Identifying Other-Race Faces: It's Less in the Eyes

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Context

Most studies in face recognition have focused on how individuals identify faces within their own ethnic group, highlighting the crucial role of the eye region in face identification[1-2-3]. Nevertheless, the general population encounters difficulties in identifying individuals from a different ethnicity, a phenomenon known as the "other-race effect" (ORE)[4]. Despite decades of investigation, the perceptual mechanisms associated with the ORE remain inadequately understood. It is plausible that suboptimal perceptual strategies are used with other-race faces, leading to poorer recognition.

Method

30 participants (14 females, M_{age}=22.20 years) were tasked to memorize and identify 8 black and 8 white faces (50% females) until they achieved a 95% performance in practice with both races.

Then, for 1520 trials for each race, they were tasked to identify the memorized faces (6° of visual angle) through 25 small Gaussian apertures randomly positioned across trials ("Bubbles Method"; Figure 1)[5].

They also performed a face recognition task following an "Old/New" paradigm combining faces of both races.

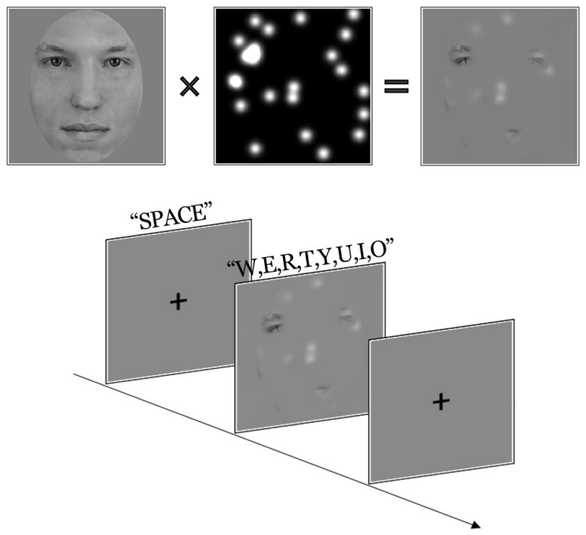

Figure 1 – Example of the application of a "bubble" filter and the procedure used in the identification task .

Results

Paired t-test revealed greater Sensibility Score (*D'*) with own-race than other-race faces ($\bar{x}_d$=0.25, s_d=0.24), in the "Old/New" recognition task, t(29)=5.68, p<.001, d=1.04 (Figure 2).

Participants also showed greater accuracy with own-race ($\bar{x}$=0.60, s=0.14) than other-race faces ($\bar{x}$=0.58, s=0.14), in the identification task with "bubblized" faces, t(29)=2.71, p=.011, d=0.49. They correctly responded faster with own-race ($\bar{x}$=2.01, s=0.46) than other-race faces ($\bar{x}$ =2.18, s=0.51), t(29)=-5.01, p<.001, d=-0.92.

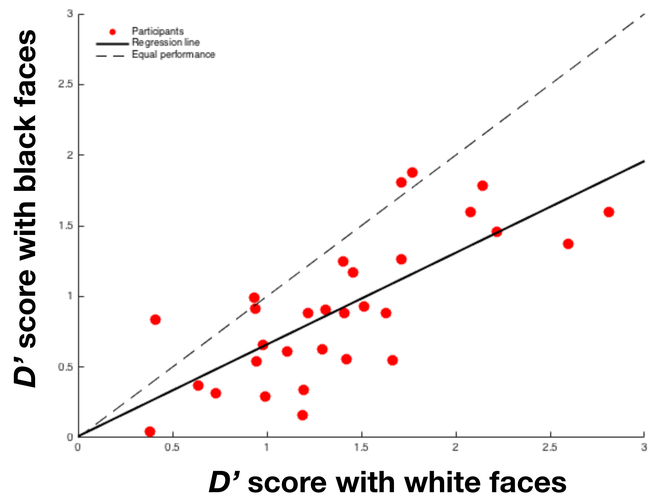

Figure 2 – Distribution of participants' *D'* with white and black faces. The black line represent the least-square linear regression line. In comparison, the dashed line shows what would constitute an equal performance with both races.

As for the "bubbles" results, linear regressions on the bubble masks and accuracy data for each participant have been performed and combined, creating classification images for both races (Figure 3).

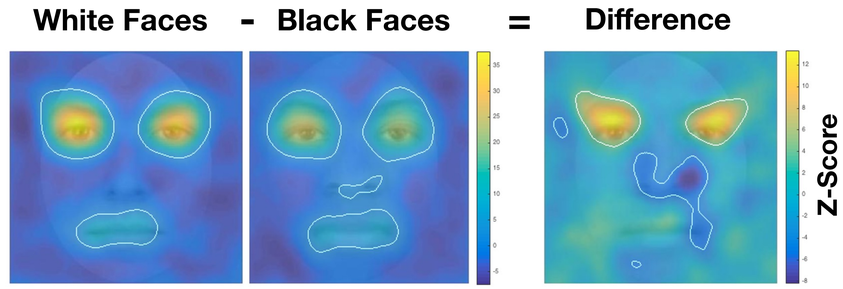

Figure 3 – Regions associated with performance with white faces, black faces and the difference between them. White lines show regions above z-score of 3.53, the unilateral threshold calculated with one-way pixel-tests for original images and above or below z-scores of -/+3.74, the bilateral thresholds calculated with two-way pixel-test for the difference (p<.05)[6].

Discussion and Conclusion

Participants exhibited an ORE in both tasks performed. Comparison between classification images of own- and other-race faces unveiled significant differences: greater eye reliance for own-race faces and increased nose and mouth reliance for other-race faces.

At least as a group effect, identification of other-race faces may be deteriorated by diminished eye reliance and excessive dependence on facial features associated with ethnic information, such as the nose and the mouth[7].

A model observer was presented with the same task and the same stimuli (one millions trials). Although the patterns of results are similar to those of participants (i.e., greater use of the eyes for white faces and the nose for black faces), the effect sizes are clearly smaller. We will now evaluate more participants, including Black participants, to ensure that the observed differences are not solely explained by the selected stimuli.

References

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