The impact of sex on visual strategies underlying the discrimination of facial expressions of pain

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Theoretical context

• Research has revealed that women are better than men at recognizing facial expressions of pain1,2 and are more sensitive to variation in pain expression3,4,5.

• Theoretical frameworks have been developed to explain this feminine advantage4,5,6, but few have explored their perceptual basis.

• The goal of the present study is to compare the visual information used by men and women to discriminate the intensity of pain facial expressions.

Method

• 72 participants (37 males, M = 22)

• Stimuli: 16 face avatars (2 identities [male and female] x 2 ethnicities [Caucasian and Asian] x 4 levels of intensity) created with FACEGen and FACSGen.

• Task: Participants were asked to decide which of two faces expressed the most pain. The two faces differed in terms of expression intensity (33%, 66% or 100%).

• The faces were sampled through space and spatial frequencies using the Bubbles method7.

• Each participant completed 3024 trials. The number of bubbles was adjusted separately for the three intensity conditions using QUEST® in order to maintain an average performance of 75% per intensity condition.

Analyses and results

• Women (M = 44.49 bubbles, SD = 20.82) need less visual information than Men (M = 56.07 bubbles, SD = 23.16) to successfully complete the task.

Classification images

• The classification images (CIs) for each sex group were generated and consisted of weighted sums of the bubble masks presented during the experiment, using the accuracy transformed into z-scores as weights.

• A cluster test (Stat4CIs) was applied to determine the statistically significant regions (T0.05 = 2.7; k = 227.0; p < 0.025).

• No difference in the regions used by men and women was found [ClusterMax = 251, p = 0.213] (See Figure 4).

• Women relied on larger regions of the face (clusters; M = 2262.0, SD = 1337.4) than men (M = 1350.0, SD = 1815.20, t(70) = 2.44, p = 0.017] (See Figure 5 right).

• Women had higher maximum z-scores (M = 3.4, SD = 0.7) than men (M = 3.0, SD = 0.7, t(70) = 2.24, p = 0.028] (See Figure 5 left).

• A mediation analysis showed that this strategy seemed to completely mediate their discrimination advantage [β = –0.60, 95% CI [–1.20 - 0.12], p = 0.01] (See figure 6).

Conclusion

The current study corroborates previous results suggesting a feminine advantage in the processing of pain perceived in others. However, it suggests that the ability in which women were found to better discriminate between different pain intensities do not necessarily rely on the utilization of specific facial features, but rather on a more efficient and/or flexible use of this information.

References


