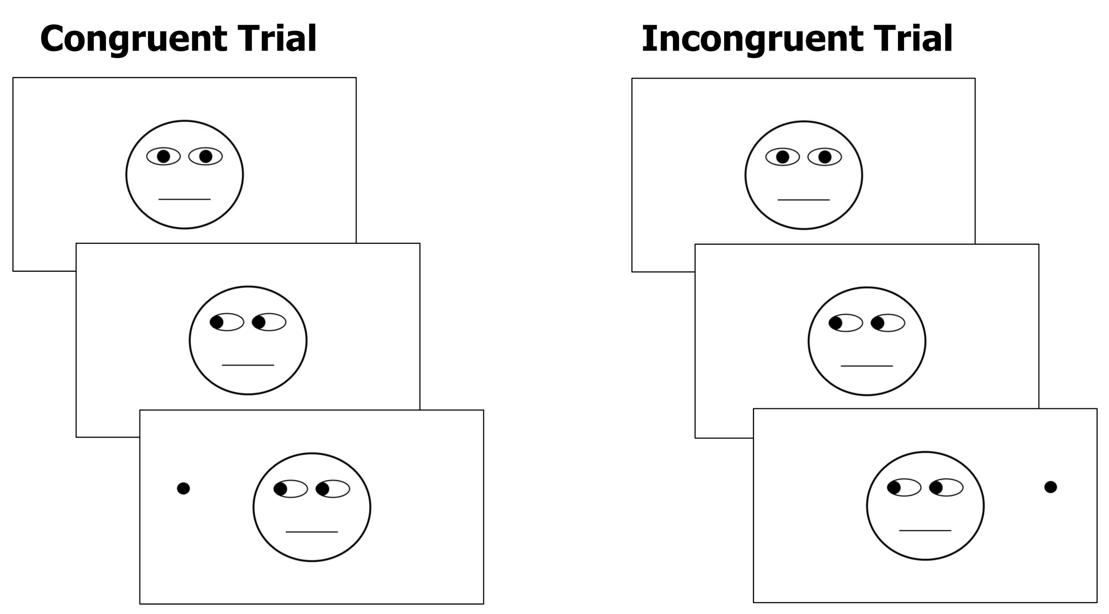
Gender differences in the use of social and non-social spatial cues

Clara Retzloff, Adi David, Justyne Ingwu, Nicole Meselsohn, Asa Kaplan, & Thomas Hutcheon
Bard College, Annandale-On-Hudson, New York

The Gaze-Cueing Effect (GCE)

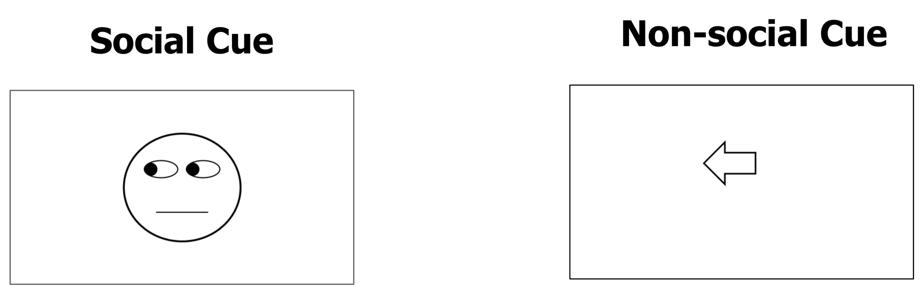
- From the earliest stages of development, humans prioritize information about the faces of others (Reid et al., 2017).
- In addition to what a face looks like, where a face is looking (gaze-direction) provides important information to observers. Humans reflexively follow the gaze-direction of others, a phenomenon that can be demonstrated in the lab using the gaze-cueing paradigm (Driver et al., 1999; Friesen & Kingstone, 1998; Hutcheon et al., under review).



- The difference in response time (RT) for incongruent minus congruent trials is referred to as the gaze cueing effect (GCE) and the GCE is present even when participants are informed that the gaze-direction is uninformative of the target location.

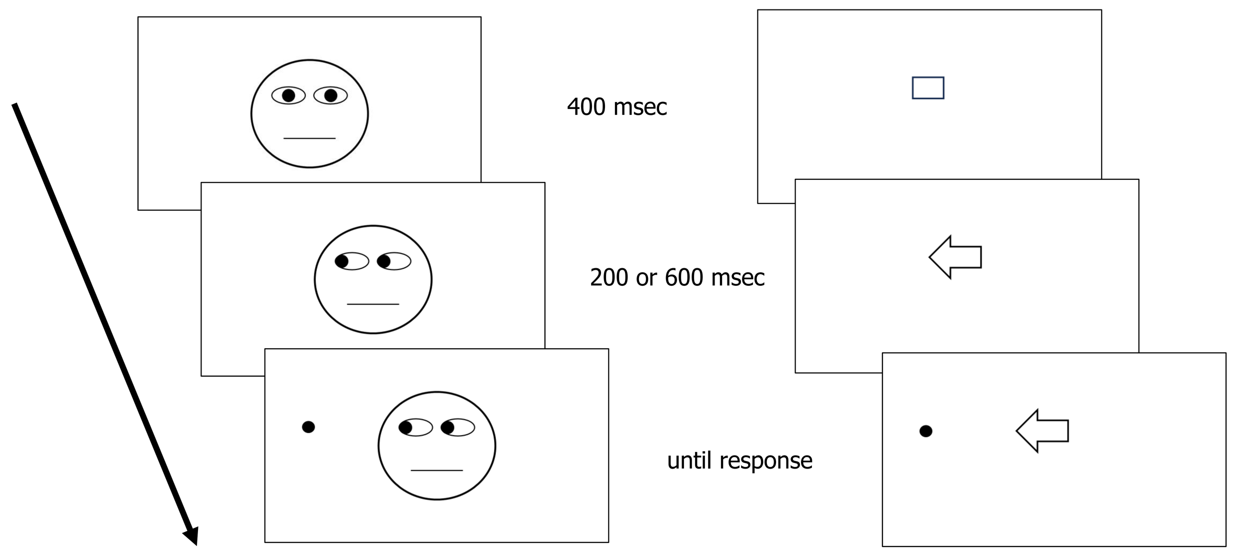
The Impact of Participant Gender on the GCE

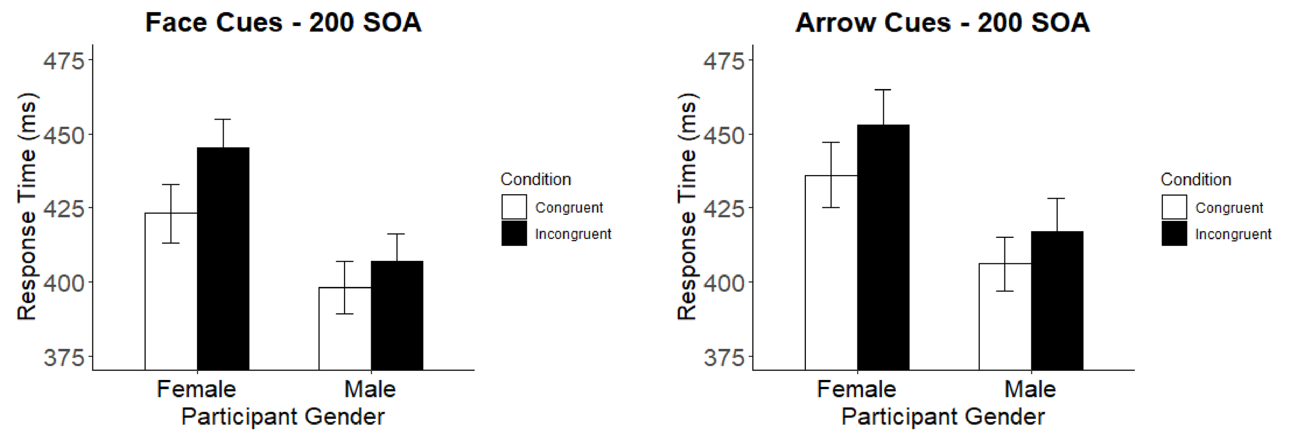
- The GCE tends to be larger for female compared to male participants (Baylis et al., 2005; Cooney et al., 2017), a difference that has been attributed to variations in social abilities (including levels of empathy) across gender (Alwall et al., 2010).
- An alternative account for gender differences in the GCE is that females and males process spatial cues differently, regardless of social-content.
- In the current experiment, we tested these accounts by comparing performance for male and female participants across a (social) face-cueing task and a (non-social) arrow cueing task.



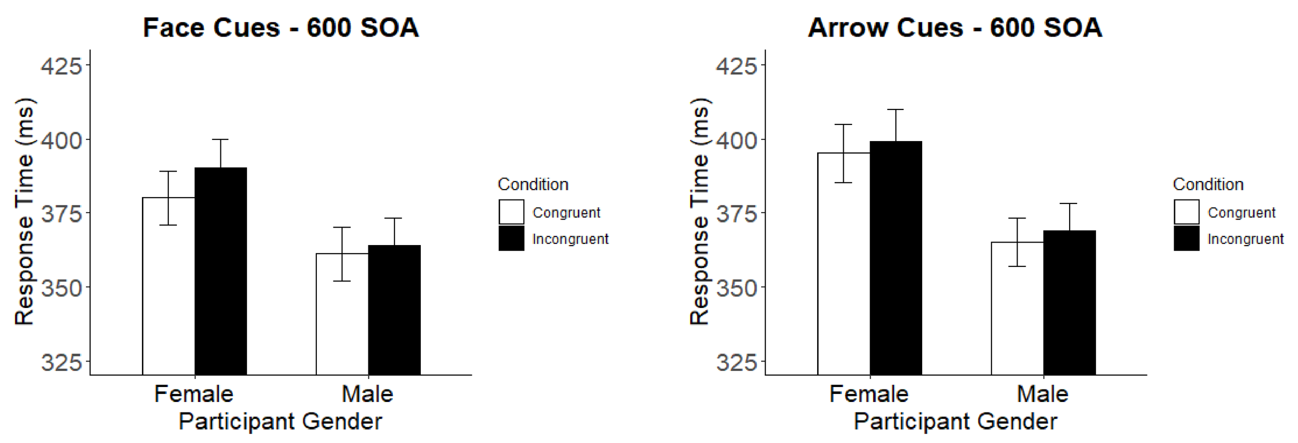
Experiment

- 100 participants (50 females and 50 males, age range 18-40 years) were recruited from Prolific™.
- Participants completed 128 trials of the face cueing task and 128 trials of the arrow cueing task (order counterbalanced across participants).
- The length of time the cue was presented varied across trials from short (200 msec SOA) to long (600 msec SOA).





At short SOAs, a GCE was observed, *F*(1,95) = 30.79, *p* = .018. This effect was numerically larger for females compared to males for face cues (*M* = 22 vs *M* = 23) and arrow cues (*M* = 15 vs *M* = 8). However, the GCE by Gender interaction did not reach significance for either face, *F*(1,95) = 2.89, *p* = .093 or arrow cues, *F*(1,95) = 2.15, *p* = .145.

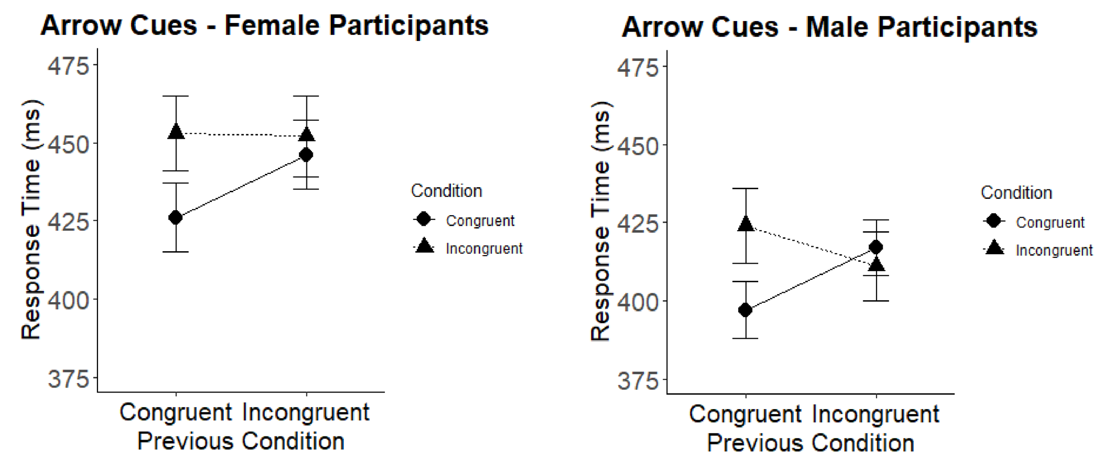


At long SOAs, a GCE was observed, *F*(1,95) = 4.367, *p* = .039. This effect was numerically larger for females compared to males for face cues (*M* = 9 vs *M* = 3) and arrow cues (*M* = 4 vs *M* = 3). Again, the GCE by Gender Interaction did not reach significance for face, *F*(1,95) = 1.25, *p* = .266 or arrow cues, *F*(1,95) = 0.006, *p* = .938.

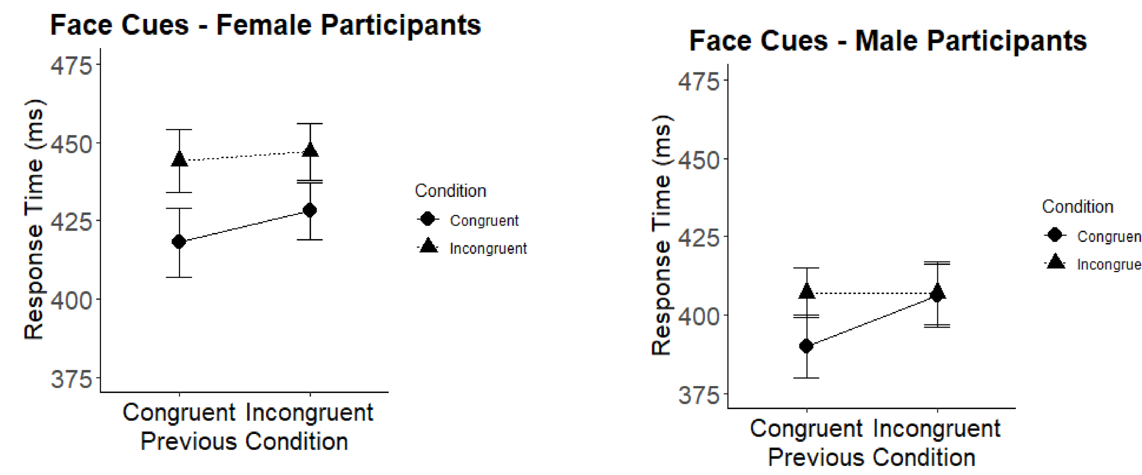
- Despite observing numerically smaller GCEs for males compared to females, we failed to find statistical evidence for gender differences in either the face or arrow cue task. We followed-up this analysis by assessing how cues impacted performance at the trial-to-trial level.

Cue Adaptation Effect

- We next tested whether the GCE would be modulated by previous trial condition.



We observed an *Arrow Adaptation effect* for both genders. The size GCE was significantly reduced following incongruent compared to congruent trials for both female, F(1,46) = 12.44, p < .001 and male, F(1, 46) =14.02, p < .001 participants.



In contrast, we observed a *Face Adaptation effect* in male, F(1,46) = 4.84, p < .033 but not female, F(1, 46) = 0.905, p = .346 participants.

- Following incongruent arrow trials, both male and female participants reduced their reliance on arrow cues. In contrast, after incongruent face trials, males, but not females, reduced their reliance on face cues.

Conclusions

- We attempted to replicate and extend previous reports of gender differences in the gaze cueing paradigm.
- Overall, we observed numerical, but not statistically significant gender differences in the GCE. However, at the trial-to-trial level, gender differences in the use of cues did emerge.
- Male and female participants appear to differ in how they process faces, but not arrows, over the course of the experiment.

References

Alwall, N., Johansson, D., & Hansen, S. (2010). The gender difference in gaze-cueing: Associations with empathizing and systemizing. *Personality and Individual Differences*, *49*(7), 729-732.
Bayliss, A. P., Di Pellegrino, G., & Tipper, S. P. (2005). Sex differences in eye gaze and symbolic cueing of attention. *The Quarterly Journal of Experimental Psychology Section A*, *58*(4), 631-650.
Cooney, S. M., Brady, N., & Ryan, K. (2017). Spatial orienting of attention to social cues is modulated by cue type and gender of viewer. *Experimental brain research*, *235*(5), 1481-1490.
Driver IV, J., Davis, G., Ricciardelli, P., Kidd, P., Maxwell, E., & Baron-Cohen, S. (1999). Gaze perception triggers reflexive visuospatial orienting. *Visual cognition*, *6*(5), 509-540.
Friesen, C. K., & Kingstone, A. (1998). The eyes have it! Reflexive orienting is triggered by nonpredictive gaze. *Psychonomic bulletin & review*, *5*(3), 490-495.
Hutcheon, T.G., McMahon, H., Retzloff, C., Samat, A., & Tinker, C. (under review). The attractiveness of face cues does not modulate the gaze cuing effect.
Reid, V. M., Dunn, K., Young, R. J., Amu, J., Donovan, T., & Reissland, N. (2017). The human fetus preferentially engages with face-like visual stimuli. *Current Biology*, *27*(12), 1825-1828.

For more information about this study, please contact Clara Retzloff (cr6306@bard.edu)