

# Context.

Although facial expressions of emotions have long been considered culturally universal (Ekman & Friesen, 1971), some studies revealed cultural differences in the perceptual mechanisms underlying their recognition (e.g. Jack et al., 2012a; 2012b). The present study aims to verify the impact of culture on the facial features that are stored by individuals in their mental representation of pain facial expressions.

# Methods.

- **Reverse correlation** (Mangini & Biederman, 2004).
- **Participants**: 30 Chinese (15 males), 30 Canadians (15 males).
- Number of trials: 500 per participant.



## *Figure 1*. Task

### References

Chauvin, A., Worsley, K. J., Schyns, P. G., Arguin, M., & Gosselin, F. (2005). Journal of vision, 5(9), 1-1. Ekman, P., & Friesen, W. V. (1971). *Journal of personality and social psychology*, 17(2), 124. Jack, R. E., Caldara, R., & Schyns, P. G. (2012). Journal of Experimental Psychology: General, 141(1), 19. Jack, R. E., Garrod, O. G., Yu, H., Caldara, R., & Schyns, P. G. (2012). Proceedings of the National Academy of Sciences, 109(19), 7241-7244. Mangini, M. C., & Biederman, I. (2004). Making the ineffable explicit: Estimating the information employed for face classifications. Cognitive Science, 28(2), 209-226.



# Culture modulates the visual representation of pain facial expressions

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Base face: Morph of an asian and a caucasian face

Base





Figure 2. Illustration of the procedure to create the stimuli.

## **Results and analysis.**

Classification images (CIs) were produced separately for each participant by averaging the noise patterns chosen during the task.

Canadians



Chinese



Presented to 15 independent judges. 100% of them judged the pain expression on the average Chinese's CI as more intense. •  $\chi^2(1) = 15.0, p < 0.001.$ 

Figure 3. Average classification images added to the base face.

- Pixel-by-pixel one sample t-tests on Canadians and Chinese CIs (p < 0.01).
- Independant pixel-by-pixel t-test (p < 0.025).
- Stat4CI (Chauvin et al., 2005) to correct for the multiple tests.

# **Conclusion.**

- Results indicate that the mental representation of pain expressions is more intense for Chinese than for Canadian participants.
- If mental representations reflect expectations about the world based on past experiences (Jack et al., 2012), the results suggest that Chinese participants may have previously been exposed to facial expressions displaying greater pain intensities.







Canadians

Chinese





Canadians minus Chinese



Figure 4. Areas significantly associated with the percept of pain. Red: Luminance increase; Green: Luminance



