Hemispheric Differences in Processing Facial Emotions: the "Paranoia Effect"

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CNS 2010 Poster # E 63
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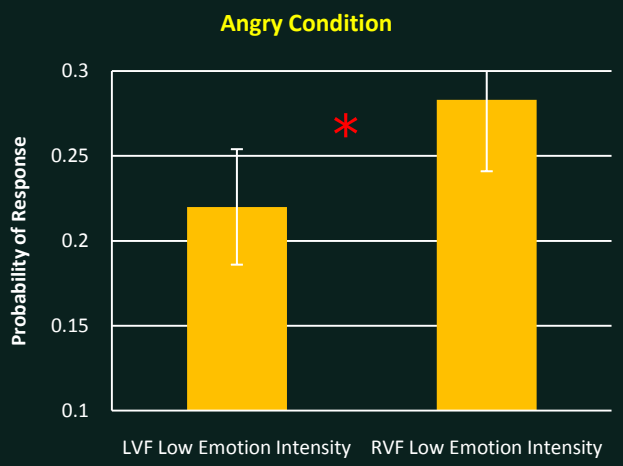
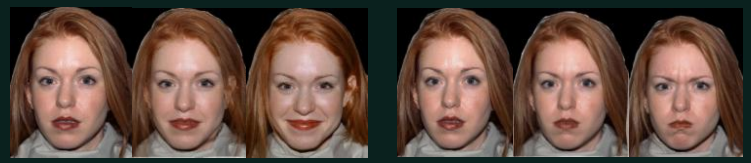
Introduction

•Behavioral and neurophysiological data show that the Right Hemisphere (RH) is specialized for processing 1) facial emotions (the RH hypothesis), 2) negative emotions (Hellige, 1993), and 3) social emotions, such as "anger" (the social hypothesis) (Keenan et al., 2006b)
• The LH is specialized for processing positive emotions (the valence hypothesis) (Hellige, 1993).
•In order to test the three hypotheses (RH, valence, social), we compared hemispheric detection of incremental facial expressions of happiness and anger.
•We predicted 1) RH specialization for detecting facial emotions in general, 2) better detection in the RH of angry than happy expressions, 3) better detection in the LH of happy than angry expressions, and 4) better detection of angry expressions in the RH than in the LH.

Methods

•*Participants:* Twenty right handed undergraduates (11 female).
•*Stimuli:* Happy (basic emotions) and Angry (social emotions) pictures from the NimStim face stimulus set were morphed with their Neutral face counterparts.
•*Procedure:* Face stimuli were presented one at a time randomly to subjects' left or right visual hemifield on a computer screen for 150ms.
•*Conditions:* Participants identified the emotion of the face as Neutral or Happy in the *Happy* condition, and as Neutral or Angry in the *Angry* condition.





•*Happy Condition:* Is the face shown 'neutral' or 'happy'?
•*Angry Condition:* Is the face shown 'neutral' or 'angry'?

Results

•A 2 Emotion (Happy, Angry) x 2 Emotion Intensity (High, Low) x 3 Target Visual Field (Center, Left, Right) repeated measures ANOVA showed:
•Better detection of emotional expressions in the LH than in the RH ($p=.035$).
•Better detection of angry than happy low intensity emotional expressions in the RH ($p<.001$).
•Better detection of angry than happy low intensity emotional expressions in the LH ($p<.001$).
•A significant 3 way interaction ($p=.002$): Happy expressions showed no hemispheric difference ($p=.495$), whereas Angry expressions showed a significant LH advantage ($p=.011$).

References

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Discussion

•The RH hypothesis was not supported: there was an RVF/LH advantage overall.
•The valence hypothesis was partly supported: Angry expressions were recognized better than Happy expressions in the LVF/RH, but contrary to expectations, the same pattern held in the RVF/LH.
•The social hypothesis was not supported: Angry expressions were *not* recognized better in the LVF/RH than the RVF/LH.
•The 3 way interaction shows that there is a greater hemispheric difference in detecting angry faces than happy faces of low intensity.
•The LH advantage in detecting angry expressions may reflect a primitive social schema in which strangers are considered hostile by default. We refer to this as the "Paranoia Effect".

Conclusion

In previous studies we showed that self faces are recognized faster when they are happy than when they are sad, whereas faces of familiar others are recognized faster when they are sad than when they are happy (Li & Zaidel, 2008). We refer to that as the "Selfish Gene Effect". Taken together, our data suggests that different default social schemas apply to different individuals: Happy applies to the self (and kin?), Sad applies to familiar others, and Angry applies to strangers. Our internal state is affected by our expressions of happiness. Friends are needed most during moments of distress. Strangers should be suspect until proven otherwise.