Sex-contingent aftereffects suggest distinct neural populations code male and female faces

AC Little (University of Liverpool) LM DeBruine (University of St Andrews) BC Jones (University of Aberdeen)

a.c.little@liverpool.ac.uk lisa@debruine.info ben.jones@abdn.ac.uk

Background: Exposure to faces biases perceptions of subsequently viewed faces such that faces similar to those seen previously are judged more normal and attractive than they were prior to exposure [1,2,3]. These aftereffects reflect changes in responses of neural populations that code faces and cannot be explained by retinal (i.e. low level) adaptation [1,2,3]. Because it is not known if different neural populations code male and female faces, we tested for sex-contingent aftereffects following adaptation to manipulated eye-spacing (Expt 1), facial identity (Expt 2) and masculinity (Expt 3).

Experiment 1

- eye-spacing + eye-spacing

Within-subject design with 27 participants

Adaptation conditions

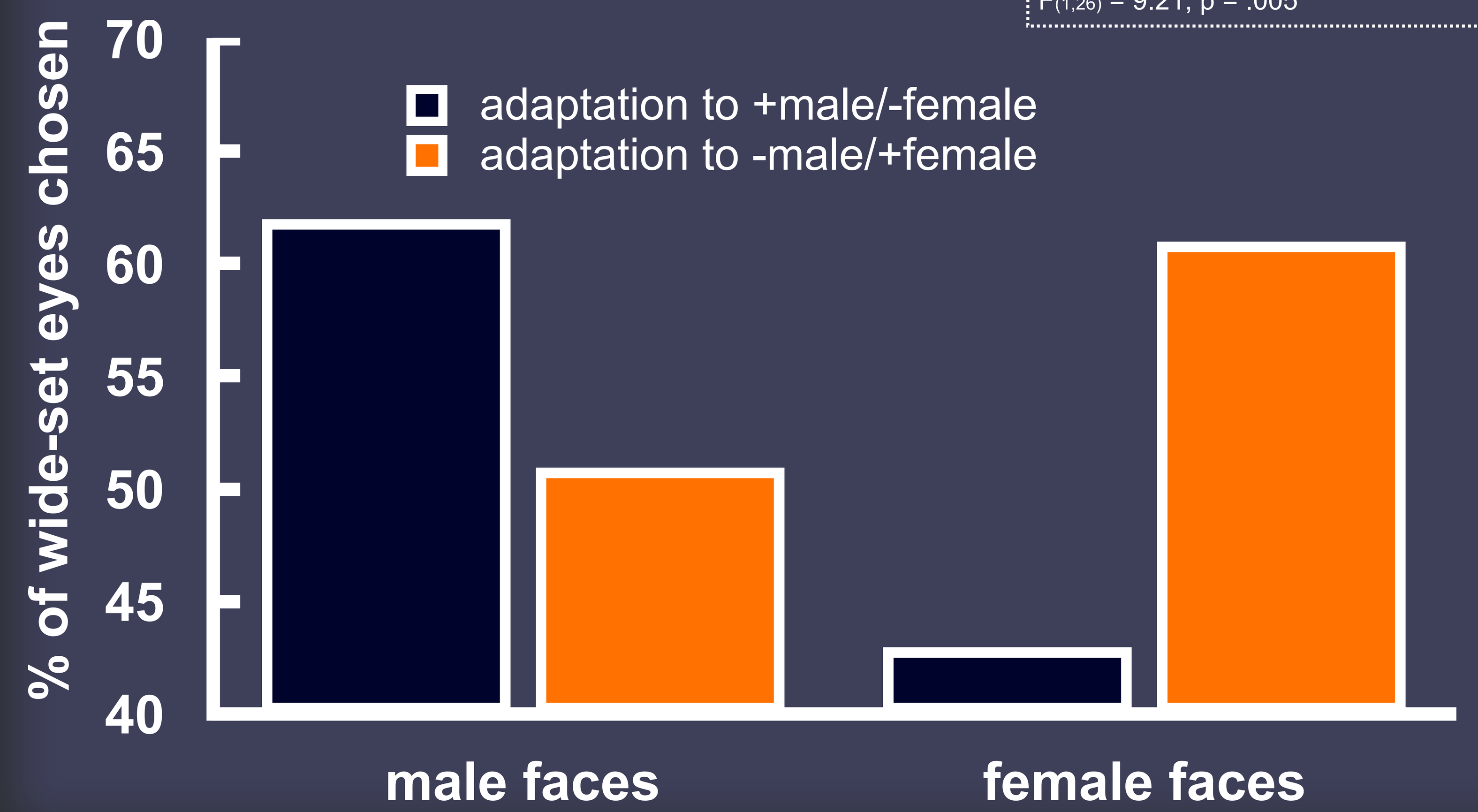
1. male faces with increased eye spacing and female faces with decreased eye spacing
2. male faces with decreased eye spacing and female faces with increased eye spacing

Test phase

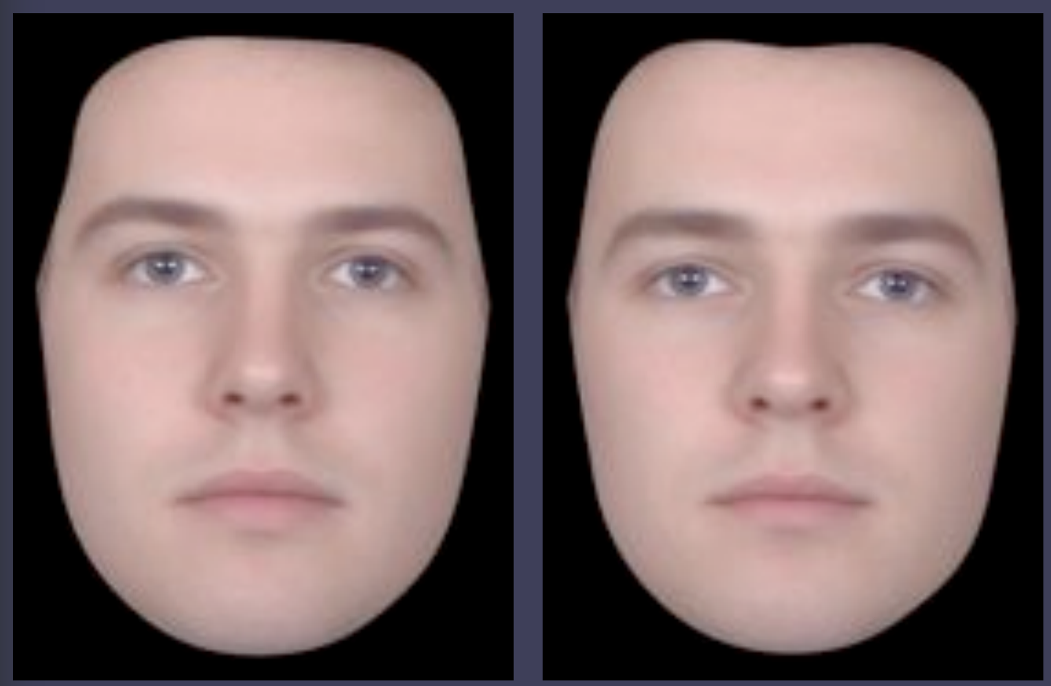
Indicated which was more normal from pairs of faces with increased and decreased eye spacing. Male and female face pairs were shown.

Analysis

There was a significant interaction between adaptation condition and sex of face in test phase. $F_{(1,26)} = 9.21, p = .005$



Experiment 2



anti face plus face

Between-subject design with 162 participants

Adaptation conditions

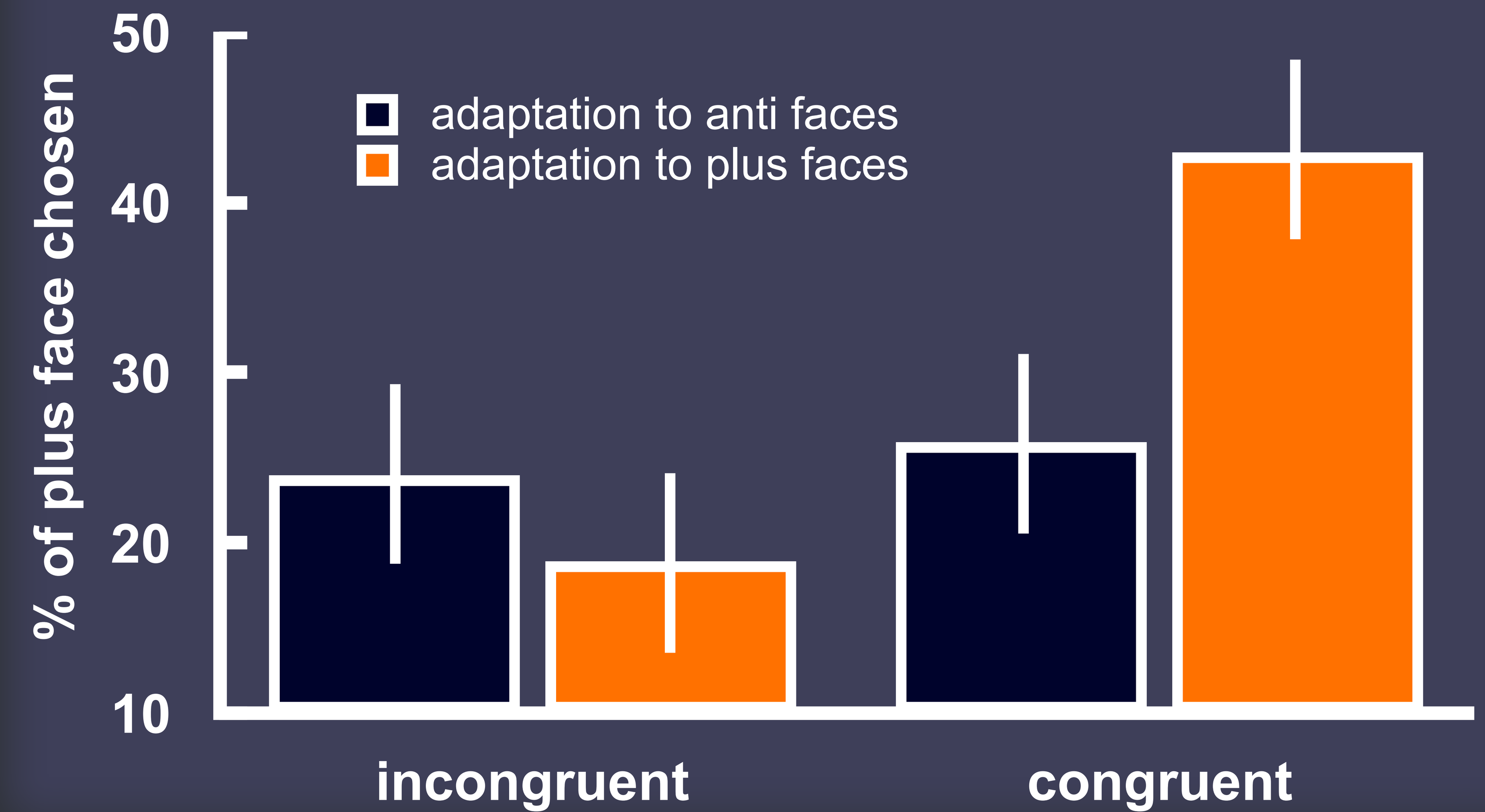
1. male faces with plus transform
2. male faces with anti transform
3. female faces with plus transform
4. female faces with anti transform

Test phase

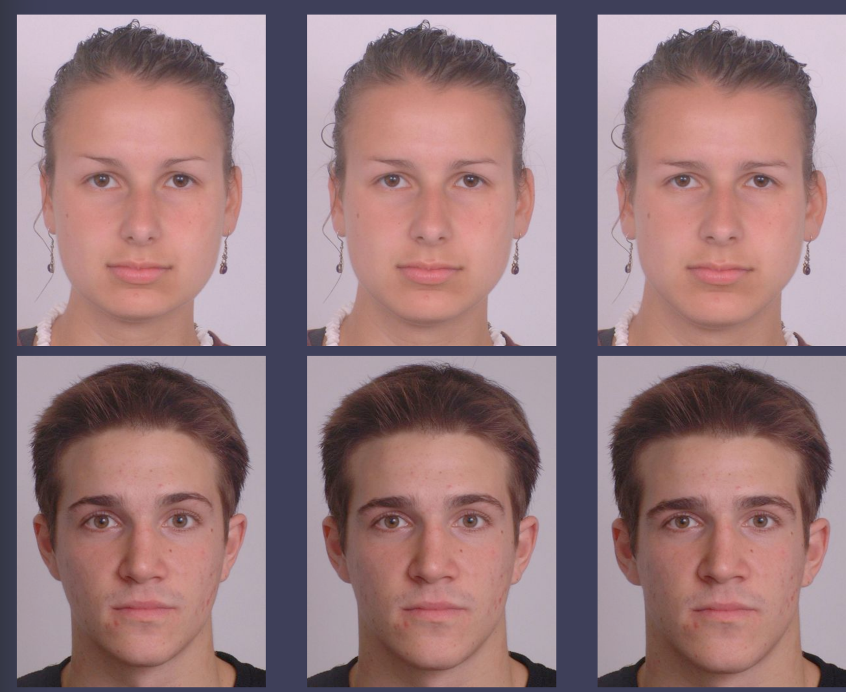
Indicated which was more attractive from pairs of faces with plus and anti transforms. Male and female face pairs were shown.

Analysis

There was a significant interaction between adaptation condition and sex of face in test phase. $F_{(1,158)} = 7.2, p = .008$



Experiment 3



feminine original masculine

Within-subject design with 21 participants

Adaptation conditions

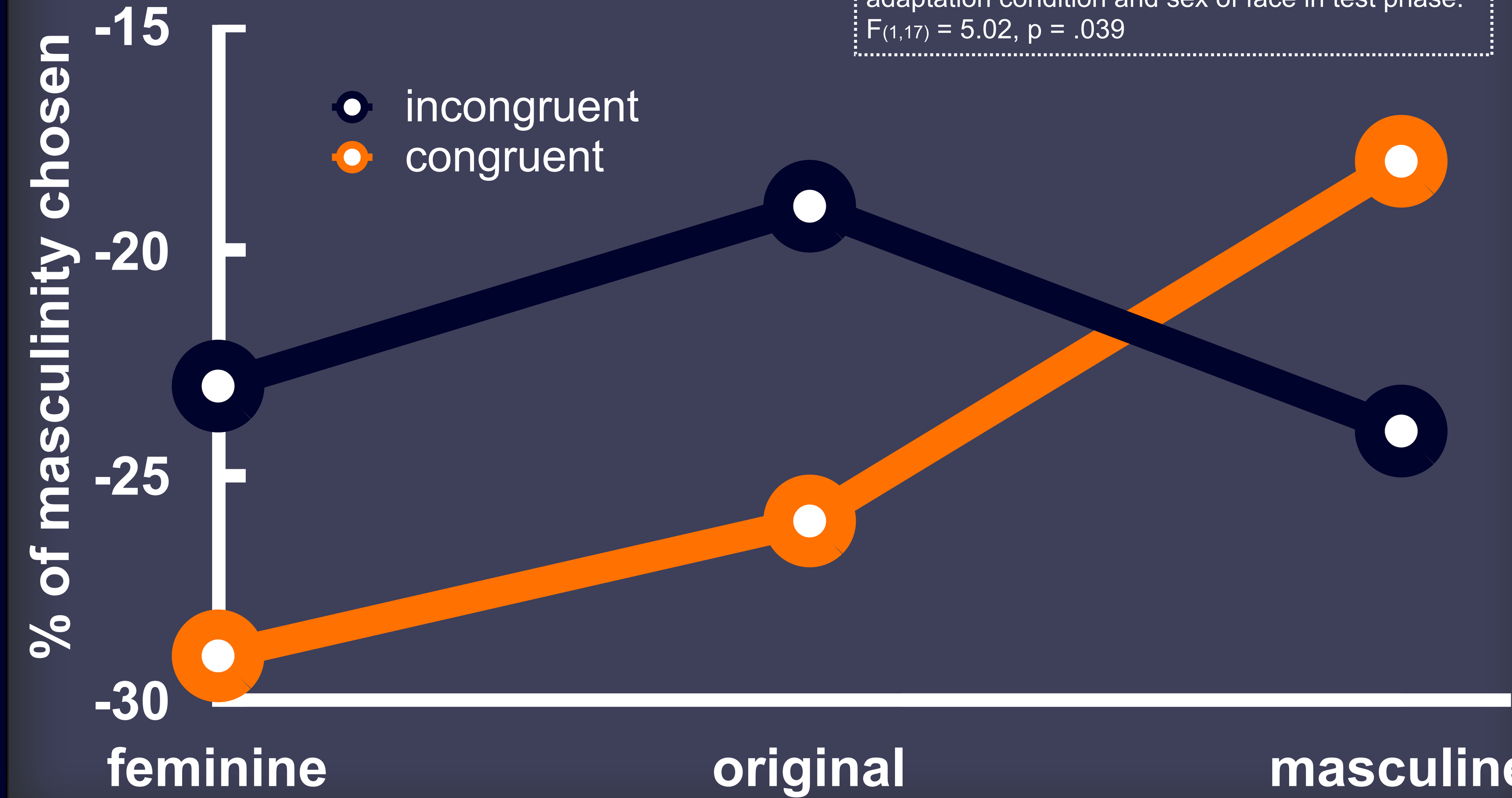
1. masculinised male faces
2. original male faces
3. feminised male faces
4. masculinised female faces
5. original female faces
6. feminised female faces

Test phase

Indicated level of masculinity preferred from a continuum (feminised to masculinised) [4]. Preference was indicated for both male and female faces before the experiment and after each adaptation condition.

Analysis

There was a significant linear interaction between adaptation condition and sex of face in test phase. $F_{(1,17)} = 5.02, p = .039$



Summary of results: Viewing faces of one sex with increased eye-spacing and faces of the other sex with decreased eye-spacing simultaneously induced opposite aftereffects for male and female faces (assessed by normality judgments). Viewing faces transformed in identity or masculinity increased preferences for novel faces with characteristics similar to those viewed only when the sex of the faces presented in the post-adaptation preference tests was congruent with the sex of faces presented in the adaptation phase.

Conclusions: Because aftereffects reflect changes in responses of neural populations that code faces, our findings indicate that distinct neural populations code male and female faces.This raises the possibility that distinct neural populations may also code other salient subcategories of faces (e.g. faces of different ages or ethnicity). Furthermore, selective adaptation of neural populations that code for male and female faces reveals a plausible neural mechanism underlying sex-specific individual differences in generalised face preferences [5].

References: 1. Leopold et al. 2001 *Nat Neurosci* **4** 89–94. 2. Webster et al. 2004 *Nature* **428** 557–561. 3. Rhodes et al. 2003 *Psychol Sci* **14** 558–566. 4. Perrett et al. 1998 *Nature* **394** 884–887. 5. Little et al. 2003 *Evol Hum Behav* **24** 43–51.

Our paper 'Sex-contingent face aftereffects suggest distinct neural populations code male and female faces' is in press with *Proceedings of the Royal Society of London, B*. Pre-prints are available from www.facelab.org