Key Note

# Chapter 13: Recognising faces

## Key note 13B: Face aftereffects and norm-based coding of faces

Several objections have been raised against the idea that face aftereffects provide good evidence for the prototype or norm-based coding of faces. This note describes one such objection, and an experiment which appears to rule it out.

A potential difficulty for a prototype-based account of face aftereffects was raised by Benton and Burgess (2008). They pointed out that, in a typical study of face aftereffects, the adapting anti-face and the prototype are constructed from the target face. Thus the prototype is related to the target by a collection of differences, which (with reversed sign) also define the relationship between the prototype and the anti-face. In other words, the anti-face and target face lie on a straight line in face space (see Figure 13.8) which passes through the prototype. Rather than demonstrating that the prototype really exists in the brain (they argued), face aftereffects may only confirm the nature of the constructed series of images. How could one decide between this account and that of norm-based coding? Benton and Burgess obtained facial images of two male actors, posing with sad and happy expressions. With morphing software, they generated sequences of faces which gradually changed between one and the other in expression, or in identity. At the start of the experiment, they established, for each participant, the image in each sequence which fell perceptually at the midpoint (so, for example, they identified the happy face which was identified on half the presentations as Actor A and half as Actor B, or the face of Actor B which was judged on half the presentations as happy and on the other half as sad). These four midpoint faces formed the adaptation stimuli. The test faces consisted of similar morphed sequences, but these varied in both expression and identity (e.g. from sad Actor A to happy Actor B). The participants were divided into two response groups: one group responded to the identity of the test images, the other to their expression. In different sessions, both response groups adapted to all four midpoint adaptation images, but responded only to one dimension (identity or expression) of the test images. The aftereffects were the difference in the effects of the pairs of adapting faces (e.g. between Actor A sad and Actor B sad, or between Actor A sad and Actor A happy) on the midpoint of the test sequences of images. Thus in some conditions (congruent), participants’ responses corresponded to the dimension which varied in the adapting pairs of faces, whereas in other conditions (incongruent) the response dimension and the adapting dimension differed. The authors argued that, on a norm-based coding account, aftereffects would occur only when the adapting and response dimensions were the same, since only for that dimension would the norm or prototype lie in face space between the adapting and the test faces. If, however, it was the nature of the sequence of test images which governed aftereffects, then similar aftereffects would be found for incongruent as well as congruent conditions. The results were clear-cut: only for the congruent cases, when adapting and response dimensions were the same, did aftereffects occur, thus supporting the norm-coding account.

Benton CP, Burgess EC (2008) The direction of measured face aftereffects. *Journal of Vision* 8(15): 1–6.