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## Effect of implicit indicators of national identity on brain activation when viewing in-group and out-group members in pain

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**Purpose/Introduction:** We used functional Magnetic Resonance Imaging (fMRI) to investigate the effects of implicit and explicit nationality cues on empathy for pain.

**Subjects and Methods:** Twenty seven healthy participants from Scotland completed an Empathy Quotient (EQ) questionnaire and a

questionnaire to quantify national attachment. Subsequently, during fMRI, participants viewed videos of someone of the same (Scottish) or different (English) nationality experiencing shoulder pain. Participants rated the pain intensity and unpleasantness of the videos that had previously been classified as showing either high or low pain intensity using the facial action coding system (Ekman and Friesen, 1978). Half of the trials were preceded by an implicit Scottish flag prime.

**Results:** Compared to low pain intensity videos, high pain intensity videos produced greater activation in right fusiform gyrus ( $p < 0.001$ ), right cerebellum ( $p < 0.001$ ), left superior frontal gyrus ( $p = 0.001$ ) and left inferior frontal gyrus ( $p = 0.003$ ), when controlling for empathy and national attachment. Furthermore, EQ score positively correlated with activation in left cerebellum ( $p < 0.001$ ). Videos showing people of the same nationality (Scottish) and which included the flag prime produced greater activation in right superior frontal gyrus ( $p < 0.001$ ) than videos showing a subject of the same nationality but without a flag prime, when controlling for empathy and attachment. In addition, when a small volume correction was applied increased activation was found in right anterior cingulate cortex ( $p = 0.012$ ). EQ score correlated positively with activation in right fusiform gyrus ( $p < 0.001$ ) and a positive correlation was also observed between national attachment and activation for a cluster in left paracentral lobule extending to precuneus and posterior cingulate cortex ( $p = 0.005$ ). There was no significant difference in activation between viewing videos of people of either explicit nationality, in the absence of the national flag prime.

**Discussion/Conclusion:** The presence of a national flag, even when presented implicitly, has an effect on the way in which we process empathy for others in pain. This demonstrates that judgments that we make about others may be modulated without our conscious knowledge and has implications for clinical practice, and in political and policy-making settings.

### References:

[1] Ekman, P. and Friesen, W.V. Manual for the Facial Action Coding System. Consulting Psychologists Press, Palo Alto, California (1978).