

# Examining Confidence Accuracy, Observation Skills, And The Dunning Kruger Effect: A Simulation Study On Eyewitness Memory

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\***Original Research Papers** are papers that report on original empirical research with a focus on teaching and learning. Papers may be qualitative or quantitative and include an Abstract, Introduction, Method, Results, Discussion, and Reference section, as well as any tables and/or figures.

## Abstract

Using a quantitative approach, this study examines the confidence accuracy relationship of eyewitness memory and observation skills and explores the relationship between self-perception and accuracy (The Dunning Kruger Effect). The present study has three purposes. The first purpose is to highlight the importance of understanding one's limitations and self-assessment abilities to ensure effective training and preparedness for high-stress situations of a police officer. The second purpose is to show that eyewitness memory accounts in consequential settings such as court should not rely on confidence as an indicator of accuracy. The third purpose is to show that eyewitness accounts of police officers are not always more correct than those of civilians. Using Humber College's Conflict Resolution FAAC Digital Simulator, 18 subjects (17 students and 1 police officer) were assigned to take part in a virtual, pre-recorded simulation experiment. Participants' confidence in observation skills and their eyewitness memory abilities were assessed. Results found no correlation between confidence and accuracy in eyewitness memory, though it revealed that people can be extremely confident in their wrong answers, demonstrating that confidence is not always a good indicator of accuracy. Despite assumptions that police officers make better eyewitnesses, findings include that there was no significant difference in memory abilities between the police officer and Humber students.

## Introduction

Confidence is defined as "The act of confiding, trusting, or putting faith in; trust reliance; belief" (Adams, 2005). One's confidence is often assumed to be an indicator of their accuracy, but is it dependable? Human judgement is susceptible to biases, including overconfidence bias, where individuals tend to be overly confident in the accuracy of their beliefs. This bias occurs when individuals have unwarranted confidence in the accuracy of their beliefs, leading them to trust their memory even when it is flawed or incomplete. This is also known as the Dunning Kruger Effect. That is, high confidence does not necessarily correspond to high accuracy, and vice versa. In fact, individuals who are highly confident in their

memories may sometimes be less correct than those who are less confident (Schlösser et al., 2013; Kruger & Dunning, 1999; Muller, Sirianni & Addante, 2021; Zhou & Jenkins, 2020). The present study aims to show a need for new police recruits to understand their own strengths, weaknesses, abilities, and limitations to focus their training efforts where they need improvement. By doing so, training resources are used efficiently and effectively. This study also illustrates that confidence and accuracy are not always related and shows that eyewitness accounts of police officers are not always more dependable than those of civilians, which brings up the question of whether the accounts of police officers should be given more weight.

## Literature Review

Police officers are tasked with various duties that rely on observation and eyewitness memory—administering line-ups, making arrests, writing notes, and reports, which are all often used as evidence in court (Odinot & Wolters, 2006). Wise, Sartori, Magnussen, & Safer (2014) claim that one of the leading causes of wrongful convictions is eyewitness error. Are reports by police officers more complete and/ or more correct than reports by civilians? Are police officers better eyewitnesses? It has been shown that prominent levels of stress during an incident can impair the memory ability of both police officers and civilians alike (Vredeveldt & van Koppen, 2016; Christianson, 1992). Further, it is known that police officers have the same visual abilities as any other people, yet their words are weighted much heavier in consequential settings such as court. A study conducted by Benton, Ross, Thomas & Bradshaw (2006) compared jurors, judges, and law enforcement on their understanding and trust in their eyewitness memory to experts of eyewitnesses. When evaluated on their memory, none of these groups performed better than the others. It can be assumed by most that police officers make better eyewitnesses because they are ‘trained observers’ (DeCarlo, 2010). Results of a 2017 study by Vredeveldt, Knol, & Koppen tell us that the eyewitness memory reports of police officers are far more correct than civilians. Further, detectives provided the most correct and complete recall of information. As this study suggests, one of the explanations for this is that level of experience and training play a role in eyewitness memory ability. DeCarlo (2010) rejects the belief that police officers are “trained observers” and claims that this claim is generally false. Research studying change blindness found that law enforcement and students did not differ in their rates of

noticing change (Smart, Berry & Rodriguez, 2014). Legal decision-makers tend to believe that eyewitnesses are dependable if they have a high confidence level, such as a police officer would but this is not always true (Spearing & Wade, 2022). Within the past two decades, extensive research has been conducted on the relationship between confidence accuracy and eyewitness memory. A study done by Perfect, Watson & Wagstaff (1993) compared the results of performance on general knowledge and eyewitness memory. It was found that a confidence-accuracy (C-A) relation was dependable in general knowledge but not eyewitness memory. There are many hypotheses around why this is, one being that individuals lack knowledge of how good they are at a particular skill, affecting how confident they are (Perfect, 2004). In contrast, new research shows that high confidence is a good indicator of accuracy. According to Spearing and Kimberley’s (2022) analysis of earlier research on line-up identification, those with prominent levels of confidence typically had higher accuracy rates.

Research on the Dunning Kruger Effect has shown that low-ranking performers are often unable to accurately self-assess their performance level, as individuals will perceive that their results are substantially better than they are. Studies that aim to assess the Dunning Kruger Effect show that participants who landed in the bottom quartile of performance are seen to overestimate their abilities significantly. In contrast, performers in the highest-performing quartile were found to have only minimally underestimated their abilities (Muller, Sirianni & Addante, 2021). In contrast, Krajč and Ortmann (2008) suggest that there is no significant difference in the abilities of low-ranking performers versus high-ranking performers in terms of the ability to self-assess. These findings suggest that a certain degree of metacognitive skill is crucial in self-assessment. Dunning (2011) calls this “meta ignorance” or “ignorance of ignorance.” Further, Dunning (2011) describes the effect as a “double burden”: the same deficiencies that lead someone to make mistakes also prevent them from recognizing them as well. The research highlights the intriguing notion that incompetence can breed overconfidence, while competence can lead to self-doubt.

## Methodology

This present study was conducted in Humber College’s Sim Lab, using a MILO Range Equipment simulator. This is a 180-degree conflict resolution simulator that uses a curved screen 193 cm high and 305 cm wide. Participants were

acting as police officers on duty and told to de-escalate the situation. Participants wore a realistic duty belt that held an IR-laser-fitted training handgun to mimic a police officer's tool belt. At only 60 seconds long, the simulation was of an adult male standing in the middle of a suburban road with five other people in the area and two cars that drove past him. He was uncooperative and displayed behavioural issues, all while being armed with a large knife. As it is a pre-recorded simulation, the scenario played out the exact same way for each participant, regardless of their actions. This means that the on-screen individual ran toward the participant with his knife at the end of the simulation every time, no matter how they interacted with the simulation. The use of the Sim Lab was vital in the creation of a realistic environment in which to run this experiment. Being able to create a safe but realistic, high-stress environment allowed for a more accurate and realistic experiment to be run.

18 Participants took part in the experiment: 1 Police officer, 8 Humber College Police Foundations students (PFP), 6 Humber College Criminal Justice students (CJ) and 3 Humber College Music Students (BM). Prior to engaging in the simulation, participants were told that the experiment was based on verbal de-escalation strategies. All participants were given a survey to rate their confidence in their abilities in eyewitness memory and verbal de-escalation skills on a scale of 1-4 (1 being not confident in their abilities, 4 being extremely confident in their abilities). After completing the simulation, participants were told of the real nature of the study when another survey was given, asking about confidence levels of their eyewitness memory and observation skill abilities on a scale of 1-4 (1 being not confident in their abilities, 4 being extremely confident in their abilities) and 8 open-answer questions testing their eyewitness memory (e.g. how many cars passed by you?). In addition to asking for their overall confidence level before and after the simulation, each open-answer question asked for the participants' confidence in that specific answer.

The written surveys were developed by our team for this experiment. The Riker Scale used to assess confidence was taken from a 2016 study titled "Academic Integrity: The Fool's Dilemma" by Qaderi, Alexandre & Thomson. When being analyzed, the eight open-answer questions were classified as either correct or incorrect. These scores were then tallied, which presented a score out of eight for each participant. The correct answer scores were then compared to the pre-

and post-confidence levels of each participant to run the correlation analysis.

**Example of how the pre- and post-confidence levels of each participant were compared for the correlation analysis**

Participant #	Number of correct answers	Post-confidence	Pre-confidence
6	3	4	3
16	7	2	3

For information related to this equipment, please visit <https://www.faac.com/milo/virtual/accessories/>

**Results & Analysis**  
**Pre-Confidence (The Dunning Kruger Effect)**

An important part of this study is looking at the relationship between pre-confidence levels and performance. As mentioned earlier, participants were asked to rank their confidence in their eyewitness memory abilities prior to the experiment and after the experiment on a scale of 1-4 (1 being not confident, 2 being somewhat confident, 3 being confident, and 4 being very confident). Correlations were run on the confidence and accuracy level. However, due to the small sample size, this was not as significant as hoped.

Employing a quantitative approach, the present study can show the Dunning Kruger Effect. To begin, Participant 17 (P-17) rated themselves as extremely confident (4/4) in the pre-survey, yet they only got 3/8 correct answers in the post survey. In contrast, P-5, P-16, and P-2 rated themselves as only somewhat confident in the pre-survey (3/4) while scoring 7/8 correct answers in the post survey. This is noteworthy as it shows that not only did P-17 not receive the highest number of correct answers, but P-17 also believed that they were going to achieve more correct responses than the others did (with a prominent level of confidence). In contrast, P-5 and P-16 received more correct answers, with a lower level of pre-confidence. Overall, there was a weak positive correlation of 0.21 between confidence and accuracy. With a larger sample size, this result may be more reflective of the Dunning Kruger Effect.

There was quite a notable difference in the averages of pre-confidence among programs. It was found that Police

Foundations students were the most confident in their eyewitness memory abilities going into the experiment, with an average pre-confidence of 3.25/4. In contrast, the average pre-confidence of CJ students was 2.83/4, and the average pre-confidence of music students was 2.33/4. As the Dunning Kruger Effect predicts, the police officer had less pre-confidence than the average confidence of all PFP students, showing that the skilled/experienced are more aware of their abilities than the unskilled/inexperienced. See [Figure 1](#).

### Confidence-Accuracy Relationship

The second main goal of the present study was to examine the confidence accuracy relationship of eyewitness memory. To do this, a graph was created, which showed the number of correct responses and post-confidence levels of each participant. The graph was then sorted by the sum of correct responses, from left to right. Results showed that there is no linear correlation between post-confidence and the number of correct responses (accuracy). P-16 rated themselves a level 2/4 confident and received 7 correct responses. In contrast, both P-15 and P-17 rated themselves with a 3/4 level of confidence and received only 3 correct responses. See [Figure 2](#).

One of the post-survey's written answer questions relating to eyewitness memory asked the participants to recall what the dog on the left side of the screen looked like. This question was a trick question, as there was no dog present in the simulation. A total of 6 participants claimed they saw a dog (33%), with 3 of them claiming this with either a level of 3/4 or 4/4 confidence. A few written answers include "large brown dog," "a lab," "small of age, light brown," "small grey," "medium size," and "small grey fur." See [Table 1](#).

The minimum, maximum, and average number of correct responses between those who had high post-confidence and those who had low post-confidence were compared. Those who rated themselves either 1 or 2 out of 4 were grouped together as low confidence and those who rated themselves as 3 or 4 out of 4 were grouped together as high confidence. We found that the maximum and minimum numbers of correct responses were the same for both groups. The average of the high and low confidence scores varied by only 0.7. Those with high post-confidence had an average score of 5.2, while those with low post-confidence had an average of 4.5.

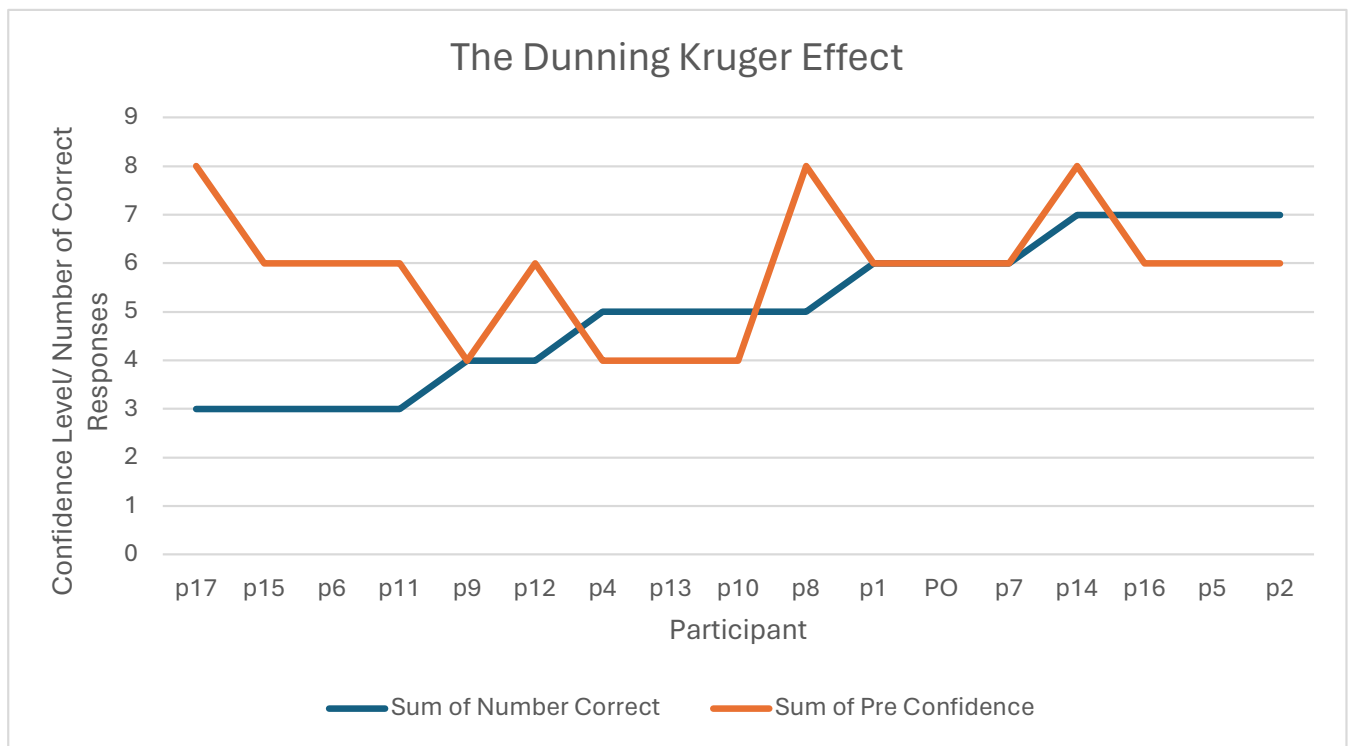


Figure 1. The Dunning Kruger Effect

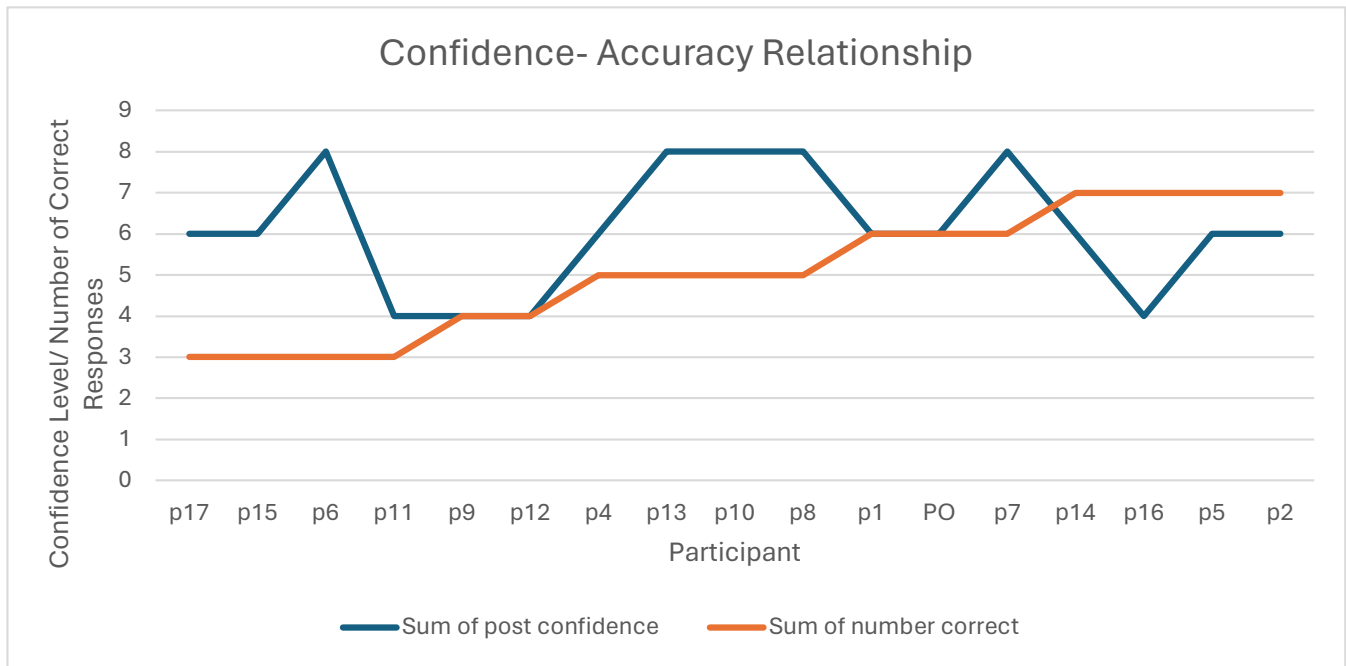


Figure 2. Confidence-Accuracy Relationship

**Table 1. Results of question “What did the dog on the left look like?”**

Participant #	Answer to Q: “What did the dog on the left look like?”	Confidence level in their answer
2	Large brown dog	1
4	A lab	1
8	Small of age, light brown	4
10	Small, grey fur	2
12	Small grey	3
14	Medium size	3

## Discussion

In conclusion, results showed that confidence accuracy has no correlation to eyewitness memory or observation skills. However, results showed that people can be extremely confident in their inadequate abilities, showing that confidence is not always a good indicator of accuracy. As mentioned by DeCarlo (2010), it can be assumed by most that police officers make better eyewitnesses because they are “trained observers.” But, contrasting results were found. The results found that the police officer did not have more correct responses than all students; four students had seven correct responses, while the officer had six. So, how do Humber College students’ observation skills and eyewitness memory differ from police officers according to their

confidence level and accuracy? The answer is short. Police officers’ and students’ eyewitness memory abilities and observation skills do not differ significantly, even though their eyewitness accounts in court are often weighed differently. One of the main purposes of this study was to show that new police officers need to understand their own limitations of ability to ensure effective training and preparedness for high-stress situations of a police officer. As the present study shows, people often have little insight into their abilities. This inability to assess one’s own limitations may have detrimental effects on confidence when entering a high-stress scene. This is particularly important for eyewitness testimony and the criminal justice system.



## Limitations

One significant limitation of the current study was the small sample size, which may compromise the reliability and generalizability of the presented results. A small sample size may not accurately represent the population being studied. As a result, future studies with larger and more representative samples are needed to confirm and generalize these findings. Due to the time constraint of the research, the present study also recognizes its limited access to data, one being that only one police officer took part.

## Future Recommendations

Findings from this study may provide future researchers with a framework for the evaluation of self-assessment of eyewitness memory abilities for police officers. As the literature around eyewitness error shows, people often assume eyewitness accounts of police officers are more correct than those of civilians. There is a strong need for police departments to consider how new recruits are trained, to make sure they are aware of their own abilities and limitations. This way, they can be more prepared to manage high-stress and fast-paced situations effectively. Having little insight into their own abilities may have detrimental effects on confidence when entering a high-stress scene. Future research can look at evaluating the effectiveness of training methods and experience, as well as accuracy and confidence of recall, to help better understand what works best for training new recruits and how to improve their skills over time. The more research is conducted in this field, the higher the potential of improving these skills. The recommendation includes creating better training programs that not only build technical skills but also strengthen cognitive and emotional readiness. This can help recruits provide more reliable eyewitness accounts in real-life situations, leading to more effective policing and fairer court hearings.

## Conclusion

This study highlights the importance of further understanding the roles of eyewitness memory and self-perception in individuals entrusted with making high-stakes observations. People often lack insight into their own abilities, which can lead to overconfidence in challenging situations. The findings underscore the need for a more detailed approach to assessing one's limitations and self-assessment abilities. Importantly, the study challenges the assumption that eyewitness accounts of police officers are always more correct than those of civilians. This suggests that we must

carefully consider how we evaluate the effectiveness of training methods and experience, as well as the accuracy and confidence of memory. By establishing this framework, we can implement better training practices for new recruits and continuously improve their skills over time.

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## Conflict of Interest

The authors have no conflicts of interest to declare.

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