

## Background

- Non-clinical dissociation involves momentary, fleeting cognitive failures (Chiu et al., 2009)
- Research has shown that effects of dissociation are increased under tasks with high cognitive load with the following impacts:
  - Working memory seems to be lowered in higher levels of dissociation (Brewin & Mersaditabari, 2013)
  - Research has found deficits in attentional processes on accuracy on the Stroop Task (Freyd et al., 1998)
- Both attentional and working memory processes are involved in lifeguarding surveillance
  - It requires allocation of attention to the scene and all individuals in the scene through stimulus driven and decision driven pathways
  - In addition, it requires updating working memory schemas to locate and evaluate distress incidents.
- Lifeguarding manuals recommend using a scan path during surveillance, but there is no scientific evidence to support the effectiveness of a rote scan path (American Red Cross, 2007)
- We tested the effects of dissociation and scan path manipulation on accuracy of drowning detection
- We expected people high in dissociation would miss more drownings and have more false alarms than people low in dissociation. High dissociation would also miss more drownings on the horizontal condition than in the random path

## Method

### Participants

- 11 undergraduate students (10 female) from ECSU
  - $N=5$  Caucasian or White,  $N=4$  Black or African American,  $N=2$  Hispanic/Latinx
  - Average age  $22 \pm 7.47$  years (range: 18 – 44)

### Task, Materials, and Procedure

- Simulated lifeguarding surveillance task programmed in MatLab using 40 videos of real-life drownings sourced from the YouTube channel: Lifeguard Rescue
  - Videos were between 5 and 20 seconds long
- Participants monitored videos of active swimming situations in an outdoor pool
- Lifeguard Scenario variables:
  - (20) Active drownings (easy versus hard),
  - (10) Passive drowning
  - (10) No drownings (Control; video was stopped before drowning began)
  - Counterbalanced and randomized
- Visual search variables
  - Random path: “move your eyes around the scene in whatever way you like”
  - Horizontal path: “move your eyes around the scene like you are reading a page, left to right and top to bottom”
- Dissociation levels were measured after completion of the search task via self-report
  - The Clinician Administered Dissociative States Scale-1 (CADSS-1) (Bremner et al., 1998)



Above: Example of active drowning. Note the evidence of splashing and the head above the water while arms slap at the surface in a classic drowning pattern



Above: Example of passive drowning. The drowning individual is holding a small child above their head. Note that the adult is fully submerged in the water under the child with no obvious signs of drowning or distress

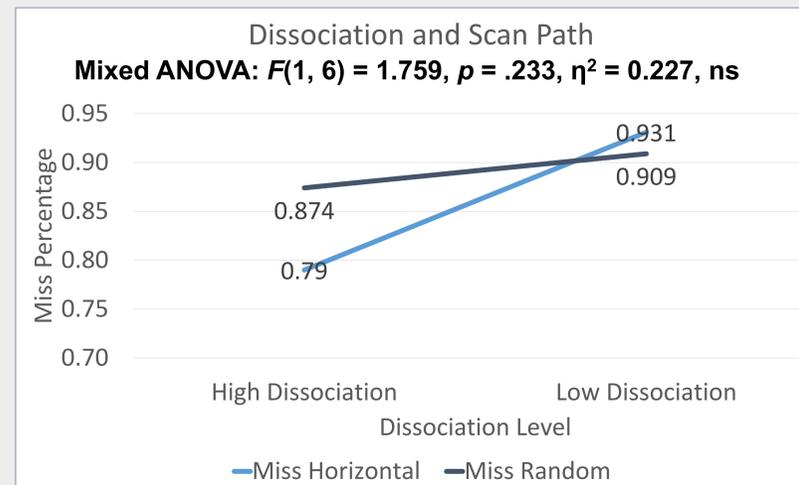
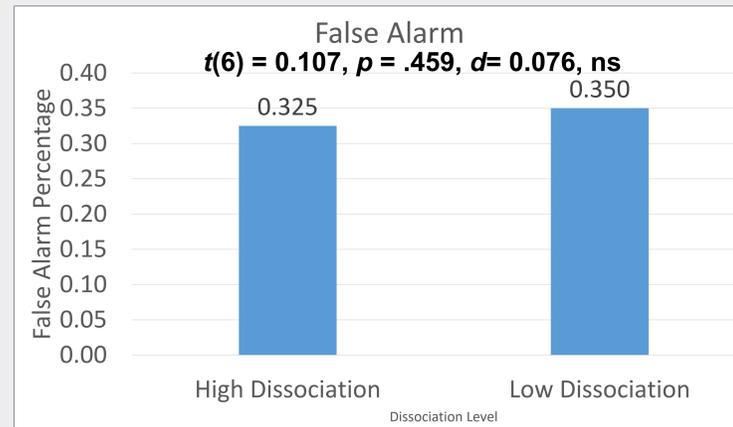
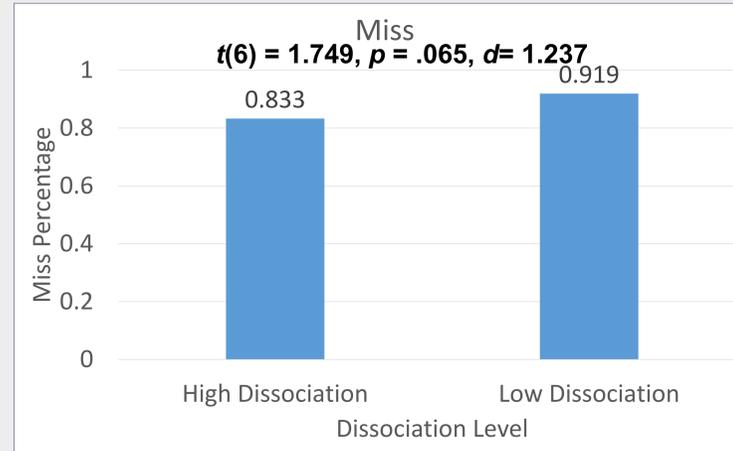
## Results

Participants were classified as “low” (30<sup>th</sup> percentile or less) or “high” (70<sup>th</sup> percentile or more) in dissociation; participants at the median were excluded from statistical analysis

**Independent Samples t-test: Dissociation (High/Low) and total Miss Rates**

**Independent Samples t-test: Dissociation (High/Low) and total False Alarm Rates**

**Mixed ANOVA: Dissociation (High/Low) and Scan Path (Horizontal and Random)**



**Conclusion: Although not statistically significant, the effect sizes suggest that dissociation may influence accuracy in a visual search task.**

## Discussion

- People high in dissociation may have missed fewer drownings overall than did people low in dissociation
  - This is opposite the initial prediction. It is possible that people high in dissociation use compensatory strategies to maintain attention while in a task, or may be better able to split attention across multiple targets (Chiu et al., 2009)
  - While the means of high and low dissociates were not statistically different based on t-test results, the large effect size and low p-value indicate that with higher power, an effect may exist
- There was no difference between people high in dissociation and low dissociation in false alarms, or alerting to a drowning without a target present
- There was no difference between the random and horizontal scan path conditions within subjects
- There was not a significant interaction between Dissociation and Scan Path condition
  - However, there was a trend showing potentially that people high in dissociation missed fewer drownings in the horizontal scan path condition while people low in dissociation missed fewer drownings in the random path condition
  - The horizontal scan path may have given people high in dissociation a reference point for their progress around the image frames, more research is needed

## Limitations

- The results indicate the study is under powered. These data are presented as preliminary results as the study is still in progress and more participants will be run
- No analyses have been run on whether participants' eye movements followed the prescribed scan path

## Future Research

- Other scan path assignments should be tested for differences in accuracy
- Field tests including in-person lifeguarding scenarios with dissociative individuals should be conducted
- Larger sample sizes will be necessary to provide enough statistical power to find effects

## References

- American Red Cross (2007). *Lifeguarding*. Staywell.
- Bremner, J. D., Krystal, J. H., Putnam, F. W., Southwick, S. M., Marmar, C., Charney, D. S., & Mazure, C. M. (1998). Measurement of dissociative states with the clinician-administered Dissociative States Scale (CADSS). *Journal of Traumatic Stress, 11*(1), 125–136. <https://doi.org/10.1023/a:1024465317902>
- Brewin, C. R., & Mersaditabari, N. (2013). Experimentally-induced dissociation impairs visual memory. *Consciousness and Cognition, 22*(4), 1189-1194. <http://doi.org/10.1016/j.concog.2013.07.007>
- Chiu, C., Yeh, Y., Huang, Y., Wu, Y., & Chiu, Y. (2009). The set switching function of nonclinical dissociators under negative emotion. *Journal of Abnormal Psychology, 118*(1), 214-222. <http://doi.org/10.1037/a0014654>
- Freyd, J. J., Martorello, S. R., Alvarado, J. S., Hayes, A. E., & Christman, J. C. (1998). Cognitive environments and dissociative tendencies: Performance on the standard Stroop task for high versus low dissociators. *Applied Cognitive Psychology, 12*(7). [http://doi.org/10.1002/\(sici\)1099-0720\(199812\)12:73.0.co;2-z](http://doi.org/10.1002/(sici)1099-0720(199812)12:73.0.co;2-z)
- Lanagan-Leitzel, L. K. (2012). Identification of critical events by lifeguards, instructors, and non-lifeguards. *The International Journal of Aquatic Research and Education, 6*, 203-214.
- Lanagan-Leitzel, L. K. (2019). An examination of the severity of aquatic incidents. *The International Journal of Aquatic Research and Education, 10*, 1-14. <http://doi.org/10.25035/ijare.10.04.07>
- Lanagan-Leitzel, L. K. (2021). Does incident severity influence surveillance by lifeguards in aquatic scenes? *Applied Cognitive Psychology, 35*, 181-191. <http://doi.org/10.1002/acp.3752>