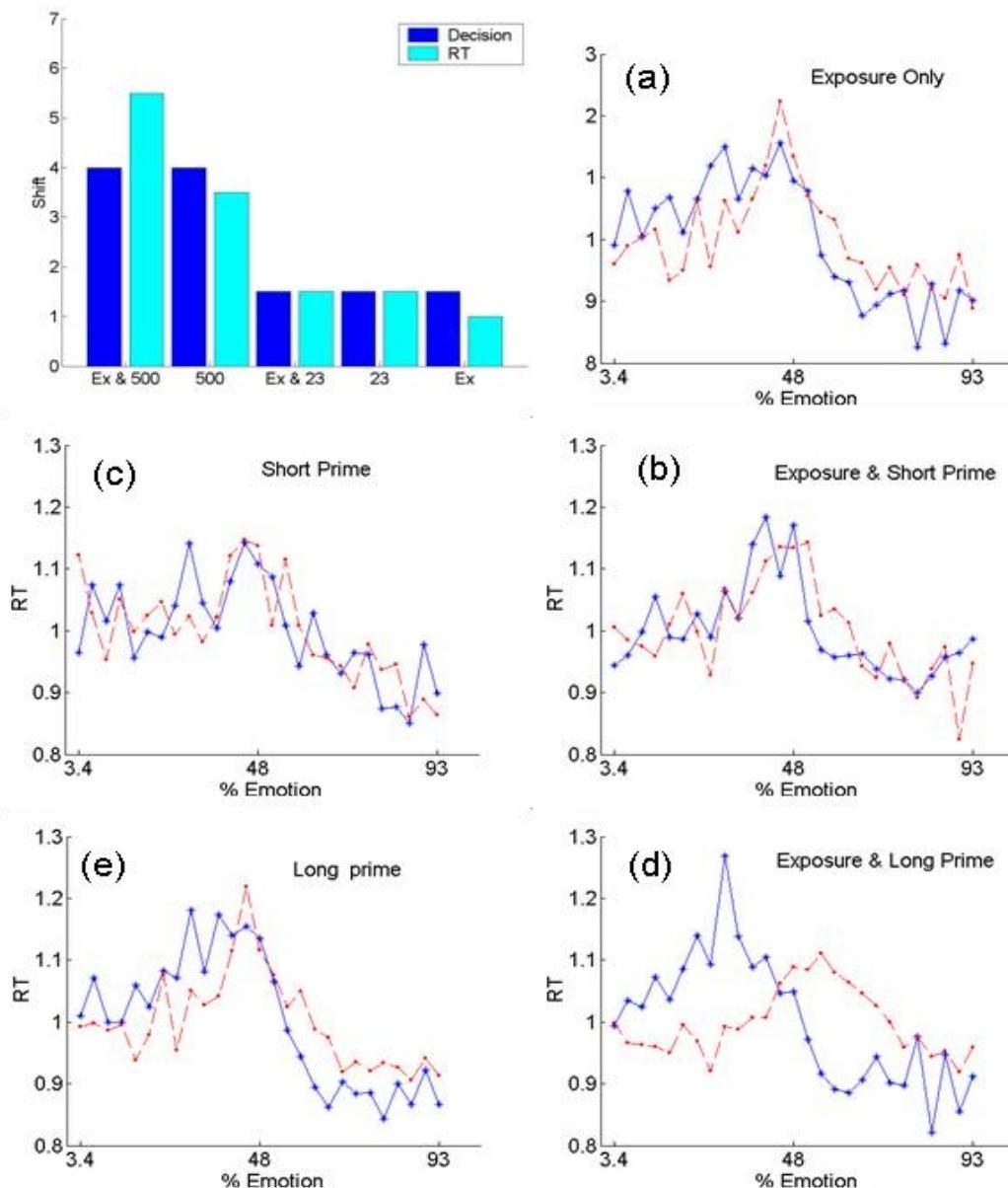


## SUPPLEMENTARY MATERIAL

### ANALYSIS OF REACTION TIMES IN EXPERIMENT 1

We normalized and averaged the reaction times of subjects in each condition, and used a non parametric method to find and estimate of the central peaks in the reaction time data for the neutral and emotional adapted reaction time data. To compare the threshold shifts in the decision data, with the peaks in the reaction time data, we also used the same non parametric method to fit thresholds to the decision data. Non parametric and parametric methods gave highly correlated results for the decision data.

Suppl. Fig. (1) illustrates, in the bar chart, the *ad hoc* threshold shifts estimated from reaction times and from the classification data, and indicates agreement between the two sets of measurements. As can be seen from the panels showing the data obtained in each of the five conditions, reaction times show a typical peak at around the same position along the morphing continuum as the categorization threshold; and, like the threshold, the position of the peak shifts with adaptation. A three-way ANOVA (factors: adaptation direction, stimulus, morph level) for Exposure & Long Prime showed a significant interaction between morph level and adaptor valence,  $F\{24,500\}=4.73$ ,  $p<0.0001$ ,  $MSE=2.11$  and similarly for Long Prime only,  $F\{24,500\}=2.62$ ,  $p<0.0001$ ,  $MSE=1.23$  and Exposure only,  $F\{24,500\}=2.14$ ,  $p<0.0011$ ,  $MSE=0.82$ . No other interactions were significant.



**Supplementary Fig. (1).** Reaction times. Top left shows the average threshold shifts calculated with the *ad hoc* method, from the reaction time (RT) data (light blue) and the *ad hoc* threshold shifts estimated from the categorization data (dark blue). The remaining panels show, for

conditions (a) to (e), the normalized reaction times (RT) for the emotional categorization task, plotted against the percent emotion in the target. Red dashed lines indicate the RT after an emotional adaptor, blue lines the RT after a neutral adaptor (as in Fig. (2)).

It is interesting that a shift in the peak of the reaction times in response to adaptation reflects the change in the decision boundary in the classification data. The peak presumably reflects the point where the subject has most difficulty classifying the target, and as this point moves in response to adaptation, it cannot be wholly determined by the properties of the morph stimuli set.

## SUPPLEMENTARY METHODS AND ANALYSIS OF EXPERIMENT 1

### Variability Between Stimuli

In experiment 1, we also considered whether the ‘dissimilarity’ between the two adaptors, and therefore the perceptual distance spanned by each the morph continuum could explain part of the variability between stimuli, in adaptation aftereffect magnitudes. As we say in the main text, correlations between stimuli across conditions were not significant. However, we also considered the average aftereffect for each stimulus across all five conditions, and compared it with two partially overlapping factors. First, the magnitude of the adaptation aftereffect might be modulated by the ‘emotional intensity’ of the emotional adaptor. Second, it might be modulated by the ‘dissimilarity’ of the neutral and emotional end points. There was indeed a negative correlation  $r\{11\}=-0.64$   $p<0.025$  between the (parametric) magnitude of adaptation of each stimulus, averaged over all conditions, and the a priori rated dissimilarity of end point stimuli on an emotional intensity scale. We also found a weaker negative correlation with the relative emotional intensity of the emotional end point was  $r\{11\}=-0.59$ ,  $p<0.05$ . The fact that this correlation is negative suggests that strong emotion in the adaptor does not result in stronger adaptation, but to show this conclusively, perceptual dissimilarity would have to be disentangled from emotional strength.

A peak is evident in each graph for the red line, and it shifts towards the left (neutral), in the reaction times to neutral adaptation. This is clearly seen in the bottom right graph for condition (e).

### Stimulus Scaling

Six subjects rated the emotional intensity of 10 samples from each morph scale, each subject was asked to rate each of the ten morphs (from neutral to emotional) for all 12 stimuli continua, on a scale of 1 to 9, indicating how intense the emotional expression appeared. This gave us a measure of the distance between the emotional and neutral ends of the morph continua for each morph set. However, as subjects also rated the emotional intensity of the emotional end, relative to the other morph sets, it also gave us a measure of the relative emotional intensity of each emotional expression.

### Thresholds

First, we fitted a cumulative normal function to the response curve, yielding a threshold (estimated as the point of inflection of the curve) and a slope parameter. For each stimulus, we took the average estimate across subjects of the difference in threshold for N-adapt and E-adapt curves, as the parametric threshold shift for that stimulus. In the non-parametric method, a straight line was fitted and subtracted from the response data at each morph value; the cumulative sum of these differences reaches a minimum at the crossing point of the data and the best fit line, and this was taken as the nonparametric threshold estimate. A third ad hoc method, found the minimum difference between two smoothed E-adapt and N-adapt curves, sliding one relative to the other in 0.5 (i.e., 1.7%) along the morphing dimension. Smoothing was obtained by a 6-point Gaussian of width 3.4%.

Our parametrically and non-parametrically estimated thresholds correlated for each stimulus,  $r\{11\}=0.93$ ,  $p<0.01$ , as did the magnitude of the difference between the emotional- and neutral-adapted thresholds  $r\{11\}=0.76$ ,  $p<0.1$ . The average threshold differences obtained with the three methods also correlated: parametric and non-parametric,  $r\{4\}=0.88$ ,  $p<0.05$ ; non-parametric and ad hoc,  $r\{4\}=0.86$ ,  $p=0.06$ ; parametric and ad hoc,  $r\{4\}=0.98$ ,  $p<0.003$ .