Eyewitness Memory Accuracy: Investigating the impact of individual differences in working memory and perceptual capacity for scenes with high versus low perceptual load.

Maryanne Brassil, Saoirse Comerford Liston, Jade Duffy, Sarah Maher, Assoc. Prof. Ciara Greene; School of Psychology, University College Dublin

maryanne.brassil@ucdconnect.ie @maryannebrassil

Introduction

- Memory for an event can often become distorted and unreliable, especially after encountering post-event misinformation.[1-2] This fragility of memory is particularly relevant when considering evidence provided by eyewitnesses to a crime.[3]
- Perceptual load is the amount of external information that requires perceptual processing in a scene.[4] High levels of visual perceptual load may impair eyewitness recall accuracy as it puts a higher demand on cognitive resources.[5]
- Perceptual capacity is an individual difference factor that refers to one's ability to encode visual perceptual information, and those with higher perceptual capacity may be less susceptible to processing errors associated with high perceptual load.[6] However, this has not previously been looked at in relation to the misinformation effect in eyewitness recall.
- Higher levels of individual ability in certain cognitive functions, such as working memory capacity, have been found to reduce rates of memory distortion caused by misinformation in eyewitness scenarios.[7] There is also evidence that this effect may be exacerbated in situations that impose high levels of perceptual load.[8]
- It was predicted that in the present study, higher levels of working memory capacity and perceptual capacity would increase eyewitness recall accuracy for both misinformation and control items. It was also expected that these effects would increase in conditions where the eyewitness scene imposed high visual perceptual load.

Methodology

- 400 valid participant responses were collected. Aged 18 – 62 (M = 25.38; SD = 8.53); 223 = Male, 173 = Female, 2 = Other gender, 2 = Not specified.
- Study was conducted online using Qualtrics. Participants watched a video (Fig.1), read misinformation and neutral information for 12 critical items from the video, and their eyewitness recall was tested for these 12 critical items in a questionnaire. A follow-up questionnaire with the same items was sent to participants after 1-week (n = 223)
- Participants were redirected to Inquisit twice during the study to complete i) a brief composite span task to measure working memory capacity[9] and ii) a subitising task to measure perceptual capacity.[6]

Figure 1. Screenshots from the video shown to participants depicting a simulated theft in a university office. Visual perceptual load was manipulated between groups with random assignment to either the low load or high load condition, with load being manipulated by the amount of visual clutter in the scene.

Main Analyses

- Overall, eyewitness accuracy was significantly less for misinformation items (M=44.96%; SD=22.08%) compared to control items (M=51.71%; SD=21.35%) in the initial survey. This difference was also significant in the follow-up for misinformation items (M=41.50%; SD=21.78%) compared to control items (M=46.99%; SD=22.44%).
- Initial questionnaire: No significant main or interaction effects for overall eyewitness accuracy in a MANCOVA. Univariate analyses showed a borderline significant main effect for working memory capacity in the misinformation condition ($F(1,399) = 3.89$, $p = .05$, $\eta_p^2 = .01$).
- Follow-up questionnaire: Preliminary analyses found a significant main effect for perceptual capacity on overall eyewitness accuracy ($p = .022$) in a MANCOVA. Univariate analyses indicate this main effect is present for misinformation items ($F(1,211) = 7.45$, $p = .006$, $\eta_p^2 = .035$), but not control items.

Summary of findings

- Individual differences in perceptual capacity were not found to impact eyewitness recall accuracy in the initial survey, but a significant main effect for perceptual capacity was observed in the preliminary analyses for the follow-up questionnaire.
- Univariate analyses tentatively support previous findings [7] that higher levels of working memory capacity may be associated with higher levels of accuracy for items where misinformation was provided in the initial survey. However, significance was borderline at $p = 0.05$.
- No interactions between these individual difference variables and visual perceptual load on eyewitness recall accuracy were observed initial and follow-up questionnaires.

Conclusions

- Findings are unexpected considering previous evidence that effects of perceptual load on eyewitness recall are moderated by cognitive ability factors.[8]
- Differing findings between the initial and follow-up questionnaire suggest that the impact of cognitive ability factors on eyewitness recall accuracy may vary depending on the recall delay period.

References: