THE IMPACT OF SEQUENTIAL LINEUPS ON UNCONSCIOUS TRANSFERENCE: DOES KNOWING THE NUMBER OF PHOTOS IN THE LINEUP MATTER?

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ABSTRACT

Unconscious transference occurs when a witness misidentifies a familiar but innocent person from a lineup. In Ross, Atkinson, Rosenberg, Pica, and Pozullo (2014), the use of a sequential lineup procedure, in which faces are presented one at a time, drastically reduced the unconscious transference error, but at the cost of also reducing the rate of correct identifications. However, in that study, the participants were not told how many faces they would view in the sequential lineup. In the present study, participants viewed a video of a staged crime that did or did not contain a bystander who looked similar to the thief, then subsequently viewed a lineup with either the thief or the bystander in it. Knowing the correct number of faces to be seen reinstated the unconscious transference effect with no corresponding increase in the rate of correct identifications. Other findings and policy implications are discussed.

DEDICATION

This thesis is dedicated to my father, without his love and support throughout the past six years; I would not be where I am today. Thank you dad, for all that you have done for me, and all that you continue to do.

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

Eyewitness evidence is often used in a court of law and is one of the strongest pieces of evidence on which a jury can rely (Laub & Bornstein, 2008). However, over the past several years, the Innocence Project has found and exonerated over 300 people that were wrongfully convicted; over 75% of those convictions were based on faulty eyewitness identification (Innocence Project, 2012). One of the possible reasons for wrongful convictions is that the eyewitness misidentifies a familiar but innocent bystander instead of the actual culprit, a phenomenon known as Unconscious Transference (Ross, Ceci, Dunning, & Toglia, 1994).

Unconscious Transference

The term Unconscious Transference (UT) was first used in 1955 (Williams, 1955) and has been more recently defined as, "the transfer of one person's identity to that of another person from a different setting, time, or context" (Read, Tollestrup, Mannersley, McFadzen, & Christensen, 1990, p. 3). One real world example of the UT effect occurred when a man working in the ticket booth at a railroad station was robbed (Loftus, 1976). That man later identified a sailor from a police lineup. Luckily for the sailor, he had a solid alibi and was soon dismissed as a suspect. It was later discovered that the sailor had bought tickets from the agent on several instances prior to the robbery and thus was familiar to the ticket agent. It appeared that the ticket agent remembered the sailor, but forgot the context for his memory and

consequently misidentified him as the thief who robbed him. This is a prime example of how UT can occur in real life situations and have dire consequences. If not for the sailor's solid alibi, he may have been tried and convicted of a crime that he did not commit.

UT has been studied extensively but those studies have produced mixed results. Some studies have found support for the UT effect (Buckhout, 1974; Loftus, 1976; Nelson et al. 2011; Ross, Benton, McDonnell, Metzger, & Silver, 2007; Ross et al. 1994; Ross et al. 2006). For example, Ross et al. (1994) showed participants a video composed of scenes about a typical day in the life of a preschool teacher. During the video, participants view a teacher reading to the children. In the transference condition, the teacher is male and appears similar to the thief that they will see later in the video. Conversely, in the control condition, the teacher is female. At the end of the video in both conditions, a teacher has money stolen from her wallet while she is getting something from a vending machine.

Ross et al. (1994) found that 75% of the participants in the transference condition and 64% in the control condition correctly identified the thief from a thief present bystander absent lineup. Thus, when participants actually saw the thief in the lineup, they correctly identified him approximately 70% of the time. However, when the participants viewed a thief absent bystander present lineup, those in the transference condition incorrectly identified the bystander as the thief 61% of the time, compared with 22% in the control condition. This showed that when the familiar, but innocent bystander was viewed in the lineup, and the participants had viewed the control video (in which the bystander is not present), the bystander was only identified at chance levels (1 in 5). However, when the participants had viewed the transference video, they incorrectly identified the bystander almost as often (61%) as those who actually viewed the thief

in the lineup (approximately 70%). This significant difference in bystander identifications between the transference and control conditions is the UT effect.

Additionally, a meta-analysis of 19 independent tests found that when researchers create transference conditions, participants are twice as likely to make transference errors when compared to control conditions (Deffenbacher, Bornstein, & Penrod, 2006). Specifically, those subjects in the transference conditions committed transference errors 33% of the time, compared to only 16% in the control conditions. Thus, when researchers exposed participants to transference conditions, those participants misidentified the bystander as the thief more than twice as often as those in the control conditions.

Conversely, other studies have found no support for the UT effect (Dysart, Lindsay, Hammond, & Dupuis, 2001; Geiselman, Haghighi & Stowe, 1996; Geiselman, MacArthur, & Meerovitch, 1993; Read et al. 1990; Experiments 1, 3, & 4). For example, in the transference condition of Read et al. (1990, Experiment 3), an "innocent" bystander would enter a store and ask a specific store clerk if he had seen a woman and small child as he (the bystander) was supposed to meet with his wife and child at this store. In the control condition, the clerk had no interaction or viewing of the bystander. After the bystander had interacted with the clerk, the perpetrator then entered the store and asked the same clerk to exchange a five-dollar bill for five dollars worth of quarters. Approximately 48 to 96 hours later, the experimenters returned and asked the clerks to take a target absent bystander present, target present bystander absent, or both (target and bystander) present lineup. In the target absent bystander present lineup, only 6% of the control condition participant's misidentified the bystander and none of the clerks misidentified the bystander in the transference condition. Similar results were found in the both present lineup where the bystander was identified 4.1% of the time in the control condition and

5% in the transference condition. When participants viewed the target present bystander absent lineup, they correctly identified the perpetrator 80% of the time in the control condition and 91.8% of the time in the transference condition. Similar rates of correct identification in the control and transference conditions occurred when participants viewed the both present lineup, with correct identification rates at 77.6% and 80%, respectively. Therefore, Read et al. (1990, Experiment 3) found high percentages of correct identifications of the target and corresponding low percentages of bystander misidentifications.

It should be noted here that one of the studies cited above involved participants viewing mugshots of potential bystanders instead of viewing them in a video. Importantly, there is a methodological difference between viewing bystanders' mugshots and viewing bystanders in other forms (in person, on film, etc…). Furthermore, even though Dysart et al. (2001) did not find any effect of viewing mugshots on UT, other research using mugshots has revealed a UT effect. Deffenbacher, Bornstein, and Penrod (2006) performed a meta-analysis on 11 different studies that exposed participants to mugshots of innocent suspects after the participants had viewed a crime. They found that those that viewed the mugshots were more likely to make a transference error (incorrectly believe that the person they chose out of the lineup was the culprit when in fact they had seen them previously in the mugbook) than those that had viewed a bystander in other forms (e.g., on film or in person). In the mugbook studies the false identification rates were 38% in the transference conditions versus 16% in the control conditions. In the studies that exposed participants to the bystander in a different form, the misidentifications of the bystander occurred 27% of the time in the transference condition compared to 17% in the control condition. Thus, viewing mugshots before viewing a lineup of suspects sometimes, and sometimes does not, produce the UT effect.

Furthermore, another study found a reverse UT effect in which the familiar but innocent bystander was recognized as familiar but innocent and then disregarded as a possible choice (Read et al., 1990 – Experiment 2). In that experiment, an "innocent" bystander would walk into a store in a mall and linger for a few minutes before the "target" would walk in and have an interaction with the store clerk or cashier. After a period of 20 minutes or 2 hours, the clerks were approached and asked to pick the "target" out of a lineup. It was found that clerks in the control condition picked the bystander out of the lineup 20% of the time. However, those in the transference condition only picked the bystander 9.7% of the time. Thus, the bystander was identified as the bystander, and not the target, and subsequently disregarded from the clerk's possible choices.

Theoretical Reasons For Unconscious Transference

Given the conflicting results presented previously, what is the cause of UT? Are there certain conditions that must be met in order for the effect to occur? According to the literature, there are four theoretical possibilities for why UT occurs: automatic processing, deliberate source monitoring at retrieval, conscious inferencing, and change blindness (Nelson et al. 2011; Ross et al. 1994).

Automatic Processing

Automatic processing refers to the idea that our minds encode many details about our lives without our conscious awareness (Hasher & Zacks, 1979). This process occurs without any conscious attention or awareness that those details are even being encoded. It is thought to be genetically hard-wired and thus not susceptible to any effects of age or environment. If

automatic processing is the mechanism producing UT then the witness should misidentify the familiar bystander without having any conscious recollection of having seen him in a previous context. The presence of the bystander in the lineup should evoke an unconsciously stored memory of the bystander that would create a sense of familiarity and thus produce a misidentification that would cause the witness to misidentify the bystander.

After participants in the Ross et al. (1994) study had viewed the lineup, they were asked if the thief was seen anywhere else in the film other than the cafeteria (where he stole the money). If automatic processing had occurred, then the participants in the transference condition should have had no memory for the man reading to the children earlier in the video. However, that was not the case. In the transference condition, 66% of the participants said that the thief had been seen previously in the film, and 95% of those people said that he had been reading to the children, i.e., the bystander (Experiment 1). These data lend little support to automatic processing as the cause of UT.

Deliberate Source Monitoring At Retrieval

Source monitoring errors occur when someone misattributes the events from one time or source with another (Johnson, Hashtroudi, & Lindsay, 1993). Using the example above (Loftus, 1976), this would occur if the ticket agent had remembered seeing both the sailor and a previous customer, thought they were two separate people, and misidentified the customer as the thief because he was confused with the actual robber. Therefore, the witness would have two separate memories for two separate people but confuse one with the other and misremember the bystander as the one seen at the scene of the crime.

Evidence against the deliberate source monitoring at retrieval theory can be found when examining the context questions from the Ross et al. (1994) study. If a deliberate source monitoring error had occurred, then subjects in the transference condition should have two separate memories for the bystander and the thief, and not think that they are the same person. However, as stated earlier, 66% of the transference participants thought that the thief had appeared earlier in the film, and 95% of them thought that the thief and the bystander were the same person (Experiment 1). Furthermore, in the target absent bystander present lineup condition, the participants were asked whether they had seen anyone in the lineup that was in the film (other than the thief). In the transference condition, 76.7% of the participants said that no one in the lineup had been seen previously in the film compared to 84.9% in the control condition. The similarity of the response rates in the transference and control conditions indicates that the participants did not report having memories for two separate individuals. As a consequence, those memories could not be confused with one another at retrieval, lending little support to the notion that deliberate source monitoring at retrieval is the cause of UT.

Conscious Inferencing At Encoding

The third theoretical approach to UT is called conscious inferencing. This approach suggests that UT occurs when, "the witness misperceives the assailant as the bystander at the crime scene and thus makes an erroneous inference that they are the same person" (Ross et al. 1994, p. 921). Thus, there are actually two separate memories: one of the bystander and one of the thief. However, the witness mistakenly thinks that they are the same person and thus connects the two separate memories.

If conscious inferencing is the reason for UT, then the UT effect should be eliminated when participants are informed that the culprit and the bystander are indeed two separate people. Ross et al. (1994) found that when the participants were informed that the culprit and bystander were different people, the UT effect disappeared and there were no differences in bystander identification rates between those in the transference (25%) and control (22%) conditions (Experiment 2).

Further, it has been argued that this effect occurs at the encoding of the memory rather than at the retrieval during the lineup process. Ross et al. (1994) examined the percentage of participants who thought that the bystander and culprit were the same person both immediately before the lineup (evidence of conscious inferencing at encoding) and after they had already completed the lineup identification task (evidence of conscious inferencing at retrieval). They found that there were no differences in bystander misidentification rates between the two groups. Approximately 72% of the participants said that the thief was seen in another part of the film (95% of them said that the thief had been reading to the children) when asked before the lineup, and 82% said that the thief had been seen earlier in the film (91% of whom said that the thief had been reading to the children) when asked after the lineup. Taken together, these data suggest that conscious inferencing occurs at encoding (Ross et al. 1994; Experiments 3).

Additionally, conscious inferencing is thought to be a complex process that involves the ability to link two independent events together across time and context. If this were the case, then the UT effect would only be seen in participants that had the ability to form a memory of a bystander in one context, and then, upon seeing the thief, refer to that bystander memory and mistakenly link the two and think that they are the same person. That is one of the basic requirements of conscious inferencing. The witness must be able to make the temporal tag

between the events in order to create a composite memory for the event. If he or she is unable to connect these events, then they will not be susceptible to the UT effect.

Based on this implication, young children would be unlikely to experience the UT effect due to the fact that they have difficulty connecting events in memory (Ross et al., 2006). More specifically, Fuzzy Trace Theory proposes that memories consist of two traces: verbatim and gist. Younger children's memories rely more heavily on specific verbatim information from each individual memory, i.e. verbatim traces, (Reyna & Brainerd, 1995). Conversely, as children age and approach adolescence, they become better at connecting information and tend to rely more heavily on gist traces. Gist traces are less susceptible to memory decay, but tend to include fewer specific memory cues, and thus the adolescent children don't remember as much specific information from each memory. Evidence for this developmental difference can be seen in children's performance in the Deese Roediger McDermott (DRM) paradigm (Brainerd, Reyna, & Forrest, 2002). When presented with a list of words (e.g., ice, freezing, chilly, etc…) and then later tested for words that are semantically similar to those, but never mentioned (e.g., cold), young children have been found to be much less susceptible than adolescents or adults to falsely recalling the never-mentioned but semantically associated items (Brainerd, Reyna, & Forrest, 2002; Metzger et al., 2008). Contrary to the young children, adolescents and adults form meaning or gist-based connections across the presented items, which may, either automatically or consciously, trigger the recall of associated items that were not presented. Additionally, as children age, their inferential processing abilities also develop which means that they can better infer that two individuals that look similar to one another may be the same person (Pezdek, 1980). Taken together, Fuzzy Trace Theory and developments in inferential processing ability suggest that as children age, they will become more susceptible to the UT effect.

Furthermore, the conscious inferencing theory of UT posits that the elderly (ages 71 and over) will also be less susceptible to the UT effect. Specifically, the age related declines in memory consolidation or "binding" that have been found in the elderly (Mitchell, Johnson, Raye, Mather, & D'Esposito, 2000) are thought to be at least partially responsible for this developmental difference. Mitchell et al. (2000) found that compared to younger adults, older adults had greater difficulty in consolidating information from multiple sources. This difficulty would make older adults less susceptible to the UT effect, as they would not be able to consciously infer that the bystander and the thief are the same person.

These developmental hypotheses were examined in Ross et al. (2006) wherein children 5-12 years of age participated in the same procedure as described above (Ross et al. 1994) and Ross et al. (2005) with middle aged and elderly participants ages 40-90. Consistent with the theory of conscious inferencing, the authors only found the UT effect in children older than 11-12 years old and adults younger than 70 years old. When participants view the transference video and then completed a culprit absent bystander present lineup, 64% of the 11-12 year-olds and 40% of the 40-70 year-olds misidentified the bystander as the thief. These percentages are consistent with the Ross et al. (1994) study, in which 61% of the participants made the same identification error.

When participants viewed the control video and then completed the culprit absent bystander present lineup 40% of the 11-12 year old children and 22% of the 40-70 year olds misidentified the bystander. These percentages are again consistent with the Ross et al. (1994) study that found that control participants misidentified the bystander 22% of the time. Furthermore, significant differences in bystander identifications were found in the transference and control conditions for both the 11-12 year olds and the 40-70 year olds. There were no

significant differences in bystander identification rates between the transference and control conditions for the 5-10 year old children or the 71-90 year old adults.

Additionally, Ross et al. (2005, 2006) also examined rates of correct identifications of the thief when he was present in the lineup. When Ross et al. (2006) had participants view the control film and then participate in a culprit present bystander absent lineup, the children ages 11-12 correctly identified the thief 89% of the time, compared to 45% in the 5-6 year olds, 60% in the 7-8 year olds, and 64% in the 9-10 year olds. Conversely, in Ross et al. (2005), there were no differences across age groups. Specifically, participants 50-60 years old correctly identified the thief 52.4% of the time, compared with 48.8% for the 61-70 year olds and 46.5% for the 71-90 year olds. Thus, the children improved with development while the elderly showed no significant differences between ages 50 to 90.

Taken together, these two studies (Ross et al. 2005, 2006) lend further support to the notion that conscious inferencing is a probable cause of UT. Young children (ages 5-10) and the elderly (ages 71-90) have greater difficulty connecting events and making the conscious inference that the bystander and the thief are the same person; thus they are less susceptible to the UT effect.

Change Blindness

A more recent theoretical approach to the UT effect is that it results from change blindness (Nelson et al. 2011). Change blindness is defined as a phenomenon that takes place when a person fails to notice major changes in their surroundings from one instance to another (Simons & Levin, 1998). In the Simons and Levin (1998) study, an experimenter would ask a pedestrian for directions, and then two men carrying a large door would walk between the

experimenter and pedestrian, interrupting their conversation. While the door was in the way, the experimenters would change and after the door had passed, a new experimenter had replaced the original one. When that occurred approximately half of the participants failed to notice the change between the experimenters.

In a study by Nelson et al. (2011), participants were shown a video of a crime. In one condition (the no change condition), the thief shown stealing the money was the same person shown exiting the building. However, in another condition (the actor change condition), the thief was shown stealing the money, and a similar but innocent foil (someone who is not the thief) was shown leaving the building. Participants in both conditions were then shown a simultaneous lineup that contained the thief who stole the money, the innocent bystander, and four additional foils, i.e. a both present lineup. When asked to pick the thief out of the lineup, in the no change condition, 64% correctly identified the thief and only 9% chose the bystander. However, in the actor change condition, only 36% of the participants correctly identified the thief, compared with 35% who chose the bystander. Additionally, only 4.5% of the participants in the actor change condition actually noticed the change, the other 95% did not see that the video had switched from the thief to the bystander. Thus, the authors argue that the mistaken identifications were due to change blindness and the fact that the participants thought the thief and bystander were the same individual.

Although both the change blindness and conscious inference explanations for UT effect posit that the witness has a memory for one individual during two separate events, there is a fundamental difference between the two: that of time. Change blindness typically occurs instantaneously. In the previous research, one person is immediately switched out for another (Simons & Levin, 1998). However, the conscious inferencing theory does not have that time

restriction. In the Ross et al. (1994) experiments, the bystander is actually seen before the thief, and they are seen several minutes apart. Another theoretical distinction that can be made between change blindness and conscious inferencing is that of depth of processing. Change blindness may be a shallow, virtually automatic process due to the fact that roughly 50% of the people don't notice the change. Conversely, an argument can be made that conscious inferencing requires deeper processing. When an individual sees the thief in the end of the film, they have to consciously link the event and the face of the thief to the one of the bystander seen previously. Conscious inferencing may happen without conscious awareness, but due to the fact that it has the ability to link events across a time delay, an argument could be made that it requires more depth of processing than change blindness.

Boundary Conditions For Unconscious Transference

Due to the lack of a clear consensus in the literature, with some studies finding significant UT effects while others failing to do so, it is paramount to discuss some methodological conditions that must be met in order for the UT effect to occur. Ross et al. (1994) posited that the UT effect would occur only when the thief and the bystander appear similar to one another. If the bystander is not very similar, then there will be no chance for confusion, and if they look too much alike, then the thief and bystander will be chosen at the same rates across all conditions. Thus, the bystander must be moderately, but not highly similar to the thief in order for UT to happen. Support for this supposition can be found in Read et al. (1990, Experiment 1). In that experiment, the bystander was rated as having low similarity to the target and in fact none of the participants selected the bystander in either a target absent bystander present lineup or a both present lineup (both the bystander and target were shown).

Additionally, the event/interaction with the bystander must be salient enough to create a memory trace for it, but it cannot be too salient or the witness will have a strong enough memory trace that he or she will not mistakenly believe that the bystander and the culprit are the same individual. Read et al. (1990, Experiment 2) believed that this overly salient interaction was the reason for the reverse transference effect that they found. Specifically, the interaction between the clerk and the bystander was so salient that the clerk was able to recognize the bystander as the bystander and thus eliminate him from the list of possible targets resulting in the bystander being chosen more in the control condition (20%) than the transference condition (9%).

Sequential Lineup Effects on Eyewitness Memory

In all of the studies on UT discussed above, there has been one common methodological feature used throughout: the simultaneous lineup procedure. Simultaneous lineups involve the witness viewing all of the suspects in a lineup at the same time. Simultaneous lineups allow for relative judgments to be used, where the suspect can compare all of the faces in the lineup to the one that they remember and pick the "best fit" out of four to six possibilities (Lindsay & Wells, 1985). In other words, the witness can compare all of the faces to each other and find the one that is most similar to the perpetrator. However, this means that the witness may not really be choosing the perpetrator, but rather the person that most resembles him or her. Witnesses can use this relative judgment strategy regardless of the accuracy of the identification; i.e. both accurate and inaccurate witnesses make can make these mistakes (Ross et al. 2007). One possible solution for this problem is that a different procedure can be used: the sequential lineup. The sequential lineup involves the witness being shown a picture or mugshot of each suspect individually (Lindsay & Wells, 1985). The witness has to make a yes/no determination of the

guilt of the suspect and is not allowed to return to a mugshot once they have made their decision. The witness must make an absolute (yes/no) judgment for each suspect, which has been shown to reduce false identifications, with a less significant reduction in correct identifications (Lindsay & Wells, 1985; Steblay, Dysart, Fulero, & Lindsay, 2001; Steblay, Dysart, & Wells, 2011).

However, while the sequential lineup procedure advocates the use of a judgment strategy that is conducive to fewer false identifications, there are also some distinct disadvantages to the procedure. In a recent meta-analysis of over 70 studies that examined sequential and simultaneous lineups, Steblay, Dysart, and Wells (2011) did find that sequential lineups resulted in 22% fewer errors than simultaneous lineups. Additionally, participants that engaged in sequential lineup procedures had a 21% advantage in correct rejections, meaning that witnesses were more likely to say that the culprit was not in the lineup when he or she really was not. On the other hand, those that viewed a simultaneous lineup had a 14% advantage in correctly identifying the culprit when the culprit was actually present in the lineup. Thus, both types of lineup procedures have their advantages and disadvantages, and it is unclear which lineup procedure is truly superior.

Ross et al. (2014) sought to examine whether or not a sequential lineup procedure would reduce or eliminate UT. The same stimulus materials from the Ross et al. (1994) study were used. Participants were recruited under the guise of a preschool education study and asked to watch a video about teaching. At the end of the video, there was a crime. Those in the transference condition watched a video in which a familiar but innocent bystander read a book to children before the theft took place and those in the control condition watched a video with a woman instead of a man reading to the children. After the video, participants viewed either a thief present bystander absent lineup or a thief absent bystander present lineup.

In order to make comparisons across studies that took place nearly 20 years apart, the authors compared the results of the context questions asked after the lineup identification procedure. In both the Ross et al. (1994) and Ross et al. (2014) studies, the authors asked the participants if the robber was seen in any place in the film other than in the cafeteria where the money was stolen. Ross et al. (1994) noted that 66% of participants in the transference condition (collapsed across both thief present and bystander present lineups) reported that the robber was seen previously in the film; Ross et al. (2014) reported a similar percentage (60%) of participants in the transference condition (again collapsed across lineup condition) who reported the same thing: that the robber was seen previously in the film.

When comparing their results to those of Ross et al. (1994), the authors found a dramatic reduction in UT using a sequential lineup. When Ross et al. (2014) compared their data to that of Ross et al. (1994), the incorrect identification rates of the bystander in the transference and control conditions dropped from 61% and 22% (transference and control) to 17% and 9%, respectively.

However, correct identifications of the thief also dropped from 75% and 64% (transference and control) in the 1994 data to 28% and 22% in the 2014 data. Thus, UT was drastically reduced by using a sequential lineup procedure, but at the cost of correctly identifying the culprit. The authors theorized that the participants were waiting for a best possible match to occur and ran out of faces before selecting one. This is evidenced by the fact that in the Ross et al. (1994) data, for the participants who viewed a culprit absent bystander present lineup, 33.7% of the participants in the transference condition and 64.4% of the participants in the control condition said that the culprit was not in the lineup. This is compared to 68% and 77% (transference and control) in the Ross et al. (2014) data. Additionally, when the authors looked

at the percentage of responses of "not in lineup" in the culprit present bystander absent lineup, they saw that the percentages in the Ross et al. (1994) data for transference and control (19.4% and 30.5% respectively) also increased in the Ross et al. (2014) data (60% and 61%, transference and control). Thus, significantly more participants chose the "not in lineup" option in the Ross et al. (2014) data than the Ross et al. (1994) data. However, in the Ross et al. (2014) study, the participants were never told how many faces they would be seeing in the sequential lineup. This is an example of a methodological characteristic known as backloading, which can alter the effects of using sequential and simultaneous lineups.

Backloading in the Sequential Lineup

Backloading a sequential lineup involves leading the participants to believe that there will be more faces in the lineup than there actually are. This can be methodologically accomplished in several ways. Many researchers do not tell participants how many faces they will see in the sequential lineup (e.g. Gronlund, Carlson, Dailey, & Goodsell, 2009; Sauer, Brewer, & Wells, 2008). Other researchers attempt to get participants to believe that they will see more photos in the lineup than they actually will either by explicitly telling them (e.g., Carlson, Gronlund & Clark, 2008) or by putting extra lines on a response sheet (Lindsay, Lea, & Fulford, 1991). Some research has shown that if participants know how many faces they will see, their selection decisions will be different than if they do not know the correct number (Horry, Palmer, & Brewer, 2012).

Horry, Palmer, and Brewer (2012) had participants come in one at a time and sit down with an experimenter. Another student then stepped out from around a corner 10 meters away and stood there for 10 seconds. The participant was instructed to try to remember the "culprit."

Then the participant was told that he or she would view a sequential lineup of 6 (no backloading), 12 (low backloading), or 30 (high backloading) photos and that once he or she picked someone out of the lineup that the lineup was over and they would not be able to see any other suspects.

When the thief was absent from the lineup, the highest backloading condition (30 faces) had a greater percentage of correct lineup rejections (84.9%) than the lower backloading and no backloading conditions (average across conditions was 60.5%). Additionally, foils were more likely to be chosen from the non-backloaded lineup (20%) than the high backloading lineup (6.1%) when the thief was not in the lineup. Thus, it appears that the participants were waiting for a "best match" to their memory trace and did not find one before the lineup was concluded. This means that the participants made a selection significantly less often in the high backloading condition, and that was advantageous due to the fact that the actual culprit was not in the lineup.

On the other hand, when the thief was present in the lineup, those in the backloading conditions (12 and 30 faces) were significantly less likely to pick the thief, 43.3% and 40.3% respectively, than the no backloading (6 faces) condition (56.1%). Furthermore, as the amount of backloading increased, the participants were more and more likely to incorrectly reject the lineup. Incorrect lineup rejection rates rose from 20.25% in the no backloading condition to 38.43% in the low backloading condition, to 48.58% in the high backloading condition. Participants ran out of faces to see without choosing anyone more often in the backloaded conditions than the non-backloaded conditions. Thus, it appears that the participants were again waiting for a "best match" to the individual that they had in their memory, but did not see one that they were confident enough to choose before they ran out of choices.

Further evidence for this waiting effect can be seen in Dysart and Lindsay (2001). The authors in that study had participants view a video of a staged crime and then later participate in a lineup identification task. Approximately one third of the participants viewed a target absent sequential lineup. Those participants were led to believe that they would be viewing 15 photos in the lineup, however they actually only saw six. Only 2.5% of the participants incorrectly identified a foil in the lineup. All of the others correctly rejected the lineup. This was compared to 35.7% of participants that viewed a target absent sequential lineup. Thus, it appears that the participants in the Dysart and Lindsay (2001) study were waiting for a best possible match and did not find one and subsequently correctly rejected the lineup. Based on these results, it appears that backloading the lineup can cause participants to wait for a best possible match, which helps to reduce false positive identifications, but at the cost of also reducing the percentage of correct identifications.

The Present Study

So how will knowing the correct number of faces affect UT? In the Ross et al. (2014) study, the participants were not told how many faces they were going to see and that reduced the negative effects of unconscious transference, but it also caused a reduction in the number of correct identifications. Due to the fact that 64% of the transference participants and 69% of the control participants rejected the lineup and stated that the thief was not present, it was theorized that they were waiting for a "best option" choice and simply ran out of faces from which to choose from. Therefore the present study will seek to examine whether or not knowing the exact number of faces to be seen will affect the percentage of incorrect identifications, and thus UT. Furthermore, the results of this experiment will be compared to Ross et al. (1994, 2006, & 2014)

so that the effect of backloading condition (not told anything, i.e. backloading vs. told correct number of faces, i.e. no backloading) can be compared. The study design is a 2 (notification condition: nothing versus correct number of faces) x 2 (experimental condition: transference versus control) x 2 (lineup condition: culprit present, bystander absent versus culprit absent, bystander present) factorial.

Hypotheses

H1: If the participants are waiting for the "best choice" to come up, then when they are told the correct number of faces (no backloading), they will be less likely to make a selection of "not in lineup" and more likely to select one of the members of the lineup.

H2: Compared with a simultaneous lineup, and a sequential lineup that does not tell the witness how many faces are available to view, participants in the notification condition (told there are five potential faces) and who are in the transference condition, should be significantly more likely to misidentify the familiar bystander and make the UT error than those in the control condition. Informing the participants of the correct number of faces to be shown should reduce the likelihood of them waiting for the best match and running out of lineup photos. The results will be an increased likelihood of 1): identifying the familiar bystander as the thief, and 2) correctly identifying the thief when shown a thief present, bystander absent lineup.

H3: If the sequential lineup method helps to reduce unconscious transference, and not backloading a lineup helps to increase the odds of participants choosing a suspect from the lineup, then the rates of identification of the bystander in the transference condition will be greater than Ross et al. (2014) and lower than Ross et al. (1994).

CHAPTER II

METHOD

Participants

A total of 185 participants were be recruited for this study from entry and upper level undergraduate and graduate psychology courses at The University of Tennessee at Chattanooga. These students may have been offered extra credit in those classes by their professors for participation. Participants' ages ranged from 18 to 43 with a mean age of 20.51 (SD = 3.164). Participants included 141 females (76.2%) and 41 males (22.2%). Of the 185 participants, 75.5% identified as Caucasian, 17.5% as African American, 3.8% as Hispanic/Latino, and 3.3% as Asian/Pacific Islander.

A manipulation check question was used to make sure that participants were aware of the number of faces to be seen. Overall, 13% (N=24) participants failed the manipulation check leaving a total of 161 participants' responses that were analyzed. This final sample had age, gender, and racial compositions that were not different from the total sample.

Materials

Each participant was seated at a desk with a flat panel computer monitor placed within a transparent viewport. The viewport was covered in tinted glass in order to prevent any glare on the monitor. Plastic viewing visors were placed atop each viewport and prevented participants from viewing one another's responses. The stimulus film was projected on a screen that is 5¾ ft. wide by 6 ft. tall. E-Prime 1.2 was used to present the lineup photographs and to measure the

reaction times of participants and to collect context and demographic data (Psychology Software Tools, Inc., 2002).

E-Prime

The program that was used to display the lineup, and record responses has been written in E-Studio, which is the programming aspect of E-Prime. (Psychology Software Tools, Inc., 2002). Participants used the program to perform the task of the sequential lineup identification, to respond to context and demographic questions, a word association task, and to perform a series of Equation Analysis Tasks.

Stimulus Film

The stimulus film, procedure, and lineups that were used in the present study are the same as those used by Ross, et al. (1994; 2006; 2007; 2014). The film has been designed to portray the "Day in the Life of a Preschool Teacher" and it displays teachers interacting with children in a preschool setting. The film consists of ten different segments that ranged from 30 to 90 seconds long each. In each of these segments preschool teachers are shown interacting with children. The films shown to the subjects in the transference and control conditions was the same except for one segment where a teacher was shown reading a story to the children. In the transference condition a male was shown reading the story to the children and that person served as the familiar but innocent bystander that was later presented in the lineup. In the control condition, a female teacher read a story to the children. All other aspects of the films shown to the transference and control participants were identical. The theft and bystander segments were each 34 seconds long, with the same amount of exposure to both the thief and the bystander.

Near the end the film the female victim tells another teacher that she is going to take a break in the cafeteria. The teacher then walked into the cafeteria, and sat down at a table with the male thief; she then removed her wallet from her purse, and took out a one-dollar bill. Next, she placed her wallet on the table, stood up, and walked to a vending machine with her back to the thief. While the victim's back was turned, the thief picked up the victim's wallet, and removed the remaining money. He then placed the wallet back on the table, put the money in his pocket, and left while the teacher was still at the vending machine with her back to him. The film ended when the thief left the room and the screen faded to black. The participants were then informed about the true nature of the study in that it was about eyewitness memory and not preschool education.

Lineup Construction

The lineups are the same as those used by Ross et al. (1994; 2006; 2007; 2014) and have been constructed so that the bystander is more similar to the thief than any other foil in the lineup which Ross et al. (1994; 2006; 2007; 2014) posit is a necessary condition for UT to occur. The photographs are head and shoulder shots that are in color, were taken by a professional photographer, and are identical in lighting source, brightness, background, clothing, and distance from the camera.

Ross et al. (1994) constructed their lineup by recruiting participants (76 college students) to compare 47 pairs of color photographs of men with similar physical characteristics (20 to 25 years old; black or dark brown hair). Subjects were shown 47 pairs of photographs in which the photograph on the subject's left was that of the person who played the thief in the film, and the photograph on the right was that of a potential lineup foil. Subjects were then asked to rate the similarity of each foil, and the bystander, to the thief. These foils were rated on a 7-point Likert

scale format (1 = not at all similar, 4 = moderately similar, and 7 = very similar), and the mean level of similarity between each foil and the thief was calculated. The lineup consisted of 4 foils, 1 bystander, and the thief. The four foils that were in the lineup fell around the median for the whole 47 foils tested, their means range from 2.48 to 2.65 meaning that they range from no, to moderate similarity to the thief (the point of comparison). The bystander had a mean rating of 3.97 indicating that he was seen as being more similar to the thief than the other foils selected. This procedure satisfied the requirement to create a lineup where the innocent bystander is more similar to the thief than any other foil in the lineup.

Procedure

Students were recruited to participate in a study on "Preschool Education," and may have been offered extra credit for their participation, or consideration of participation according to their course instructors' guidelines. Participants were run in groups no larger than 10, and were seated at preselected numbered spaces in a computer lab. Subjects were assigned in a block-randomized design such that all the participants in a given session saw the same video and lineup conditions. At the beginning of the sessions the participants were told that they were about to participate in a study about psychology and education. The participants were then asked to take a seat at one of the ten computer desks and informed by the experimenter that the study was focusing on ways to attract people to a career in preschool teaching. They were then told that they would see a video as a part of this study, and would be asked to give their opinions and reactions to the film. Before the film started, and the lights lowered, the participants were asked to fill out the informed consent (Appendix A). Both versions of the film (transference and control) lasted 4 minutes 5 seconds. 55 participants saw the transference video (i.e., bystander and thief are present in the video) and then participated in a thief absent, bystander present

lineup. 58 participants viewed the control video (i.e., only the thief is present) and then participated in a thief absent, bystander present lineup. Finally, 48 participants viewed the control video and participated in a thief present bystander absent lineup.

After seeing the video (either transference or control) participants were informed as to the true nature of the study, and asked to participate in the lineup portion of the study. The participants were informed that they would be seeing a series of faces one at a time on their computer. They were instructed that they were to try to identify the thief who stole the money from the wallet or indicate that the thief was not in the series of faces. Participants were also told that they could not go back and look at previously seen faces once they have answered yes, or no to a face. Additionally, on two separate occasions, participants were explicitly told the number of faces that they would see. Finally, they were informed that the person who stole the money may or may not be in the series of faces that were about to see. The full instructions are included in Appendix B.

When participants began the lineup task, each face appeared on the screen in sequence, and the program would only move on to the next face when the participant had answered with one of the only two buttons the program allowed (1 = no and 2 = yes). After they had answered yes or no for each face they were also asked to rate their confidence in their decision on a 7-point Likert scale (1 = not at all confident; 4 = moderately confident; 7 = extremely confident). After they concluded with the lineup portion of the study there was a manipulation check question that asked the number of faces that the participant was supposed to see. This was to make sure that the participant was fully aware of the manipulation and knew that they could have seen up to five faces. After the participants were done with the lineup portion of the study, they were asked to answer a series of context and demographic questions. The context questions asked about

specifics in the film and the lineup task such as whether or not the thief had been seen at any other time in the film, if there were any male teachers in the film and their description, and if there was anyone in the lineup that was also present in the film. The full list of context questions are included in Appendix C.

Additionally, demographic questions were asked about the participants' age, sex/gender, race/ethnicity, their education level, their parents' education level (one at a time), current occupation, first language, eyesight, caffeine intake, and amount of sleep prior to participating in this study in order to see if any of these variables affect the results in any way. Similar demographic characteristics were collected in Ross et al. (2014) and these questions were collected here to ensure comparison across samples. A complete list of demographic questions are located in Appendix D. After the participants completed the context and demographic questions, they attempted to complete a series of Word Association Tasks (e.g., they were given the words wall, sweeper, and lamp, and told to find one word that could be used in conjuncture with those three, in this case the word is street: wall street, street sweeper, and street lamp), and a series of Equation Analysis Tasks (e.g. they will be given a sentence like 7 W. of the A. W., and have to figure out what the capitalized letters stand for, 7 Wonders of the Ancient World) to keep them busy, so they would not engage in behavior that would distract others. After the participants completed the tasks they were debriefed, and thanked for their participation. The entire session took an estimated average of 30-45 minutes to complete.

CHAPTER III

RESULTS

In order for our results to be comparable to Ross et al. (1994) and Ross et al. (2014), we first examined the percentage of participants that viewed the transference video and subsequently stated that the thief was seen previously in the film. Our analysis showed that 65.5% of the participants who viewed the transference video stated that they had seen the thief previously in the film; that percentage is comparable to that of Ross et al. (1994) where the percentage was 66% and to Ross et al. (2014) where the percentage was 60%. Therefore, even though participants were not randomly assigned to viewing conditions (simultaneous, sequential backloaded, or sequential non-backloaded), it appears that across studies participants were encoding the stimulus information similarly. Additionally, the mean age of participants in the present study (20.51 years) does not differ from Ross et al. (1994) (mean age of 18.2 years) or Ross et al. (2014) (mean age of 19.9 years).

Overall Percentage of Choosers

In order to ascertain the overall effect of knowing the correct number of faces, a *z*-test on proportion was calculated to examine the rates of choosing anyone (bystander, thief, or foil) from the lineup across studies. As predicted in hypothesis one, significantly more participants chose someone from the lineup in the present study (47.9%) compared to the Ross et al. (2014) study (34.4%), $z=2.928$, $p < .003$.

Thief Absent Bystander Present Lineup

Next, we examined the participants that viewed the culprit absent bystander present lineup. As can be seen in Table 1 below, participants who viewed the transference video were significantly more likely to misidentify the bystander as the thief than those that viewed the control video (36.4% vs. 13.8%), $z = 2.831$, $p < .005$. This result supports the first part of hypothesis two that knowing the correct number of faces to be seen would increase the percentage of misidentifications of the bystander.

Table 1 Rate of bystander misidentification by condition: bystander present/thief absent lineup.

	Bystander (%)	Foil (%)	Not in lineup (%)
Transference	36.4*	14.5	49.1
Control	13.8	27.6	62.1

*(z test on proportion, $p < .005$)

Note. Sample size = 55 for transference, 58 for control

Further analyses were conducted to compare the results of the present study to previous studies. Table 2 shows the comparison of the misidentification rates of the bystander in the present study to those in Ross et al. (1994) and Ross et al. (2014). In order to test the prediction of hypothesis three, separate z-tests on proportions were conducted. The results showed significant differences between the present data and Ross et al. (1994), $z = 2.949$, $p < .003$, as well as Ross et al. (2014), $z = 2.567$, $p < .01$.

Table 2 Rate of bystander misidentification by condition and study: bystander present/thief absent lineup.

	Ross et al. (1994)	Ross et al. (2014)	Present Study
Transference	60.9%	17%	36.4%
Control	21.9%	9%	13.8%

Thief Present Bystander Absent Lineup

Additional analyses were conducted to examine the percentage of participants who correctly identified the thief from a thief present, bystander absent lineup. A *z*-test on proportion revealed that significantly more people correctly identified the thief (37.5%) than misidentified an innocent foil (14.6%), $z = 2.620$, $p < .009$. The percentages of correct identification and incorrect identification and lineup rejection can be seen below in Table 3.

Table 3 Rate of thief identification by condition: thief present/bystander absent lineup.

	Foil (%)	Thief (%)	Not in lineup (%)
Control	14.6	37.5*	47.9

*(*z* test on proportion, $p < .00$)
Note. Sample size = 48

Next, we compared the rates of correct identification of the thief to those of Ross et al. (1994) and Ross et al. (2014). Although the percentage of correct identifications did increase from 28% in the Ross et al. (2014) data to 37.5% in the present study, z tests on proportions revealed no significant difference between the studies, $z = 1.134$, $p > .05$. This result is contrary

to the second part of hypothesis two that knowing the correct number of faces to be seen would increase the percentage of correct identifications. However, there was a significant difference between the present data and those of Ross et al. (1994), $z = 2.454$, $p < .01$. Specifically, more correct identifications were made in the Ross et al. (1994) study (63.9%) than in the present study (37.5%). Table 4 shows the comparison of these percentages across studies.

Table 4 Rate of thief identification by condition and study: thief present/bystander absent lineup.

	Ross et al. (1994)	Ross et al. (2014)	Present study
Control	63.9%*	28%	37.5%

*$p < .05$ (z test on proportion)

CHAPTER IV

DISCUSSION

Overall, results supported our first hypothesis in that significantly more witnesses made a lineup selection (thief, bystander, or foil) when they knew the correct number of faces than when they did not. It appears that participants felt more pressure to make a selection than in the Ross et al. (2014) study. Additionally, we found partial support of our second hypothesis. Compared to individuals who were not informed, those who knew the exact number of faces to be viewed were more likely to incorrectly identify the bystander. However, while the number of participants who did correctly identify the thief when he was present did increase when the correct number of faces to be seen was known (25% to 36.5%), this difference was not significant. Furthermore, we found support for our third hypothesis in that participants in the present study were significantly more likely to misidentify the bystander as the thief compared to Ross et al. (2014), but significantly less likely to make the misidentification error compared to the participants in Ross et al. (1994). Thus, participants who view a simultaneous lineup are the most likely to make the UT error and mistakenly misidentify the familiar but innocent bystander as the thief, followed by those that view a sequential lineup and know the correct number of faces to be seen, and then those that view a sequential lineup and do not know the correct number of faces to be seen. Comparisons to existing literature are discussed below.

Unconscious Transference

When examining the existence of the UT effect, the present study found a significant difference between transference and control conditions, thus reinstating the effect when compared to Ross et al. (2014). Furthermore, we demonstrated that sequential lineups can reduce the UT effect by both reducing the number of people who misidentify the familiar but innocent bystander after viewing the transference video (61% in simultaneous lineup compared to 23.9% in sequential lineups) and also by reducing the difference between transference and control conditions (39% in simultaneous lineup compared to 13.1% in sequential lineups). Additionally, backloading the sequential lineup further reduces both the number of participants who misidentify the bystander to 17% and also further reduces the difference between transference and control conditions to 8%. Moreover, when the sequential lineup was backloaded, the UT effect was barely significant in a lenient one tailed test whereas the non-backloaded sequential and simultaneous lineups showed differences that were stronger in a more conservative test.

Therefore, if our aim is to fully reduce or eliminate the existence of the UT error, then showing eyewitnesses a backloaded sequential lineup is the most successful identification method that we have explored. A backloaded sequential lineup results in the fewest transference errors and the smallest UT effect. However, the same techniques that reduced the UT error, sequential lineups and backloading, also resulted in the fewest correct identifications of the thief.

Sequential and Simultaneous Lineups

When comparing the results of the present study to those or Ross et al. (1994; 2014), we found that participants who viewed the sequential lineup had a 49.2% advantage in correct

rejections of the thief absent lineup. This finding is consistent with previous research that found sequential advantages in correct rejections of 23% (Steblay et al. 2001) and 22% (Steblay et al. 2011). We also found that participants who viewed a simultaneous lineup had a 42.1% advantage in correct identifications of the thief over those who viewed a sequential lineup. This finding is also consistent with previous research demonstrating simultaneous lineup advantages of 15% (Steblay et al. 2001) and 14% (Steblay et al. 2011) in correct identification of the suspect when the suspect is present in the lineup.

Therefore, our findings support the idea that there are advantages and disadvantages to using both simultaneous and sequential lineups. Participants who view a simultaneous lineup are better at identifying the suspect when he or she is present, but more susceptible to misidentifying an innocent suspect if the correct suspect is not in the lineup. Furthermore, the advantages to the simultaneous and sequential lineups in the present study were much stronger than those found in previous research. One possible reason for this is that we are only comparing the results of three studies whereas the Steblay et al. (2011) article is a meta-analysis that compared the results of 72 different studies. It is possible that with more research into the effects of simultaneous and sequential lineups on UT that these larger differences would be reduced. Furthermore, the present study found significant differences in identification rates between simultaneous and sequential lineup participants whereas the Steblay et al. (2011) meta-analysis included some studies that did not find significant differences between the two which may have reduced the advantage of one lineup methodology over the other.

Backloading The Sequential Lineup

Informing participants of the number of faces to be seen in a sequential lineup increased the percentage of correct identification of the thief from 25% to 36.5%, although this was not statistically significant. This is consistent with the findings of Horry, Palmer, and Brewer (2012) who found that participants made more correct identifications of the suspect when they knew the correct number of faces to be seen (56.1%) than when the lineup was backloaded with 6 or 24 faces (43.3% and 40.3% respectively).

Additionally, we found that backloading the lineup decreased correct rejection rates of the bystander from 72.5% to 55.7%. This result is also consistent with previous literature (Lindsay, Lea, & Fulford, 1991, Experiment 3; Horry, Palmer, & Brewer, 2012). Specifically, participants in the Lindsay, Lea, and Fulford study (1991, Experiment 3) were more likely to make a false identification when they were told the correct number of lineup members (16.7%) than when the lineup was backloaded by not telling them anything about the number of faces to be seen (6.8%). Additionally, participants in the Horry, Palmer, and Brewer study (2012) correctly rejected the target absent lineup more often when the lineup was backloaded with 6 or 24 faces (63.3% and 83.6%, respectively) than when they were told the correct number of faces to be seen (49.4%).

Overall, our findings support the idea that there are advantages and disadvantages to backloading a sequential lineup. Informing participants of the correct number of faces to be seen does result in a small increase in the number of correct identifications of the suspect in a suspect present lineup. However, that increase in the number of correct identifications comes at the cost of having a smaller percentage of correct rejections of the suspect absent lineup. Our results are consistent with previous literature in finding that backloaded lineups make participants more

likely to reject the lineup altogether, and that is advantageous when the suspect is not in the lineup, but harmful when he or she is actually present.

Limitations

There were several limitations to this study. First, no participants were shown the transference video and then asked to complete the thief present, bystander absent lineup due to prioritizing power to other cells. Future research should address this by examining the effects of knowing the correct number of faces when the participants view the transference video and subsequently view a thief present, bystander absent lineup. Additionally, lineup order was not manipulated as the thief or the bystander was always seen in the 4th position out of 5 lineup members. Some research has shown that when participants know the correct number of faces to be seen, there are more correct identifications of the suspect and more correct rejections of the suspect absent lineup when the suspect is shown earlier in the lineup (Horry, Palmer, & Brewer, 2012).

Another limitation is that we did not employ a fully randomized design when making comparisons. We compared the results of several studies, some of which were conducted almost 20 years apart. Cohort or other similar effects may be affecting our data. A fully randomized factorial design would have given us the best data however that was not feasible due to time limitations. Finally, 13% of participants failed the manipulation check and did not correctly report the correct number of faces to be seen. We are unsure why we had such a high number of manipulation check failures. Answers on the manipulation check covered the whole selection range of one to seven. Outside of the correct answer of five, the other two most prevalent responses to the manipulation check question were that of four potential faces to be seen (25% of

failures) and seven potential faces to be seen (37.5% of failures). It is possible that these participants were not paying close enough attention to the experimenter, which would explain those who selected a higher number of faces that they actually saw. It is also possible that participants misunderstood the question and responded with the number of faces that they actually saw, due to the fact that if they made a selection from the lineup, then the lineup ended and they were not shown any more faces, this would explain some of those participants who selected numbers fewer than five.

Future Directions

The next step in this study will be to examine the effects of lineup order on UT using a sequential lineup procedure where participants do or do not know the correct number of faces to be seen. This will allow the researchers to determine whether individuals are more likely to make an incorrect decision at the beginning or the end of the lineup procedure. Horry, Palmer, and Brewer (2012) also investigated lineup order effects and found no real differences of suspect position when the lineup was backloaded. However, when participants knew the correct number of faces to be seen, correct rejections were more likely if the suspect was in position 2 (out of 6) and bystander misidentifications were more likely if the target was in position 6 (out of 6). Thus, it appears that placing the suspect earlier in the lineup order both increases correct identifications and decreases false identifications when the eyewitness knows the number of faces to be seen.

Additionally, future studies should add another manipulation check question that asks the participants if knowing the correct number of faces to be seen altered their selection decision or criteria. If the participants are making selection decisions more often, but are not consciously

realizing it, then that would advocate even more for police and other law enforcement officials to not inform eyewitness of the correct number of faces to be seen in a sequential lineup.

Another potential future direction of this study would be to look at the reaction time of participants when they know or do not know the number of faces to be seen. Ross et al. (2014) and the present study both collected reaction time data on participants using E-Prime. That reaction time data could be examined to see if participants take more or less time in making selection decisions when they know or do not know how many people will be in the lineup. Additionally, researchers could also look at whether or not participants take more or less time to make their responses as they approach the end of the lineup. If participants are feeling more pressure to make a selection as they approach the end of the lineup, then they should take more time to evaluate each member of the lineup and thus have slower reaction times than the participants who do now know the number of faces to be seen and are feeling less pressure to make a selection.

Implications

The results of the present study have significant implications for the law enforcement community, even when there is not a familiar bystander in the lineup. Our findings add to the data that show that there are advantages and disadvantages to using both simultaneous and sequential lineups. Simultaneous lineups result in more correct identifications while sequential lineups result in more correct rejections of a target absent lineup. Additionally, our data also show that there advantages and disadvantages to backloading a sequential lineup. If participants are told the correct number of faces, they are more likely to make a selection decision, regardless of whether or not the suspect is actually in the lineup. This can lead to a higher number of

correct identifications, but it can also lead to a higher number of misidentifications of innocent suspects. In fact, the percentage of participants who made the UT error and selected the bystander and those who correctly identified the thief were nearly identical, 36.4% and 37.5% respectively.

Therefore, eyewitnesses should not be told the exact number of faces they will view in a lineup, as it not only makes them significantly more likely to misidentify an innocent bystander in the lineup, but also will not significantly improve the number of correct identifications of the thief. However, both of these methodological comparisons, sequential versus simultaneous and backloaded versus non-backloaded have accuracy trade offs. In each instance one has higher rates of correct rejections of suspect absent lineups and the other has higher rates of suspect identifications. Additionally, while it may appear that a non-backloaded sequential lineup is a medium ground between a simultaneous lineup and a non-backloaded sequential lineup, it is not that simple. Even though the backloaded sequential lineup has correct rejection and correct identification rates in between the other two methodologies, the only significant gains made between backloaded and non-backloaded lineups were in bystander misidentifications. Correct identifications of the suspect did increase, but not significantly so. Thus, it appears that there is nothing significant to be gained by informing eyewitnesses to the correct number of faces to be seen in the lineup.

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APPENDIX A

INFORMED CONSENT

PROTOCOL TITLE: "A Day in the Life of a Preschool Teacher"
UNIVERSITY OF TENNESSEE AT CHATTANOOGA

Please read this consent document carefully before you decide to participate in this study. This research has been approved by the University Institutional Review Board.

The Institutional Review Board of the University of Tennessee at Chattanooga (FWA00004149) has approved this research project # 12-085.

Purpose of the research study:

The purpose of this study is to show you a videotape about preschool education and to assess your thoughts and reactions to it.

What you will be asked to do in the study:

You will be asked to watch a video about preschool teaching, and give your opinions and reactions to the video.

Time required:

1 hour

Risks and Benefits:

There are no inherent risks involved with participating in this project. However, information from this study may benefit many in the future.

Confidentiality:

Your responses to any questions during the study asked are entirely confidential. Your name does not appear anywhere on the questionnaire, and you are not being evaluated in any way.

Voluntary participation:

Your participation in this study is completely voluntary.

Right to withdraw from the study:

You have the right to withdraw from the study at anytime without any penalty.

Whom to contact if you have questions about the study:

Dr. David Ross (David-Ross@utc.edu)
Dominick Atkinson (Dominick-Atkinson@mocs.utc.edu)

Agreement:

I have read this form and I agree to participate in the aforementioned procedure. I acknowledge that I have received a copy of this informed consent.

Participant: _____ Date: _____

If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact Dr. Bart Weathington, Chair of the Institutional Review Board, at 423-425-4289. Additional contact information is available at www.utc.edu/irb

APPENDIX B

INSTRUCTIONS READ TO PARTICIPANTS

Introduction

Thank you for coming today. My name is _____, and we appreciate your participation in our study. Today's session will last about an hour and I would like you to please listen carefully to the instructions that I'm going to give you.

Once we start the study it is very important that you do not talk to anyone. Please turn off your cell phones or switch them to silent and do not use them during the experiment. Once the experiment has begun, it cannot be stopped, and please do not look at anyone else's computer screen because we are interested in your individual answers.

After we finish the study, we will tell you all about what we are doing and can answer all your questions.

Task at Hand

You are participating in a study on psychology and education conducted by Dr. David Ross at UTC. As part of this study, I am going to show you a short film about teaching young preschool children. As many of you may know, the number of people going into the teaching profession, especially at the preschool level, has dropped dramatically over the last several years. The film that I am going to show you is designed to be shown to college students in hopes of attracting them to a career in preschool teaching. It shows what the average day in the life of a preschool teacher looks like, and shows some of the rewards and benefits of being a teacher. So, what I would like to do is show you the film, and then get your opinion and reactions to it. The film is about 15 minutes long.

Do you have any questions so far?

Before we get started, there is a sheet of paper called an Informed Consent Form. As part of the normal process of being part of a study we need you to read over this form and sign it at the bottom. This means that you are volunteering to participate in our study. Additionally, when you registered in the SONA system, you should have received a 4 digit identification number. Please place that number at the top of the sheet. If you do not know your number, it should be in the initial registration email that you received from SONA, or at the bottom of any of the reminder emails that you received about this session.

Present Film

After the Film

As you can see by the crime at the end of the film, this study is not about education and preschool teaching. Instead, it is about eyewitness memory and your ability to recall the crime you have just seen. Our goal, was to create as realistically as we could, a "crime" that you would observe without you knowing that it was going to happen. Now, I would like you to put yourself into the role of a real "eyewitness" and imagine that I'm a police detective who is asking you to describe your memory for the crime.

Lineup Identification

Now what I want to do is show you a series of photos of faces. When you view the photos, I want you to try to identify the thief who stole the money from the wallet or indicate that

the thief is NOT in the series of faces. You will view each of the faces one at a time, and you can view up to FIVE faces.

You cannot go back and look at previously seen photographs once you have answered yes or no to a face! After you are done with the photos we ask a series of questions that cannot be returned to once completed.

If you that think the person who stole the money is NOT being shown, then you will press the 1 key on the keyboard to indicate "NO"

If you that think the person who stole the money IS being shown, then you will press the 2 key on the keyboard to indicate "Yes"

After responding Yes or No to each face you will be asked to rate how confident you are in your response.

Finally, IF you have pressed "yes" for any face you are done with that portion of the study, and will not see anymore faces.

Please Remember, you will be viewing up to FIVE faces and the person who stole the money *may or may not be in the series of faces that you will see.*

After you are done with looking at the faces the computer will ask you a series of questions, and then you will be asked to complete a series of tasks.

Do you have any questions?

You can now begin. Please Press the Spacebar to start.

Debriefing

As you know, this is a study of eyewitness memory. I regret having to deceive you about the purpose of the study earlier, but as you can see it is not possible to do this research without the use of some deception. I would like to thank you for participating in this research.

I must ask you to please not talk to other people about the experiment. As you can see, it is critical that people not be informed about the nature of the study prior to participating in it. Other people from the community have yet to participate, so please don't tell them about the study. Okay? Thank you very much for you time, please have a lovely/great morning/afternoon.

APPENDIX C

CONTEXT QUESTIONS

Context Questions

1. Is there any person in the lineup who was seen in the film, but was NOT the person who stole the money from the wallet?

   Possible Answers: 1=No 2=Yes 3=Don't Know

2. If yes, what number does that person have in the lineup, and what was that person seen doing in the film? Please describe below. When you are done press the F7 key.

   Possible Answers: (They type the response to this question)

3. Was the robber seen in any place in the film other than in the cafeteria where the money was stolen?

   Possible Answers: 1=No 2=Yes 3=Don't Know

4. If yes, where was the robber seen and what was he doing? Please describe below. When finished press the F7 key.

   Possible Answers: (They type the response to this question)

5. When you were shown each photograph and asked whether or not that person was the thief how did you make your decision? Please describe below. Press the F7 key when finished.

   Possible Answers: (They type the response to this question)

6. How many MALE preschool teachers, if any, were shown in the film? Provide a VERY BREIF description of each, and state what they were doing. Please describe below. After you are finished press the F7 key.

   Possible Answers: (They type the response to this question)

7. Describe your memory of the robber. What did he look like? What type of clothing did he have on? (Give as much information as possible about the physical appearance of the robber.) Please describe below. Press the F7 key when you are done.

   Possible Answers: (They type the response to this question)

8. Describe your memory of the crime from the moment the victim entered the cafeteria until the end of the film. (Describe everything you can remember about the event (even seemingly unimportant details)). Please describe below. Press the F7 key when you are done.

   Possible Answers: (They type the response to this question)

APPENDIX D

DEMOGRAPHICS QUESTIONNAIRE

Demographic Questions

1. How Old Are You? Please type in your answer. Press ENTER when done/ Possible Answers: (They type the response to this question)

2. Are You:
   M = Male
   F=Female
   O=Other

3. Which is your dominant hand?
   L=Left
   R=Right
   A= Ambidextrous

4. What is your race/ethnicity?
   4=Caucasian / White
   5=Caucasian / White Non-Hispanic
   6=African American / Black
   7=Hispanic / Latino
   8=Asian-Pacific Islander
   9=Native American / American Indian

5. Your Education Level is?
   1=Less than Highschool
   2=Highschool / GED
   3=Some College
   4=2-Year College Degree (Associates)
   5=4-Year College Degree (BS,BA)
   6=Master's Degree
   7=Doctoral Degree

6. Father's Education Level
   1=Less than Highschool
   2=Highschool / GED
   3=Some College
   4=2-Year College Degree (Associates)
   5=4-Year College Degree (BS,BA)
   6=Master's Degree
   7=Doctoral Degree

7. Mother's Education Level
   1=Less than Highschool
   2=Highschool / GED
   3=Some College
   4=2-Year College Degree (Associates)

5=4-Year College Degree (BS,BA)
6=Master's Degree
7=Doctoral Degree

8. What is your current occupation? Please type in your answer. (Press F7 when you are done)
   Possible Answers: (They type the response to this question)

9. What was your first language? Please type in your answer. (Press Enter when you are done)
   Possible Answers: (They type the response to this question)

10. Do you have corrected vision?
    1=Yes, Glasses
    2=Yes, Contacts
    3=Yes, Laser Surgery
    4=Yes, Other
    5=No

11. Do you drink or eat caffeinated food and/or drinks?
    Y=Yes
    N=No

12. Have you had caffeine in the last 24 hours?
    Y=Yes
    N=No

13. Which of these best describes your average consumption of caffeine?
    1=Once a week
    2=Twice a week
    3=Three times a week
    4=Four times a week
    5=Five times a week
    6=Six times a week
    7= Everyday

14. How many hours of sleep did you get last night? Please type in your answer. Press ENTER when you are done.
    Possible Answers: (They type the response to this question)

APPENDIX E

INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

MEMORANDUM

TO: Dominick Atkinson **IRB # 12-085**
Dr. David Ross

FROM: Lindsay Pardue, Director of Research Integrity
Dr. Bart Weathington, IRB Committee Chair

DATE: February 21, 2013

SUBJECT: IRB #:12-085: The Impact of Sequential Lineups on Unconscious Transference in Lineup Identification: Further Exploration

The Institutional Review Board has reviewed and approved all changes proposed in Form B.

You must include the following approval statement on research materials seen by participants and used in research reports:

The Institutional Review Board of the University of Tennessee at Chattanooga (FWA00004149) has approved this research project # 12-085.

Please remember that you must complete a Certification for Changes, Annual Review, or Project Termination/Completion Form when the project is completed or provide an annual report if the project takes over one year to complete. The IRB Committee will make every effort to remind you prior to your anniversary date; however, it is your responsibility to ensure that this additional step is satisfied.

Please remember to contact the IRB Committee immediately and submit a new project proposal for review if significant changes occur in your research design or in any instruments used in conducting the study. You should also contact the IRB Committee immediately if you encounter any adverse effects during your project that pose a risk to your subjects.

For any additional information, please consult our web page http://www.utc.edu/irb or email instrb@utc.edu

Best wishes for a successful research project.

VITA

Dominick Joseph Atkinson was born and raised in Russiaville, IN. He attended Butler University in Indianapolis Indiana where he received a Bachelor of Arts in Psychology in May of 2012. After graduation, he came to The University of Tennessee at Chattanooga to pursue his Master's Degree in Research Psychology. While at UTC, he worked as a graduate student for the Teachers HELP Program and taught two introductory psychology courses. Mr. Atkinson has accepted an offer to continue his education and pursue his doctoral degree in cognitive psychology at Iowa State University in the fall of 2014.