

Supplemental File 3

This file presents our results on cross adaptation between real faces and the motion faces, and our investigations as to why the first-order cartoon face, but not the first-order real face, produced an aftereffect on the second-order motion faces.

We cross adapted real faces (rf) and motion faces (mf). The psychometric data from 4 subjects (2 of them naive) for the rf-mf condition are shown as the dashed red curve in Supplemental Fig. 1, panels a-d (together with the 0-mf and mf-mf conditions mentioned in the text). The data for the 0-rf, rf-rf, and mf-rf conditions are shown as blue, green, and dashed red curves, respectively, in Supplemental Fig. 2, panels a-d. The PSE shifts from the corresponding baseline are summarized in panel e of the figures. There was little aftereffect transfer in either direction between the first-order real faces and second-order motion faces. Similar weak or null interactions have also been reported for low-level stimuli (Nishida et al., 1997; Larsson et al., 2006; Ashida et al., 2007).

We then investigated why the first-order cartoon face, but not the first-order real face, produced an aftereffect on the second-order motion faces. One possible explanation is that the contrast of the real face (0.27 for the mouth against the surrounding area) was much lower than that of the cartoon face (0.99). To test this, we set the luminance values of the adapting cartoon face to the mean values measured from the mouth and the surrounding area of the adapting real face (Supplemental Fig. 3a). We focused on the mouth since it is particularly

important for facial expressions (Xu et al., 2008), and since the expressions of the cartoon and motion faces were solely determined by the nature of their mouths. We found that this contrast-matched static cartoon face (cf_c) still generated a significant aftereffect on the motion faces (cf_c -mf; dashed black curves in panels a-d and black bar in panel e of Supplemental Fig. 4). This suggests that low contrast alone cannot explain the null effect of the rf-mf condition. Note, however, that contrast does affect adaptation, since the reduced contrast of the adapting cartoon face produced a smaller aftereffect (compare cf_c -mf in Supplemental Fig. 4 and cf-mf condition in Fig. 3 of the main text).

A second possible explanation is that the mouth curve of the adapting cartoon face was a stronger adaptor than the mouth of the adapting real face, perhaps because it had sharper edges or matched the mouth shape of the test motion faces (see Fig. 1 of the main text). To examine this possibility, we pasted the mouth curve from the contrast-matched adapting cartoon face (cf_c above) over the mouth area of the adapting real face. The resulting modified real face (rf_m , Supplemental Fig. 3b) now had the same mouth shape and mean contrast as the cartoon face (cf_c) but still did not produce a facial-expression aftereffect on the motion faces (rf_m -mf; red dashed curves in panels a-d and red bar in panel e of Supplemental Fig. 4). This suggests that the mouth-shape difference was not by itself the determining factor.

It is instructive to compare the cf_c -mf and rf_m -mf conditions above. The mouth curves in cf_c and rf_m were exactly the same, and had the same mean contrast

against the surrounding areas (Supplemental Fig. 3, panels a and b). Yet, placing the curve in the context of a cartoon face (cf_c) produced an aftereffect on the motion faces, whereas placing it in the context of a real face (rf_m) did not. One would have expected the opposite results since rf_m carried cues of sad expression over the whole face while the sad expression of cf_c was only specified by the mouth. One possibility is that the curve in rf_m was not as salient as the curve in cf_c even though they had the same mean contrast. However, saliency is an unlikely explanation here since the mouth in the original saddest real face (Fig. 1e of the main text) was highly salient but as we already noted, adaptation to that face did not generate an aftereffect on the motion faces either (Supplemental Fig. 1, $rf-mf$). These considerations prompted us to propose the background similarity hypothesis in the main text.

Figure Captions

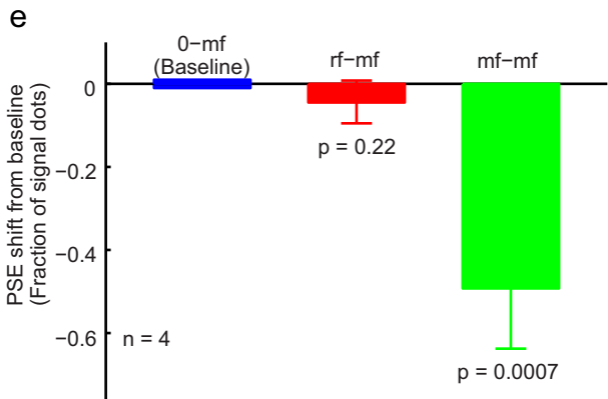
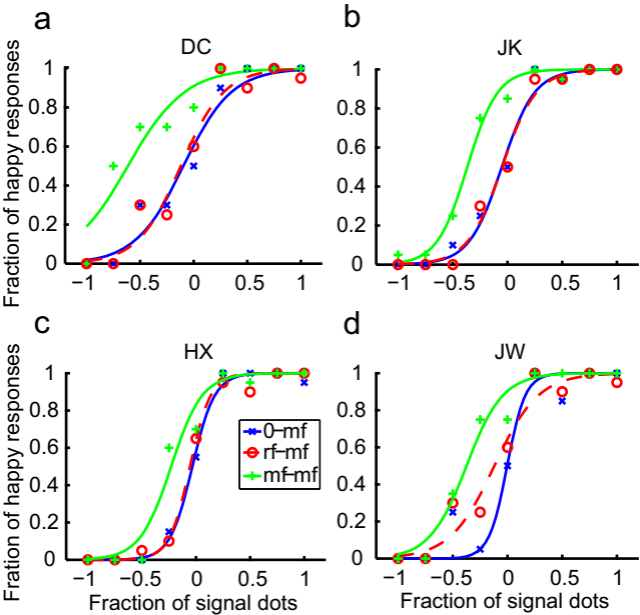
Supplemental Figure 1 The effect of real face adaptation on the perceived expression of the motion faces. (a-d) Psychometric functions from two naive subjects (DC, JK) and two experimenters (HX, JW). The test stimuli were always the motion faces (mf). The adapting stimuli varied with conditions as follows: 0-mf, no adaptation baseline (blue); rf-mf, adaptation to the saddest real face (dashed red); mf-mf, adaptation to the saddest motion face (green). (e) Summary of all four subjects' data. The data for the 0-mf and mf-mf conditions were copied from Fig. 3 of the main text.

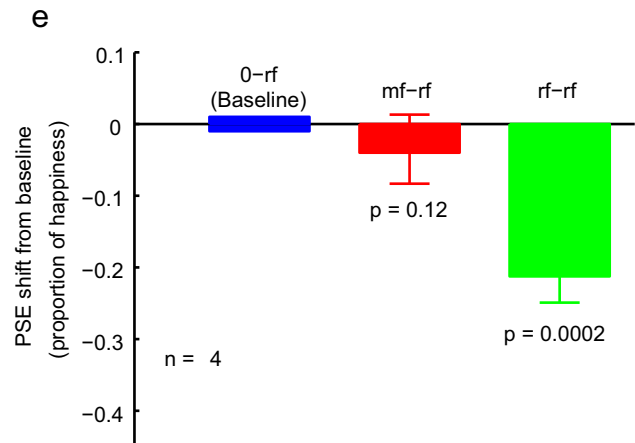
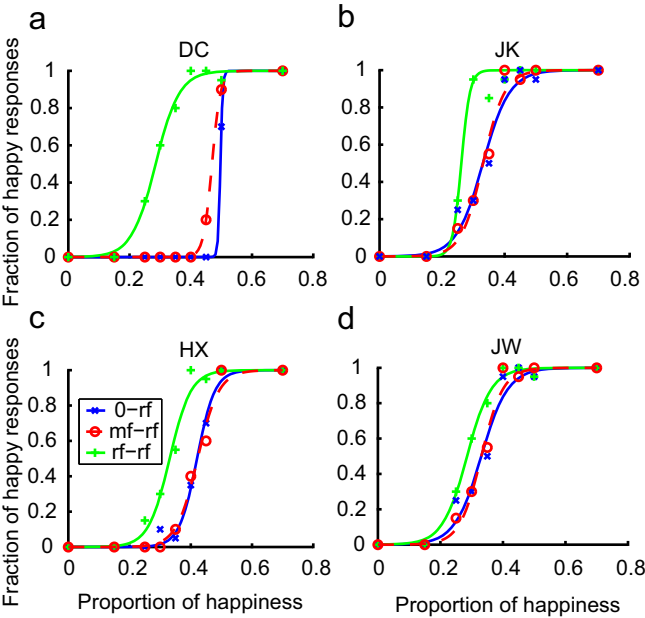
Supplemental Figure 2 The effect of motion-face adaptation on the perceived expression of the real faces. (a-d) Psychometric functions from two naive subjects (DC, JK) and two experimenters (HX, JW). The test stimuli were always the real faces (rf). The adapting stimuli varied with conditions as follows: 0-rf, no adaptation baseline (blue); rf-rf, adaptation to the saddest real face (green); mf-rf, adaptation to the saddest motion face (dashed red). (e) Summary of all four subjects' data.

Supplemental Figure 3 Manipulations of some adapting faces. The adapting faces were always the saddest of the expressions we generated as shown here. (a) Contrast matched static cartoon face (cf_c). The foreground and background luminance values were matched to those of the mouth and its surround of the

saddest real face in Fig. 1e. (b) Modified real face (rf_m). The mouth curve from cf_c was pasted to the mouth of the saddest real face.

Supplemental Figure 4 The effect of adaptation to some manipulated faces on the perceived expression of the motion faces. (a-d) Psychometric functions from two naive subjects (DC, ZZ) and two experimenters (HX, JW). The test stimuli were always the motion faces (mf). The adapting stimuli varied with conditions as follows: 0-mf, no adaptation baseline (blue); cf_c -mf, adaptation to the contrast matched cartoon face (dashed black); rf_m -mf, adaptation to the modified real face (dashed red); mf-mf, adaptation to the saddest motion face (green). For subjects DC, HX, and JW, the data for the 0-mf and mf-mf conditions were copied from Fig. 3 in the main text. (e) Summary of all four subjects' data.





a cf_c



b rf_m

