer confidence-accuracy correlations as previously believed. Implications for eyewitness identification and the justice system are discussed.

The Effect of Identification Style on Confidence Inflation in Eyewitness Testimony

The validity of eyewitness testimony is a hotly contested topic; various laboratory studies highlight the fallibility of human memory and question a person's ability to give accurate testimony (Loftus & Ketcham, 1983). Such research raises obvious concerns as to the reliability of eyewitness reports, as do real case studies of eyewitness testimony. Of most concern are those cases involving suspect identifications because errors can mean the difference between imprisonment and freedom, or even life and death. Statistics reveal that the primary cause of wrongful conviction in the justice system is inaccurate eyewitness identification (Borchard, 1932), a fact well illustrated by a study that holds eyewitness misidentification responsible for 52.3% of 8,500 wrongful convictions (Rattner, 1983).

Such identification errors, if discovered, are typically identified through DNA exoneration. Researchers have begun looking at specific samples within this exonerated population and found shocking results. Approximately 75% of the convictions overturned by DNA evidence had been initially sentenced due to eyewitness testimony ("The Innocence Project"). For example, a National Institute of Justice study investigating 28 individuals released from long-term prison sentences found that 24 of them had been convicted due to eyewitness testimony (as cited in Wells & Bradfield, 1998). Although long prison sentences are devastating enough, the results of misidentification can be much worse: a study looking at 40 overturned cases found that five of the people had been on death row at the time of their release (Wright, Self, & Justice, 2000). Unfortunately, not all of those wrongfully convicted are saved by DNA tests: over 7,000 people were executed in the twentieth century and at least 25 of them were innocent (as cited in Loftus & Ketcham, 1991). Since eyewitness testimony is the leading cause of these wrongful convictions (Borchard, 1932), these statistics indicate that eyewitness

testimony is not operating optimally.  Research needs to be done to determine why eyewitness

testimony is faulty and how this problem can be fixed.

**Factors Contributing to Eyewitness Error**

The fact that eyewitness testimony may be unreliable is not surprising to memory experts.

It is known that the initial perception of events (i.e., the actual experience) fades over time,

which may lead to inaccuracies.  Every time an event is recalled, the memory must be

reconstructed and with each recollection the memory can be changed.  This change can be a

product of succeeding events, other people's recollections or suggestions, an increased

understanding, or even a new context (Loftus & Ketcham, 1991).  Some suggest that prior

knowledge could also influence how people recall a specific experience.  The way a person

reconstructs memory is often heavily biased by their general knowledge of the world and often

relates to their prior experiences.  For instance, memory can be altered by preconceived notions

about the characteristics of the area that the crime occurred in or of the race of the perpetrator

(Rumelhart & Norman, 1973).  Remembering is viewed as a combination of information stored

in the past and information present in the immediate environment (Tulving & Thomson, 1973),

suggesting that memory may be contaminated by the past.

The errors found in eyewitness testimony not only result from the problematic nature of

memory, but also from characteristics inherent in the witnessing conditions, known as estimator

variables (Wells, 1978).  These variables can include characteristics of the event itself as well as

characteristics of the witnesses.  One such event characteristic is exposure duration, or how long

the eyewitness views the culprit while the crime is being committed (Wells, Olsen, & Charman,

2002).  Those who view the culprit for a longer period of time should be more accurate than

those with a brief view.  Other event characteristics include viewing distance, with longer

distances resulting in poorer accuracy (Lindsay, Semmler, Weber, Brewer, & Lindsay, 2008), and retention intervals, with longer intervals resulting in poorer memory (Deffenbacher, Bornstein, McGorty, Penrod, 2008).

Characteristics of the witnesses are also extremely important to accuracy. Some of the most significant witness characteristics include age (Wright & Stroud, 2002) and stress (Loftus, 1980). Studies have shown that young children and elderly populations may have poorer recall (Pozzulo & Lindsay, 1999; Yarmey, 1984) and that there may be an "own-age" effect, meaning that people are more accurate at identifying suspects in their own age group (Wright & Stroud, 2002). Witness stress is also a potential source of error. Features of the crime such as violence or the presence of a weapon can greatly affect arousal and attention (Loftus, 1980). As suggested by the Yerkes-Dodson Law, there is an optimal level of arousal, and higher levels of stress result in lower performance and therefore a decreased ability to accurately recall the event (Yerkes & Dodson, 1908).

In addition to memory and estimator variables, system variables can also lead to eyewitness error. System variables are those that are under control of the criminal justice system and include aspects such as poor questioning and identification techniques. One particular issue is the introduction of post-event information and misinformation, which is a product of the wording of witness interrogation questions. The phrasing of a question can affect the initial memory of an event and then alter how that memory is stored for future reference (Loftus, 1975). For instance, if an officer initially asks a suspect how fast a car was going when it passed a barn, the eyewitness will later be more likely to report having seen a barn than someone who was simply asked how fast the car was going. This is particularly troubling if, as in the reported studies, there was no barn present (see Loftus, 1975). These findings indicate that a

presupposition of an event increases the later assertion that the event actually occurred. Thereby, information attained after the event can alter the representation of the event itself (Loftus, 1975; Loftus & Ketcham, 1991; Tulving & Thomson, 1973). Questions cannot only alter memory by introducing subsequent information; they can also impact memory simply through word choice. When asking for estimates of speed in a crash, researchers who used the term "smashed" rather than "bumped" received estimates of speed that were 10 mph faster and were more likely to receive reports of broken glass at the scene (Loftus, 1975). These studies indicate that the storage of a memory is extremely vulnerable to post-event questions and may not be entirely reliable.

Another problematic aspect of police interrogations is postidentification feedback. Studies have shown that when eyewitnesses are given positive confirmation after making a lineup choice, specifically "Good, you identified the suspect," participants' confidence levels jump drastically (e.g., Wells & Bradfield, 1998). The participants who received positive feedback not only reported more confidence in their identification decision, but also reported that they had a better initial view of the culprit and that they were naturally adept at recognizing faces (Wells & Bradfield, 1998), which suggest an increased confidence not just in the specific task, but in identification abilities in general.

One of the final issues with eyewitness error involves poor lineup construction (Cutler & Penrod, 1988). Single-suspect lineups consist of one suspect and the remaining lineup members are known innocents, or foils. Sometimes the foils in the lineup are not carefully chosen and do not fit the description of the suspect (Wells, 1993). Although the nominal size of the lineup may be six, if only one suspect matches the description of the target, the lineup has a functional size of one. In lineups with a low functional size, the concern is that the witness can infer which

lineup member the police expect them to choose; actual recognition is not needed to make this choice. Because police would be unlikely to exert the time and effort of conducting a lineup unless they had a good reason to do so, the witness might infer that the suspect is probably the perpetrator (Wells, 1993). By creating lineups with low functional size, police officers essentially force the eyewitnesses' identification decision.

Various factors contribute to eyewitness error and make eyewitness testimony seem less than reliable. Much of the research investigating eyewitness error blames poor police questioning (Loftus, 1975), but the studies above show that aspects outside of police control, including estimator variables and the very nature of memory, can be just as damaging to accuracy. This is troublesome because it indicates that even if police officers do their jobs perfectly and testimony is not tainted by poor questioning techniques, it may still be faulty. Eyewitness error can be a product of the faulty nature of memory, estimator variables, or system variables. Having so many potential sources of error results in a low likelihood of extracting accurate testimony and makes many hesitant to trust eyewitnesses.

**Factors Contributing to False Convictions**

Factors that contribute to eyewitness error are naturally problematic, but it is arguably more detrimental when judges and juries rely on such errors, potentially leading to false convictions. A major cause of concern is that eyewitness identification/testimony is often perceived to be reliable and valid. One factor contributing to this belief is that, when incorrect, witnesses are not being malicious, nor are they intentionally accusing innocent suspects; rather, they genuinely believe in the truth of their testimony (Loftus & Ketcham, 1991). This lack of malice has two consequences, the first being that detecting a false identification is not as simple as detecting a lie; there are no clear markers to look for. Police officers can often detect lies in

testimony by identifying features such as frequent pauses, which indicate a suspect's increased effort to generate a consistent story (Mann, Vrij, & Bull, 2002). Unfortunately, such useful markers are not available when witnesses are not intentionally lying.

The second problem is that witnesses often show great confidence on the stand, even when incorrect in their identifications. This is especially problematic because jurors view confidence as the single most important quality when determining the accuracy of testimony (Wells, Lindsay, & Furguson, 1979). The average person expects those who seem confident in the accuracy of their statement to be, on average, more accurate: confidence implies credibility and people tend to believe those who seem credible (Williams, Loftus, & Deffenbacher, 1992). This reliance on confidence is further complicated by the finding that confidence and accuracy have essentially no correlation (Fleet, Brigham, & Bothwell, 1987; Lieppe, 1980; Sporer, Penrod, Read, & Cutler, 1995). A meta-analysis of 25 studies found that there was no consistency in the pattern between confidence and accuracy, with almost equal proportions of slightly positive, slightly negative, and zero correlations (Deffenbacher, 1980). Ideally, if confidence was to be a reliable indicator of accuracy, the relation would need to be positive and relatively high. However, only one study found a correlation as high as .87, with the remaining positive correlations typically ranging from .06 to .30, indicating that there is neither a strong nor reliable relation between confidence and accuracy (Deffenbacher, 1980). The impact of this disparaging lack of correlation is further augmented by the fact that jurors seem indifferent to the information: even when jurors are informed of the lack of correlation, they still rely on confidence above all else when making their decisions (J. Borrill, personal communication, February 17, 2010).

Eyewitness testimony has been shown to be unreliable in many instances (Loftus &

Ketcham, 1991; Wells & Bradfield, 1998; Wright & Stroud, 2002), but what makes this finding all the more troubling is that faulty testimony is readily believed. Because eyewitnesses truly believe the statements they make, they give clear and concise testimony that they are extremely confident in (Loftus & Ketcham, 1991). Judges and jurors then falsely associate this high level of confidence with accuracy and trust the given testimony (Wells et al., 1979). The fact that this faulty association between confidence and accuracy exists in the mind of the public makes confidence inflation in eyewitness testimony a huge problem for the court system.

**Confidence Inflation**

Jurors' inability to disregard confidence highlights a major problem in the justice system. Because jurors appear to be unable to resist relying on confidence, the best solution may be to improve the correlation between confidence and accuracy. This would, in essence, increase the reliability of eyewitness identification. As a result of improving the confidence-accuracy correlation, when jurors inevitably rely on confidence their judgment might actually be indicative of accuracy and result in a less detrimental outcome (i.e., false conviction). Previous studies looking at the confidence-accuracy correlation suggest that confidence inflation is the key reason for the poor correlation (Bradfield, Wells & Olsen, 2002; Wells & Bradfield, 1998). Thus, in order to improve the correlation, confidence inflation needs to be reduced.

Confidence inflation can potentially be influenced by both internal and external factors. Some of these external factors are system variables, or factors that are under control of the legal system, and include aspects such as preparation for cross-examination (Wells, Ferguson & Lindsay, 1981), passage of time (Wells & Bradfield, 1998), and post-identification feedback (Wells & Bradfield, 1998). The justice system has recognized such problems and as a result, many social reform agencies have suggested alterations to police procedure ("The Innocence

Project"). One such reform measure is the utilization of a double-blind identification procedure, in which the questioning officer does not know who the suspect is. This is done in order to reduce the effects of postidentification feedback, which was mentioned earlier. Despite the acknowledgement of these problems and psychologists' appeal for reform, not all organizations take heed of the suggestions. For example, the double-blind procedure has only been implemented as a standard procedure in ten U.S. jurisdictions ("The Innocence Project").

The fact that internal and external factors can both influence confidence makes the problem of eyewitness accuracy much greater. Originally the problem was seen to be external, influenced by factors such as system variables that could reduce accuracy and increase confidence in testimony. However, now it is understood that even if all system variables are properly controlled for, there are many other factors that could undermine the accuracy of testimony. Even with proper external control, internal factors could be operating that may lead to confidence inflation. Such internal factors could include the processes of verbalization/public commitment and self-perception.

Public, verbal commitment to a position is known to strengthen one's belief in their position (Brehm & Cohen, 1962; Kielser, 1971), but it has also been found that written commitment can strengthen one's belief as well (Bergman & McAllister, 1982; Burn & Oskamp, 1987). This has been illustrated in a variety of circumstances, including community efforts to increase recycling: 42% of households that did not recycle began to do so after being asked to sign a petition in support of recycling, whereas only 11% of the control group began recycling (Burn & Oskamp, 1987). In the realm of eyewitness testimony, commitment has been shown to reduce a witnesses' tendency to change their testimony. When participants viewed a car accident, those who were asked to sign a statement estimating the car's speed were significantly

less likely to change their estimate two weeks later (Bergman & McAllister, 1982).  Since public commitment appears to strengthen and solidify witnesses' beliefs in their positions, it is expected that commitment (i.e., identifying a suspect) should strengthen witnesses' beliefs in their identification decision and thereby inflate their confidence.  Thereby, it is expected that those who publicly commit themselves to a lineup choice will express an elevated level of confidence (Lieppe, 1980).  One potential explanation for this expected trend comes from the theory of cognitive dissonance.  According to this theory, psychological tension arises when someone has conflicting attitudes, beliefs, or behaviors.  In order to reduce this internal tension they change one of these features in order to get their viewpoints in line and create consistency (Festinger, 1957).  In the case of eyewitness testimony, if a person's action of identifying a suspect is in conflict with an internal uncertainty over who the suspect really is, they need to change one of these features.  It is often easier to change attitudes than behaviors, so in this case the easiest way to reduce tension would be to increase confidence in the choice rather than retract the identification.

Another potential source of confidence inflation is suggested by self-perception theory. One of the earliest scholars of self-perception theory argued that perceptions of one's own behavior can create an emotion or attitude (Bem, 1972).  Typically when people are uncertain of how they feel, they look back on their past behavior to gain insight.  People's natural tendency to self-reference in order to determine their attitudes can be clearly seen in eyewitness testimony research.  One study examining witness confidence asked subjects to rate their confidence after making an identification decision, giving them the opportunity to refer back to their past decision before deciding how confident they were.  Subjects either rated their confidence immediately after the identification or after first viewing a video of their identification performance.  Those

who rated their confidence without viewing the video revealed a confidence-accuracy correlation of .04, whereas those who viewed the video improved the correlation to .48. This shows that subjects do indeed reference their past behavior to make decisions about their attitudes; these participants were alerted to valid but previously unobserved aspects of their overt behavior, such as response latency, that helped them determine their confidence (Kassin, 1985). This study showed that people do indeed utilize self-perception, examining past behavior in order to determine their attitudes.

Although self-perception had a positive effect in this case, essentially improving the confidence-accuracy correlation, it may not always have a positive effect. In most cases witnesses are not offered the opportunity to view a video of their performance: they do not get the additional information about their response latency or facial expressions, they must simply rely on the fact that they made a choice. In such studies, eyewitnesses show increased confidence after making an identification, reflecting the self-analysis that since they were willing to identify the person they must have been confident in their choice (Lieppe, 1980). These instances indicate that having made an identification in the past will create an attitude of confidence in the present (Lieppe, 1980).

**Current Study**

The current study replicates the conditions of typical real world identifications in which eyewitnesses are not offered a chance to view their performance and simply must rely on the fact that they made a choice when they are assessing their confidence. In such settings, the internal factors of public commitment and self-perception are potentially as influential as system variables at increasing confidence inflation. In order to reduce confidence inflation and improve the confidence-accuracy correlation, these internal factors need to be further investigated.

This research has two goals: the first is to determine the relative impacts of commitment and self-perception on confidence inflation and the second is to determine if the effects of these internal processes can be reduced, thereby improving the confidence-accuracy correlation. In order to separate these two factors, this study will manipulate style of suspect identification (public, private), leaving only one condition open to potential influences of public commitment. In the public condition the confidence rating will be given after the identification is verbally reported as well as written and signed. In the private condition the confidence report will be given before the identification is reported, leaving confidence ratings unaffected by public commitment. Both public and private conditions are subject to self-perception, because both involve reporting back on previous behavior, but only the public condition is subject to public commitment because it is the only condition that involves voicing and writing the identification before giving a confidence report. Thus, it should be those in the public condition with the greatest confidence inflation.

## Method

### Participants

Seventy-nine Colby College students (61 female) were recruited through Experimetrix and General Announcements and were either given course credit or monetary compensation for their participation. An additional 30 students (22 female) participated in the pretest. In order to establish the relation between confidence and accuracy, the design of the study required control over participant accuracy by manipulating suspect presence in the lineup. Thus, to gather correct responses, a target-present lineup was used, and to gather incorrect responses, a target-absent lineup was used. Previous research has shown that in target-present lineups, participants are reliably accurate in their identifications, however, participants will often incorrectly identify a

suspect in target-absent lineups (Bradfield et al., 2002). In the event that a participant in the target-present lineup chose incorrectly or a participant in the target-absent lineup correctly rejected the lineup, their data was removed. As a result, there were 61 usable participants in the main study and 30 in the pretest.

**Pretest**

A pretest was conducted in order to establish how to describe the lineup to participants, specifically whether or not biased language should be used in alerting the participants to the suspect's absence or presence. In scenarios involving biased language, participants are not informed that the perpetrator may be absent from the lineup, which often makes them feel that they must identify a suspect (Bradfield et al., 2002). By manipulating bias in the language, the goal was to ascertain which wording would lead to the most identifications (i.e., inaccurate decisions) in the target-absent condition. Inaccurate decisions were desired in the target-absent condition because the target-present condition typically leads to a high rate of accuracy (Bradfield et al., 2002). In order to run proper correlations between confidence and accuracy, a sufficient number of both accurate and inaccurate responses need to be collected.

In a design similar to the public target-absent conditions described in the main study below, participants were asked to choose a suspect from a lineup and identification accuracy along with pre- and post-lineup confidence was assessed. However, in the pretest participants faced one of three language conditions. They were either explicitly told that the suspect may not be in the lineup (unbiased), were asked to identify the suspect if they believed he was present (neutral), or were simply told to identify the suspect from the lineup (biased). A chi-square analysis indicates that accuracy was not equally distributed across the language conditions, $X^2$(2, $N$=30)=8.900, $p$=.012. As expected, more participants were likely to incorrectly identify a

suspect when they received the biased language (100%) than those that received the unbiased (40%) or neutral (50%) language. There were no effects on confidence levels as measured before or after lineup presentation (both $ps>.381$).  This finding replicates previous research in the field (Bradfield et al., 2002), and as such, biased language was used during the actual testing.

**Materials and Procedure**

Upon entering the lab, participants were asked to sit down at a desktop computer, where a PowerPoint slide show was awaiting them on the screen.  The slide show consisted of a 43 second long video that depicted a man planting a bomb on a roof top, a Boggle-style word find, and a lineup containing six mugshots that were presented simultaneously.  The video and lineups were taken from a previous study (Bradfield et al., 2002) and the word find was randomly generated by computer.

As done in previous research (see Bradfield et al., 2002), participants were told that the study was concerned with how people form impressions, and that they would be asked to watch a brief video and then answer questions about what they saw.  Participants were misled about the purpose of the study in order to keep the witnessing conditions true to life: eyewitnesses are typically not informed in advance that they will be witnessing a crime, so they are often caught off guard and are not focused on remembering every detail of the scene.

After being given this introduction, participants then viewed the video of the rooftop bomber.  After seeing the video they were told that they would later be asked to attempt to identify the bomber from a lineup and were asked how confident they were that they could do that on a scale from 0% (not at all certain) to 100% (totally certain).  After answering, participants were given a Boggle-style word find consisting of an 8×8 grid.  This operated as a filler task which they were given 5 minutes to complete.  The words they found needed to be at

least three letters long and all the letters needed to be connected either horizontally, vertically, or diagonally.

Once the five minutes were up, participants were then asked to identify the bomber from the video. The identification was done differently depending on condition. Participants viewed one of two possible lineups; one that contained the target (target-present condition) or one that did not contain the target (target-absent condition). The lineups in both conditions were organized in the same way, with mugshots organized into two rows of three. In both conditions the photos remained in the same positions throughout all trials, with the exception of in the target-present condition in which the bomber was in Position 1.

In the private condition, half the participants looked at the target-present lineup and half looked at the target-absent lineup. Then they were all were asked to decide who the bomber was and were told to alert the experimenter once they had made a decision but not to say what that decision was. Once they reported that they had made a choice, participants were asked how confident they were that they made the correct decision, again on a scale from 0-100%. After giving their confidence ratings, participants were then asked to report their identification decision.

In the public condition, half the participants looked at the target-present lineup and half looked at the target-absent lineup. Then they were all asked to decide who the bomber was and were told that the experimenter would first take their verbal statement of identification and then ask them to write down their statement of choice for record keeping purposes. Once the participants made a decision they told the experimenter and were then given a sheet of paper to fill out. This sheet consisted of one sentence, simply stating "I, (participant's name), identify suspect number (#) as the bomber". Then there were lines to sign and date underneath. Once

participants had verbalized and written their suspect identification, they were asked to rate how confident they were that they had made the correct decision, on a scale from 0-100%.

At the end of the experiment, all participants were fully debriefed and any participant questions were answered.

## Results

### Confidence

The first focus of analysis was eyewitness confidence level, both before and after lineup presentation. Confidence reports taken pre-lineup were subjected to a 2 (identification style: public, private) × 2 (lineup style: present, absent) between-subjects ANOVA. As expected, confidence levels were statistically similar in all conditions and relatively high ($M$=75.503; see Figure 1). Of course, at this point in the procedure the identification and lineup variables had yet to be manipulated, so one would not expect differences between conditions (all $ps$>.366). As such, this data provided us with information as to baseline confidence post-event but pre-lineup, and showed that it was equal across the four experimental groups. Confidence reports taken post-lineup, and subjected to the same ANOVA, indicated that there was an effect of lineup style, $F(1,57)$=15.151, $p$<.001 (see Figure 2). Specifically, once shown the lineup, participants were more confident in their ability to identify the suspect when he was present in the lineup than when he was not. There were no other effects (all $ps$>.379).

This research allows for an analysis of confidence change from pre- to post-lineup confidence measures. To find confidence change, post-lineup confidence was subtracted from the pre-lineup baseline. Thus, positive numbers indicate a decrease in confidence (see Figure 3). These values were first subjected to a 2 (identification style) × 2 (lineup style) between-subjects ANOVA. The analysis revealed an effect of lineup style, such that there was greater confidence

decrease for those who saw the target-absent lineup than the target-present one, $F(1,57)=18.844$, $p<.001$. There was also a marginal effect of identification style, showing that there was a greater decrease in confidence when identifications were made publicly, compared to privately, $F(1,57)=2.822$, $p=.098$. Though there was no interaction between the two variables ($p=.321$), planned comparisons indicate that there is no difference in identification style in the target absent lineup ($p=.636$), but that in the target present lineup there was a moderately greater decrease in confidence when identifications were made publicly compared to privately ($p=.061$).

To determine if these change values represent a significant decrease in confidence from pre- to post-lineup measures, the values were then subjected to a 2 (identification style) x 2 (lineup style) x 2 (time of confidence report) mixed design ANOVA, with identification style and lineup style as between-subjects variables and time of confidence report as a within-subjects variable. Analysis revealed a marginally significant interaction between time and identification style, $F(1,57)=2.822$, $p=.098$, and planned comparisons indicated that this interaction was present in the target-present lineup, $F(1,29)=10.744$, $p=.070$, but not in the target-absent lineup, $F(1,28)=45.067$, $p=.632$. In the target-absent lineup, both public and private confidence ratings changed significantly over time (both $p$s<.01), but in the target-present lineup, public confidence ratings changed significantly over time ($p=.001$) while private confidence ratings did not ($p=.340$). Specifically, confidence ratings taken privately with a target-present lineup were the only ratings that failed to show a significant decrease in confidence from pre-lineup to post-lineup measures.

**Confidence-Accuracy Correlation**

Once confidence levels were measured, the next step was to examine the correlation between confidence and accuracy. Identification accuracy (coded as 1 and 0 for accurate and

inaccurate, respectively) was manipulated by suspect presence or absence, in the lineup, and as such could be used in a point-biserial correlation with confidence levels, both before and after lineup presentation (see Table 1). Results reveal that pre-lineup there was no relation between confidence and accuracy (both $ps > .840$). As would be expected from two near-identical correlations, there was no difference between the two based on identification style (again, a variable yet to be manipulated), $z=0$, $p=1$.

The correlation between confidence and accuracy post-lineup, however, is another story. When identifications were made privately, it seems that the two were positively correlated, $r(30)=.569$, $p=.001$. As such, when private reports were given, higher confidence levels were related to greater accuracy. A similar, though marginally significant, pattern emerged for publicly made reports, $r(31)=.347$, $p=.056$. Further analyses revealed that there were no significant differences between the correlations for reports given post-lineup, $z=-1.05$, $p=.294$.

Though there may not be differences *within* each confidence reporting (i.e., public v. private at confidence report pre-lineup; public v. private at confidence report post-lineup), it would be valuable to see if there is indeed a strengthening of the relation between confidence and accuracy from pre-lineup to post-lineup. When identifications were made publicly, there was no significant difference in the relation, $z=-1.21$, $p=.226$. However, when identification were made privately, the relation between confidence and accuracy was significantly stronger when made post-lineup compare to pre-lineup, $z=-2.23$, $p=.026$. Thus, it appears that there is some diagnostic value for making identifications privately and assessing confidence post-lineup.

## Discussion

### Confidence

The initial confidence measure taken pre-lineup was designed to establish a baseline confidence level.  This could then be compared with confidence ratings taken post-lineup, once lineup and identification variables had been manipulated, in order to see their relative effects.  Since no variables had been manipulated at the time of this initial confidence report, it was expected that all confidence ratings would be relatively equal, which is what was found.  Pretest data as well as previous research (e.g., Sporer, 1993) also indicated that these levels would be higher than post-lineup confidence.

In post-lineup confidence measures there was an effect of lineup style, such that participants reported greater confidence levels when exposed to the target-present rather than the target-absent lineup, but there was no effect of identification style, meaning that public and private identifications did not differ significantly in their confidence ratings.  The effect of lineup style was expected but the lack of effect in identification style was not.  In regards to lineup style, it was hypothesized that those exposed to the target-absent lineup would show less confidence.  Even though target-absent participants still made a choice, they should recognize on some level that the correct suspect was not there and as a result should show a decreased confidence relative to their target-present counterparts.

In terms of identification style post-lineup, it was hypothesized that those in the public identification condition would show the highest confidence levels.  This was because both public and private conditions were thought to be subject to the influences of self-perception theory whereas the public condition would have the added influence of verbalization/public commitment, giving an added boost to confidence levels.  However, the data revealed that those in the private identification condition actually had the descriptively highest confidence levels.  This is likely because public identifications do not encompass self-perception theory, as

originally thought. Since self-perception theory "concerns the effect of self-directed cognitions on personal attitudes" (Shaw, Zerr, & Woythaler, 2001, p. 143), it is likely that self-perception processes only have an effect on privately held identifications and no longer apply once those identifications are publicly disclosed (Shaw et al., 2001). Another reason self-perception may be absent from public identifications is that once identifications are shared with others, interpersonal processes may overshadow any self-perception effects. It is likely that participants lower their confidence ratings when forced to declare them publicly in an effort to present themselves favorably to others, particularly when there is a chance that they could be wrong. Embarrassment could result from appearing overly confident about an incorrect response, so participants report lower confidence as a self-presentation strategy (Shaw, Appio, Zerr, & Pontoski, 2007; Shaw et al., 2001). The knowledge that participants use self-presentation strategies to reduce embarrassment may be useful in helping police officers modify identification procedures. It has been shown that when there is only one witness, public and private confidence ratings are the same (Shaw et al., 2007), indicating that participants are willing to rate confidence higher when they have no fear of being contradicted. Therefore, when conducting investigations, police officers should either have multiple witnesses or at least make the sole witness think that there are multiple witnesses, in order to moderate any confidence inflation that might otherwise occur.

Both the definition of self-perception theory and the use of self-presentation to avoid embarrassment seem to indicate that self-perception theory was not in effect during public identifications. This means that the public condition reflects verbalization/public commitment and the private condition reflects self-perception theory. Since the private condition revealed

greater confidence levels post-lineup, it can be inferred that self-perception theory has a greater impact on confidence inflation than does public commitment.

**Confidence-Accuracy Correlation**

The correlation trends that were expected at the beginning of the study ended up being correct despite the unexpected post-lineup confidence levels. Correlations were expected to be poorest pre-lineup because confidence levels were extremely high and participants had yet to see the lineup they would be asked to choose from. It was expected that higher confidence levels would lead to poorer correlations because confidence inflation has been shown to be problematic in the past (Bradfield et al., 2002; Wells & Bradfield, 1998). Therefore, the best correlation was expected to result from the identification style that had the lowest confidence level. This prediction, however, did not prove to be accurate. The worst correlations were in fact in the pre-lineup conditions, as expected, but the best correlation was the private identification post-lineup, even though it had the highest confidence rating of both post-lineup measures. This shocking result indicates that it is not necessarily higher confidence levels that produce poor correlations and suggests that low confidence levels can also produce poor confidence-accuracy correlations.

The poor correlations found pre-lineup indicate that asking an eyewitness to assess their confidence at being able to identify a suspect prior to seeing a lineup will not be a valid indicator of later accuracy. These confidence levels are too high and result in poor correlations. Significant differences between pre-lineup correlations and post-lineup correlations indicate that eyewitnesses are better able to predict accuracy after having seen the lineup, perhaps because they are better able to understand the complexity of the task before them. These post-lineup correlations are greater because their confidence levels are lower, reflecting a greater reality in their estimation of their ability to correctly identify the suspect.

The significant post-lineup correlations indicate that asking an eyewitness to assess their confidence either publicly or privately will be a valid indicator of later accuracy.  However, when comparing improvement in correlations from pre-lineup to post-lineup, only the private condition showed significant improvement.  It is possible that the lack of significant change in the public condition is due to confidence levels in this condition being too low, which as suggested earlier can also result in poor correlations.  Despite having lower confidence levels than the private condition post-lineup, the public condition revealed descriptively lower correlations, suggesting that high confidence levels are not the only factors that damage correlations.  These trends suggest that there is an optimal confidence level somewhere between the 75% confidence seen in the pre-lineup measures and the 59% confidence seen in the public post-lineup condition.  The private post-lineup condition, at 69% confidence, is closer to this optimal level and therefore reveals a better confidence-accuracy correlation.

In addition to being significant, the post-lineup correlations were much higher than expected.  It is likely that these high correlations are misleading and have more to do with the study's method than the specific features of the identification procedure.  In this study participants watched a video of a staged crime and reported their identifications and confidence ratings to a student experimenter.  In the event of a real crime, witnesses would view the offense in person rather than watch a video and they would report to a police officer rather than a fellow student.  The act of reporting to a real officer about a real crime carries greater potential for anxiety and embarrassment upon being incorrect.  Also, in real crimes the testimony a witness gives is far more significant because it could potentially put someone in jail.  Since features of a real crime would likely enhance self-presentation effects to avoid embarrassment, the reported confidence levels would be lower than they were in this study.  The public confidence ratings

given post-lineup were already lower than optimal, which reduced the strength of the confidence-accuracy correlation, so lowering these levels any further would result in even worse correlations. This means that the significant public, post-lineup correlation seen in this study would be reduced in the event of a real crime. The effect of a real crime on private correlations is less certain. The private confidence ratings given post-lineup were higher than the public ratings but lower than the pre-lineup ratings, indicating that they were closer to the optimal level of confidence. Thus, the effect of lowered confidence will depend on what the optimal level of confidence is: lowering confidence could either improve correlations by bringing confidence closer to its optimal level, or worsen correlations by bringing confidence beneath its optimal level. The impact of a real crime on private correlations is uncertain, but it would likely be detrimental to public correlations. This suggests that the apparent usefulness of public identification styles is actually overrated due to the methodology in this study and that private identification is a more valuable procedure.

**Recommendations**

The results of the current study indicate that although confidence inflation is a problem in eyewitness testimony, it is not the only problem. Confidence levels that are too low can also produce poor correlations. When measured post-lineup, public confidence ratings were lower than private confidence ratings but still produced the worst correlations. This, in combination with the knowledge that the poor correlations found pre-lineup were a product of high confidence levels, indicates that there is an optimal level of confidence and poor correlations can result from confidence that is both above and below this optimal level. High confidence levels with poor confidence-accuracy correlations have been shown to lead jurors to believe false testimony, but it is possible that low confidence levels with poor confidence-accuracy

correlations could be just as detrimental: since jurors rely on confidence above all else, they may interpret low confidence as inaccuracy and reject testimony that is true.  High confidence can lead to false convictions and low confidence could potentially lead to a failure to arrest the criminal.  Neither situation is ideal and in order to prevent both from happening identification styles that produce better correlations need to be utilized.

This current study indicates that private identifications made post-lineup produce the highest confidence-accuracy correlations, but there is still much work to do in this field.  It is likely that changes can be made that would produce even better correlations and be of more use to the justice system.  The results show that low confidence levels can also result in poor confidence-accuracy correlations, meaning that future identification styles cannot simply be designed to lower confidence levels; they must be designed to find the optimal level.  A potential way to find this optimal level would be to create one identification procedure that encompasses both self-perception theory and public commitment.  Self-perception theory leads to high levels of confidence whereas public commitment leads to lower levels of confidence, and by combining them in one procedure they may be able to moderate each other and result in an optimal level of confidence.  In order to create such a condition, the act of public commitment needs to avoid verbal declaration that could negate self-perception theory as well as avoid self-presentation pressures.  A potential way to do this is to have participants write down their identification choice and confidence levels and leave the room before the experimenter looks at the response. Leaving the room early would enable them to escape the embarrassment of being confident yet incorrect, while writing their answer would allow them to avoid verbally declaring their choice and may allow them to retain self-perception influences.

Although the current study indicates that a private identification procedure used post-lineup produces significant correlations, it is likely that a modified identification procedure could produce even better correlations by finding the optimal confidence level. It is important to find the best confidence-accuracy correlation possible because jurors rely on confidence far too much, even when told not to (J. Borrill, personal communication, February 17, 2010). Attempts to prevent this reliance has proven ineffective, so the next logical solution is to improve the correlation so that confidence will actually be indicative of accuracy and jurors' reliance on confidence will be less detrimental.

**Conclusion**

Various unrelenting factors relating to the nature of memory and witnessing conditions limit the ability of eyewitnesses to be accurate. Witnesses cannot be expected to be accurate all of the time, so the justice system needs to make modifications that enable a better detection of this inaccuracy. If false convictions continue to happen and innocent people continue to be thrown in jail and/or executed, people will lose faith in the justice system. The fear of being randomly accused of a crime one did not commit, as well as the fact that the actual criminals remain on the streets, could create a culture of fear in which people distrust criminal justice professionals and the system itself. Government bodies will not want to fund an ineffective system that the citizens do not support, and this will only compound the systematic problems that already exist. In order to make people feel safe and allow them to trust and support the system that governs them, modifications need to be made that will increase the effectiveness of this system and prevent false identifications. Such belief in and support of the system will hopefully allow advancements to occur and the system will continue to see great improvement, thereby keeping criminals off the streets and creating a safer environment for citizens.

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Table 1

*Confidence-accuracy correlations as a function of identification style and timing of confidence report*

| | Timing of Confidence Report | |
|---|---|---|
| Identification Style | Pre-Lineup | Post-Lineup |
| Public | $.038_a$ | $.347_{ab}$ |
| Private | $.038_a$ | $.569_b$ |

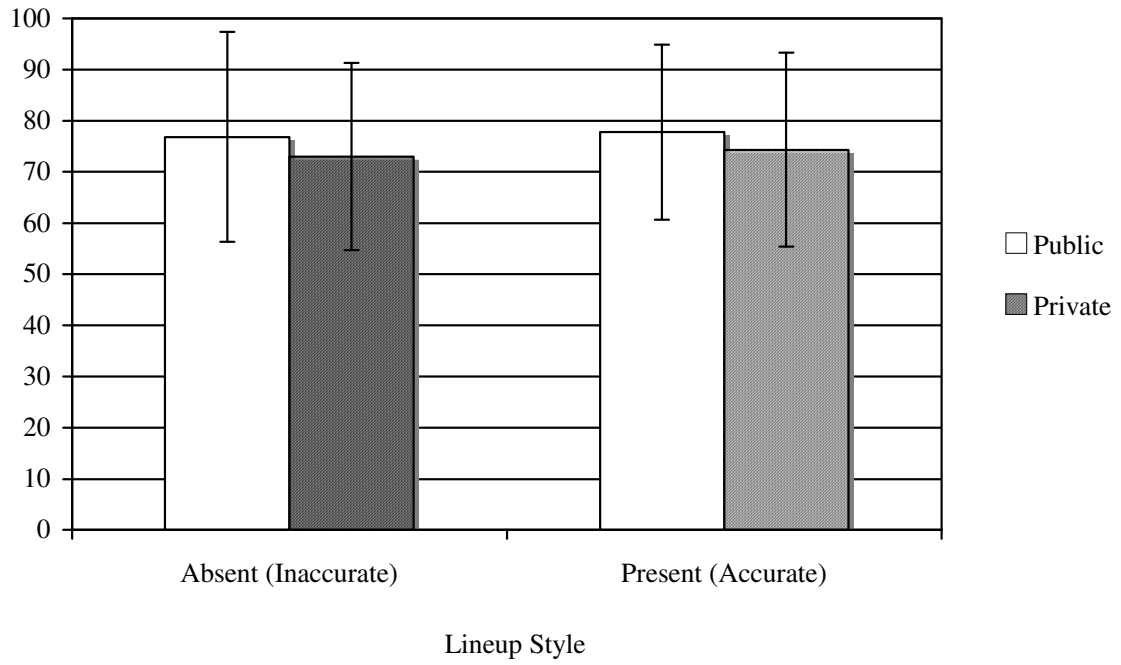Note: Correlations with different subscripts are significantly different from each other.

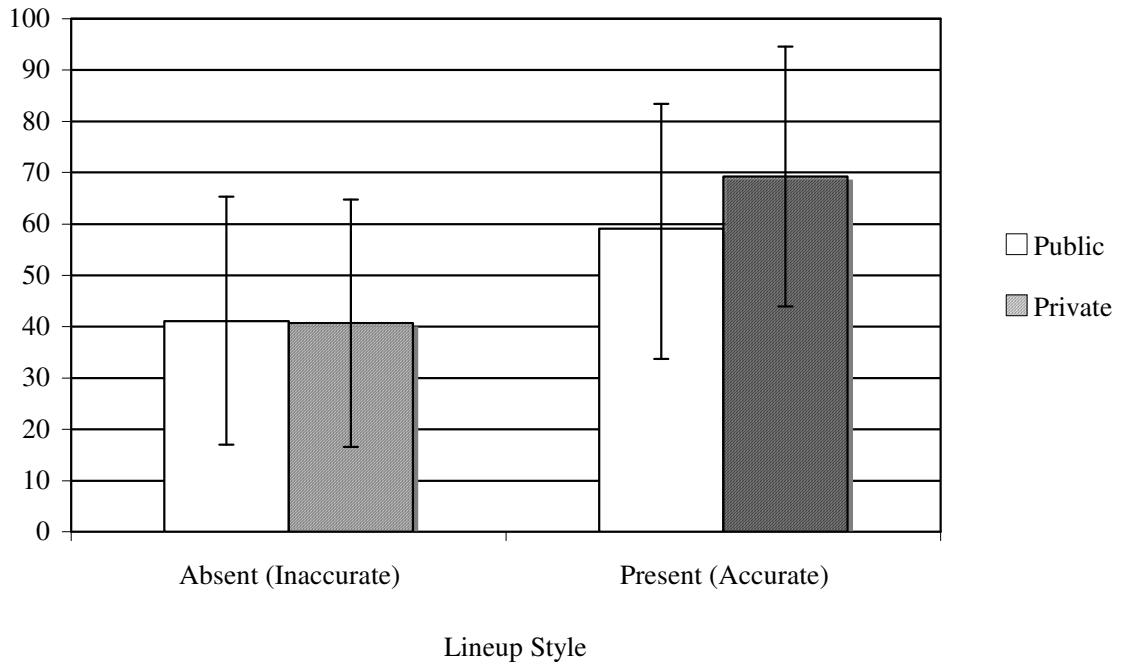Figure 1. Mean confidence ratings taken pre-lineup

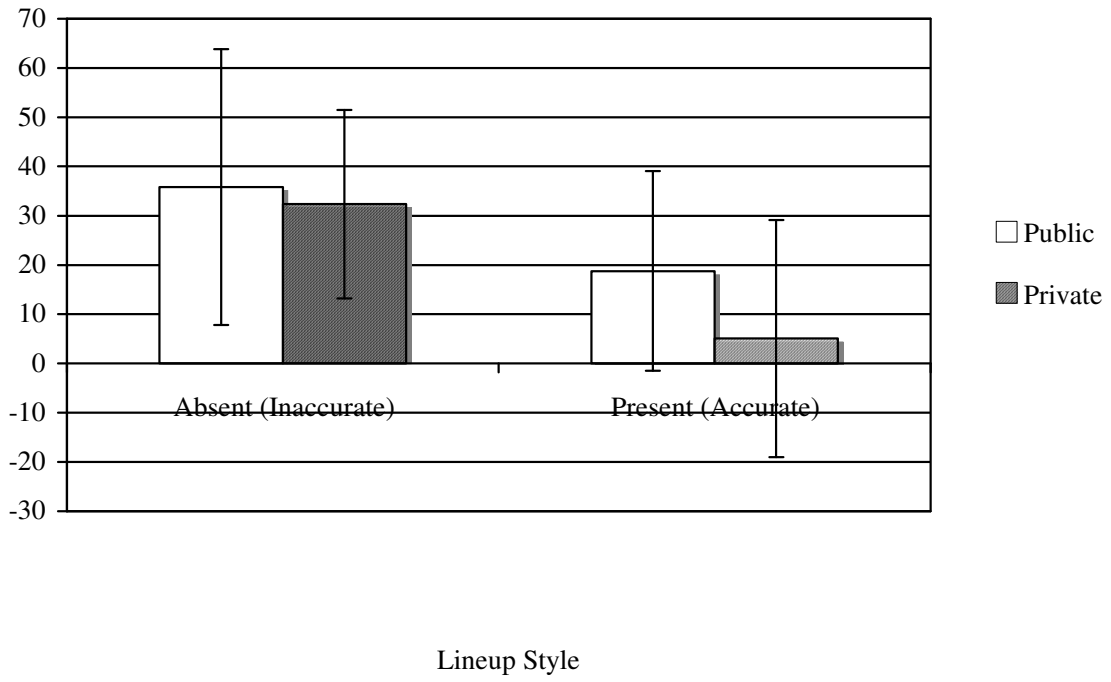Figure 2. Mean confidence ratings taken post-lineup

Lineup Style

Figure 3. Confidence change from pre-lineup to post-lineup