

Individual Differences in Holistic Face Processing and Composite Construction Using a Feature-based System

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Introduction

Evidence has suggested there are individual differences in holistic face processing ability. On one end of the continuum lie individuals with severe impairments in face recognition. On the other end lie 'super-recognisers', who have superior face recognition abilities.

Research has also found individual differences in potentially dissociable indexes of holistic face processing called 'hits' and 'correct rejections' ^{1,2}.

Little research has investigated the relationship between holistic face processing ability and an applied measure of face memory- composite construction, with research finding conflicting results ^{3,4}.

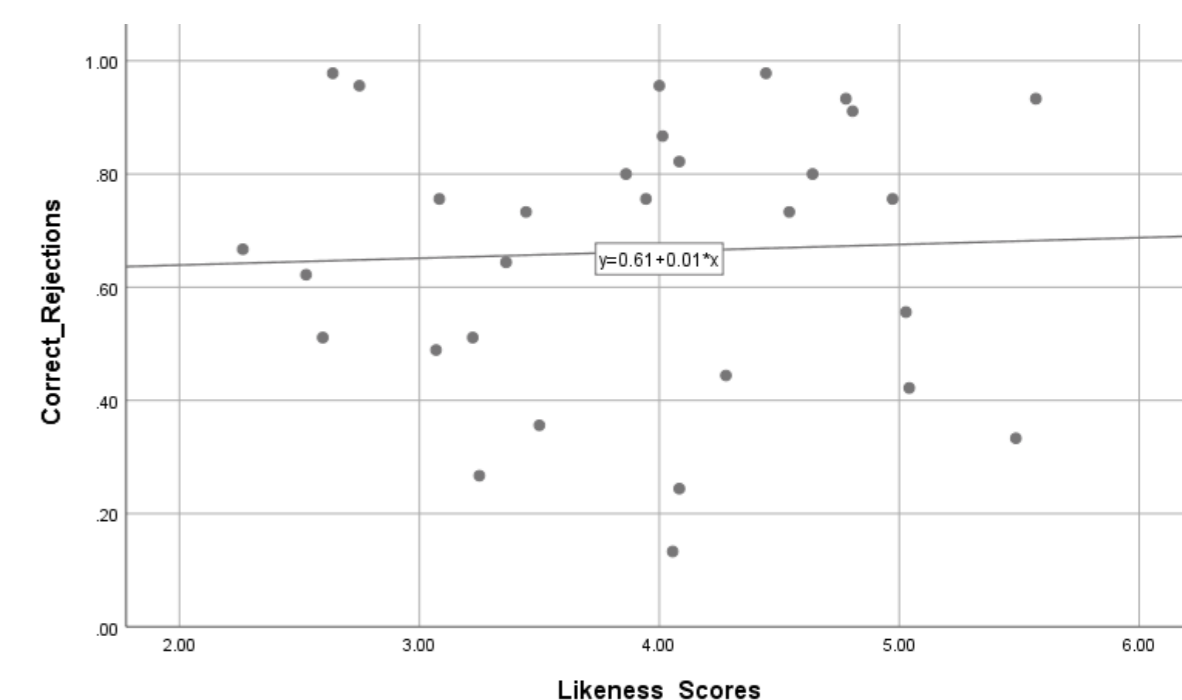
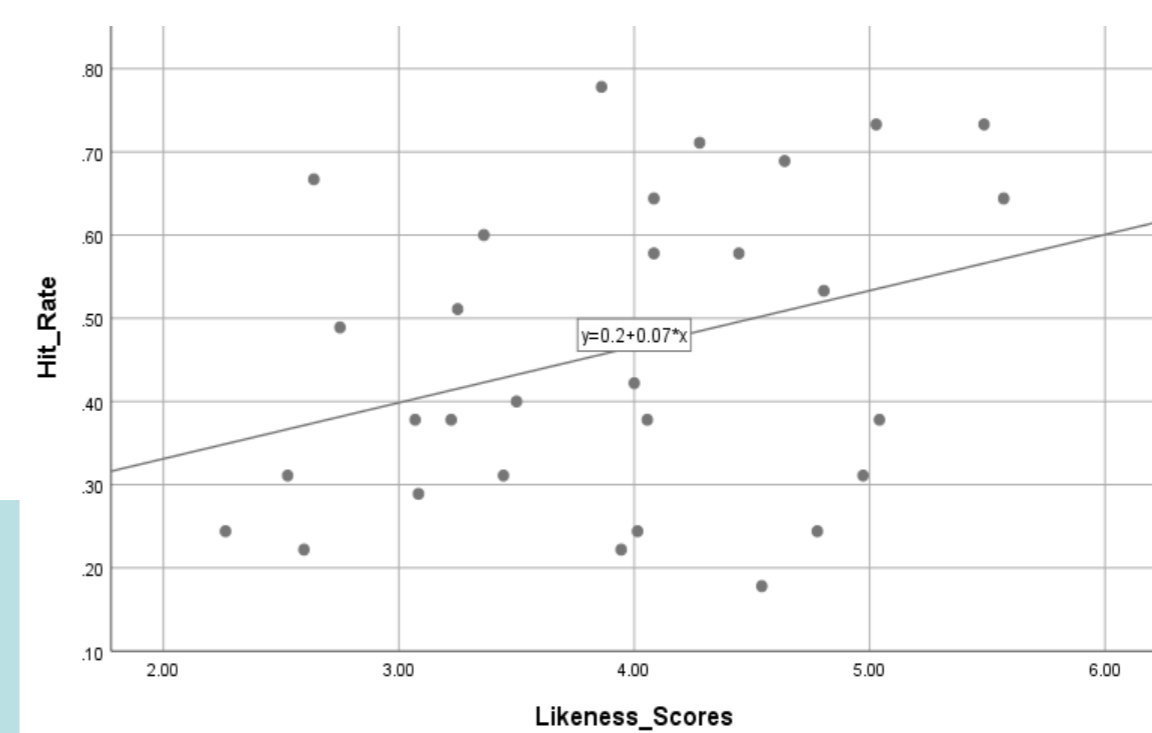
Therefore, we propose a relationship exists between holistic face processing and composite construction accuracy. We also propose that composite accuracy can be predicted by separate and possibly dissociable indexes of holistic face processing- hits and correct rejections

Results

A multiple linear regression was undertaken for analysis. Results found the regression model did not predict the outcome, suggesting no significant relationship between holistic face processing ability and composite construction accuracy, $F(2,27) = 1.72, p = .199$.

Correct rejections as a predictor variable did not add any predictive ability to the outcome, ($\beta = 0.18, t = 0.26, p = .795$).

Hits as a predictor variable also did not predict any predictive ability to the outcome, although a marginal effect was observed, ($\beta = 1.64, t = 1.84, p = .077$).



Method

Participants:

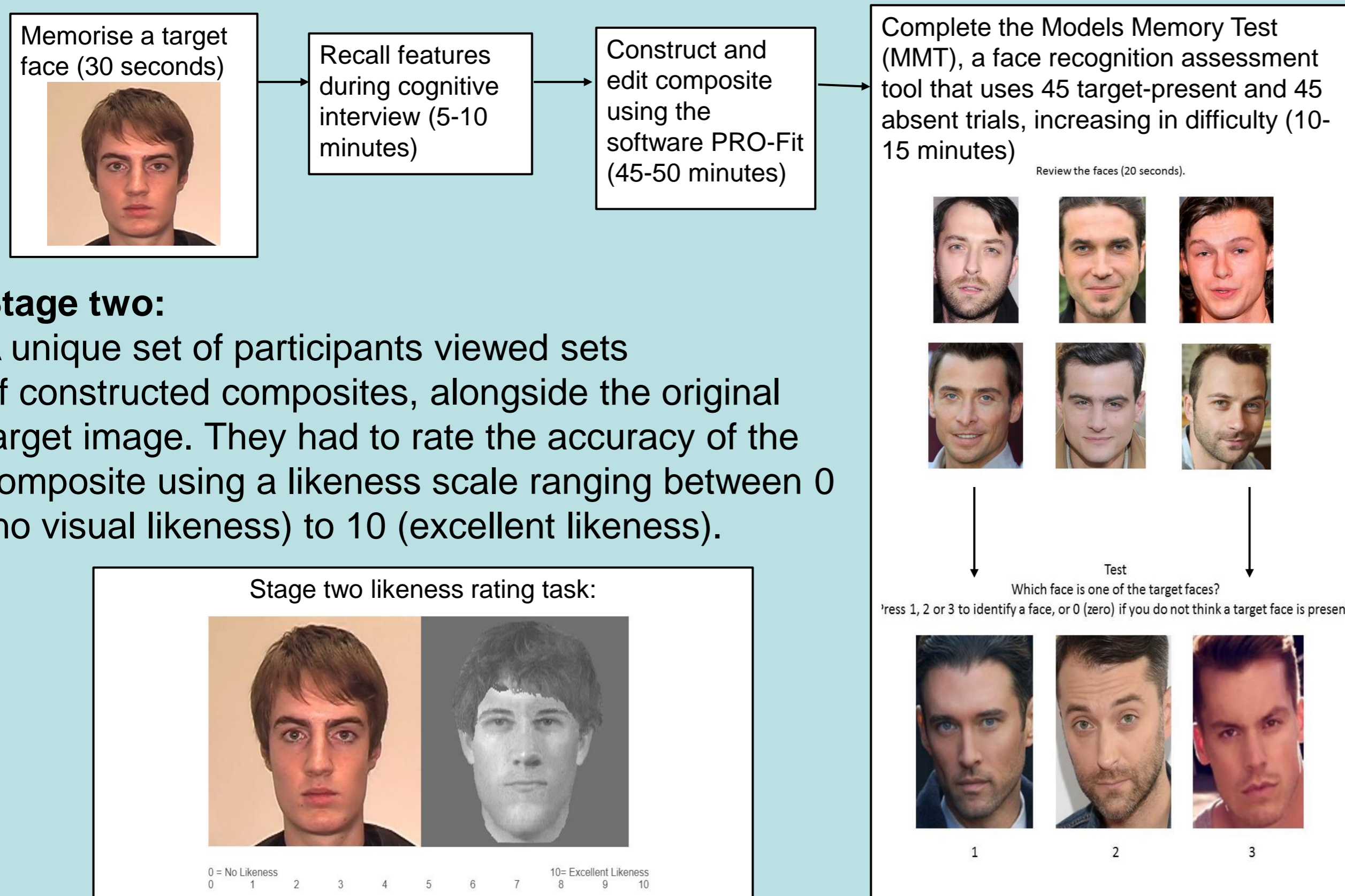
In stage one, 30 participants (26= female) were recruited from Bournemouth University. The mean age of the participants was 20.57 years.

In stage two, 72 participants (47= female) were recruited from Bournemouth University and social media platforms. The mean age of the participants was 23.40 years.

Procedure:

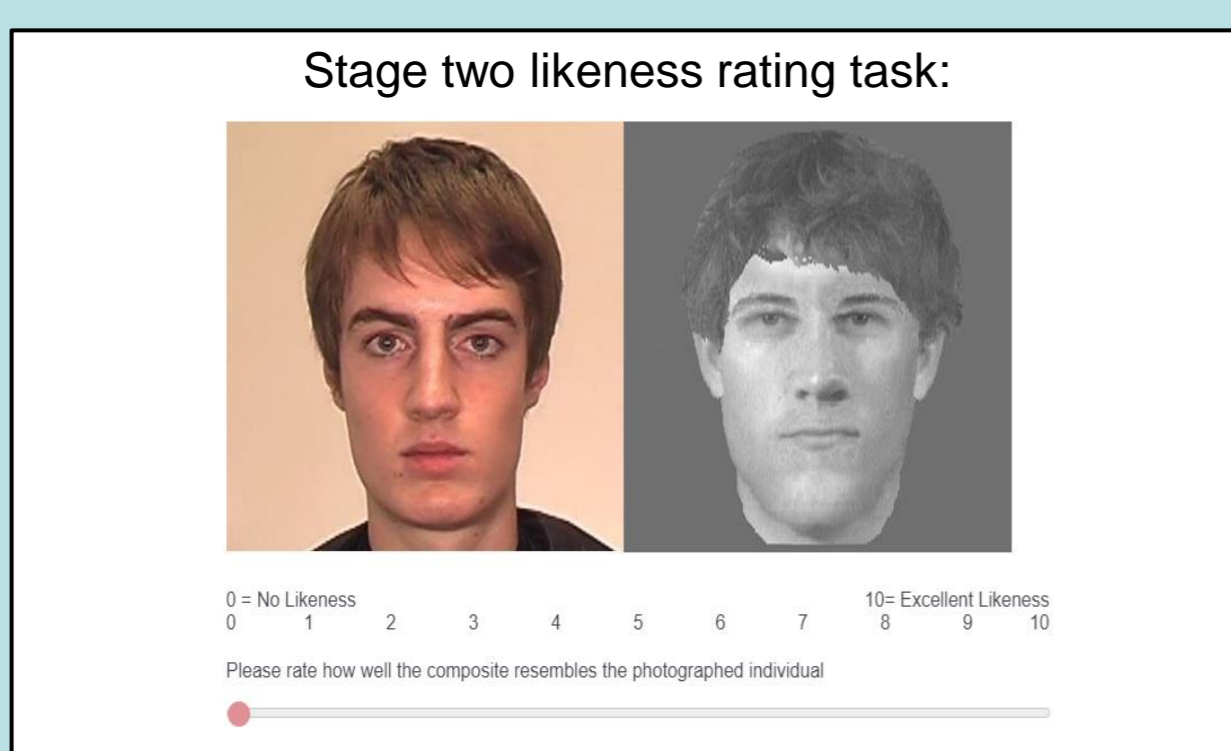
In both stages, a within-participant design was employed.

Stage One:



Stage two:

A unique set of participants viewed sets of constructed composites, alongside the original target image. They had to rate the accuracy of the composite using a likeness scale ranging between 0 (no visual likeness) to 10 (excellent likeness).



Discussion

The results suggest that individual differences in holistic face processing abilities do not predict composite accuracy, nor do specific indexes of holistic face processing.

However, there could be an interesting explanation for the marginal effect between hits and composite accuracy:

With differing hit abilities, individuals differ in their confidence selecting features during composite construction, and also when selecting the target face during the MMT. This may have had a bigger influence on the quality of the composites constructed.

Compared to other forensic methods where both indexes of holistic face processing are important for its efficiency^{1,2}, only hit ability may be important when constructing a composite.

Despite methodological limitations, this research has important practical implications for forensic settings - determining which forensic technique best to use for example.

References

1. Bindemann, M., Brown, C., Koyas, T., & Russ, A. (2012). Individual differences in face identification predict eyewitness accuracy. *Journal of Applied Research in Memory and Cognition*, 1(2), 96-103. [doi:10.1016/j.jarmac.2012.02.001](https://doi.org/10.1016/j.jarmac.2012.02.001)
2. Bobak, A. K., Hancock, P. J., & Bate, S. (2016). Super-recognisers in action: Evidence from face-matching and face memory tasks. *Applied Cognitive Psychology*, 30(1), 81-91. [doi:10.1002/acp.3170](https://doi.org/10.1002/acp.3170)
3. Bennetts, R., Akhter, S., Ziegler, K., & Frowd, C. (2016). Individual differences in creation of forensic composite faces: A comparison of multiple systems. *Journal of Vision*, 16(12), 73. [doi:10.1167/16.12.73](https://doi.org/10.1167/16.12.73)
4. Garcia-Solley, E. (2019) *The Use of Facial Composites in Person Identification* (Doctoral dissertation). University of Kent. <https://kar.kent.ac.uk/72996/>