Individual differences in face identification correlate with face detection ability Virginie Burns¹, Guillaume Lalonde-Beaudoin¹, Justin Duncan¹⁻², Stéphanie Bouchard¹, Caroline Blais¹, & Daniel Fiset¹ (1) Département de Psychologie, U. du Québec en Outaouais; (2) Département de Psychologie, U. du Québec à Montréal

Introduction

Our brain is tuned to detect, identify and integrate social information conveyed by faces. Despite the crucial role of face detection, little is known about the visual processes underlying this endeavor and how it relates with face identification. Recently, Xu and Biederman (2014) presented a case of acquired prosopagnosia (MJH) with a face-specific detection impairment— MJH's car-detection abilities are within the normal range. Thus, we hypothesized that there may exist a correlation between face identification and detection proficiency in normal adults.

Methods

Forty-five (45) participants took part in our experimentation

Detection ability

- 2-AFC face detection task
- 2-AFC car detection task
- 100 trials/task/participant
- Phase spectrum randomization (Dakin et al., 2002) with power spectra equalized across face and car stimuli (see exp. 2 in Xu & Biederman, 2014)

Face processing ability

We computed individual global face scores (GFS) by averaging z-scored performances in three tasks (see Royer et al., 2015):

- Cambridge Face Memory Test (CFMT)
- Cambridge Face Perception Test (CFPT)
- Glasgow Face Matching Test (GFMT)





Figure 1. Creation of a phase randomized stimulus in which the proportion of original phase, *w*, is determined by Quest (Watson & Pelli, 1983) to maintain 75% correct responses—the proportion of phase randomization is then simply *1-w*.

Results

We obtained significant 👦 a negative correlation between § face processing abilities (GFS) and face detection threshold, § ° r=-.43, p<.01. This correlation $\frac{1}{2}$ remained significant when Ξ partialling out the car detection $\frac{2}{6}$ -2 threshold, $r_{partial}$ = -.37, p< .05. GFS did not correlate with the car detection threshold, p > .05*p*=.38).



 $(r = -.27; p = .07 - r_{partial} = -.14; Figure 2.$ Correlation between global face score and face detection threshold, r = -.43, *p*< .01.

Conclusion

Our results show that performance during a very simple face detection task correlates with performance in higher-level face processing tasks. Our results challenge a recent study that found no link between those abilities (Robertson et al., 2017). More research is needed to better understand what perceptual mechanisms are shared between face detection and face identification.

References

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