My Face, My Heart: Cultural Differences in Integrated Bodily Self-Awareness

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Abstract

Body-awareness is produced by an integration of both interoceptive and exteroceptive bodily signals. However, previous investigations into cultural differences in bodily self-awareness have only studied these two aspects in isolation. We investigated the interaction between interoceptive and exteroceptive self-processing in East Asian and Western participants. During an interoceptive awareness task, self-face observation improved performance of those with initially low awareness in the Western group, but did not benefit the East Asian participants. These results suggest that the integrated, coherent experience of the body differs between East Asian and Western cultures. For Western participants, viewing one's own face may activate a bodily self-awareness which enhances processing of other bodily information, such as interoceptive signals. Instead, for East Asian individuals, the external appearance of the self may activate higher-level, social aspects of self-identity, reflecting the importance of the sociocultural construct of 'face' in East Asian cultures.

Recent neurocognitive models of the self have identified the first-person experience of the body as fundamental to our self-awareness (Damasio, 2000; Gallagher, 2005). There are two main ways in which we process such bodily information. First, we perceive our bodies from the outside, through exteroceptive senses such as vision. The perception of external information related to the body has been shown to maintain and update our sense of body-awareness and the way in which we represent our external appearance. The systematic modulation of body-awareness can be achieved using bodily illusions such as the Rubber Hand Illusion (Botvinick & Cohen, 1998). In this, measurable changes in the perception of the body are induced when participants are exposed to synchronous visuotactile stimulation whilst looking at a rubber hand. Similar manipulations have shown that even the representation of one's own face, which can be considered as a key feature of one's personal identity, can be updated. For example, in the 'enfacement illusion' (Sforza, Bufalari, Haggard, & Aglioti, 2010; Tsakiris, 2008), participants observe another person being touched on the face whilst they receive synchronous touch to their own face. This shared multisensory experience between individuals reliably modifies the mental representation of one's facial appearance.

However, the exteroceptive perception of the body, from the outside, is just one channel of information available for self-awareness; we also receive 'interoceptive' information about the body, from the *inside*. Interoception, defined here as the sense of the physiological condition of the body, is a ubiquitous information channel used to represent one's body from within. A renewed interest in the functions of basic homeostatic processes has emphasized the primary role of interoception as a vital type of information-processing, necessary for both self-awareness and social cognition (Craig, 2010; Damasio, 2010). Whilst the exteroceptive view of the self emphasizes its malleability (Tsakiris, 2010), the interoceptive models of the self centre around what is thought to be the core of self-

awareness, that is the representation of how it feels to be me, rather than what is being perceived as being me (e.g. Damasio, 2010).

However, recent evidence suggests that interoceptive and exteroceptive bodily information are not processed in isolation, but rather can interact to affect the way the body is perceived. For example, it has been shown that individual differences in interoceptive awareness, or IA, can modulate exteroceptive bodily perception (Tsakiris, Tajadura-Jiménez, & Costantini, 2011). When participants with poor IA were exposed to the Rubber Hand Illusion, they experienced a stronger change in body-ownership, perceiving the foreign limb as part of their body. Those with higher IA were less susceptible to the illusion, indicating that their exteroceptive perception of their bodies was less malleable. Furthermore, it has been shown that the exteroceptive perception of the body (from the outside) can modulate IA, thus indicating that the relationship between IA and exteroceptive body perception is bidirectional. Ainley and colleagues (2012) demonstrated that mirror self-observation, which relies on exteroception, enhanced low IA. Individuals with low baseline IA showed significant increases in accuracy when performing the heartbeat detection task whilst looking at their face in a mirror, as compared to looking at a black screen. During mirror self-observation, the perception of one's own face may evoke an integrated self-awareness which then enhances processing of other self-related bodily information, such as interoception, via a top-down gating of attention. Rather than interoceptive and exteroceptive bodily signals being processed in isolation, Ainley et al. (2012) and Tsakiris et al. (2011) suggest that they are integrated and thus can modulate one another. This integration may provide us with a coherent, rich multisensory experience of the bodily self (Craig, 2010; Critchley, Wiens, Rotshtein, Ohman, & Dolan, 2004).

Recently, social cognitive neuroscience has begun to focus on potential cultural differences in self-processing (see Zhu & Han, 2008; Cohen, Hoshino-Browne, & Leung,

2007 for reviews). Western and East Asian cultures show striking differences in the way the self is conceptualized. Westerners tend to hold an 'independent' self-construal, where they think of the self as unique and distinct from social context, and value individuality. Conversely, East Asian cultures tend to hold an 'interdependent' self-construal, in which interpersonal relationships are stressed, the self seen as embedded in a social context, and group harmony and cooperation are valued (e.g. Heine, 2001). These differences in self-construal may be associated with differences in information-processing biases in East Asian and Western cultures, whereby East Asian individuals tend towards a holistic processing style and Western individuals tend towards a more analytical information-processing style (see Kuhnen, Hannover & Schubert, 2001).

These differences in self-construal can also be seen at the level of the brain. For both Western and East Asian participants, the judgment of self-related personality traits has been shown to activate medial prefrontal cortex (MPFC). However, East Asian participants also activated MPFC when they judged their mother's personality traits, showing that they represented significant others alongside the self in the same brain area (Zhu, Zhang, Fan & Han, 2007). Furthermore, this neural overlap between representations of self and mother is enhanced by priming an interdependent (East Asian) self-construal, and reduced by priming a more independent (Western) self-construal (Ng, Han, Mao & Lai, 2010).

In addition to differences in conceptual self-processing, there are also marked cultural differences in the way bodily aspects of the self are processed. For example, recent studies have highlighted cultural differences in 'exteroceptive' self-processing, particularly when observing one's own face. Sui, Liu, and Han (2009) recorded event-related potentials whilst participants judged orientations of their own faces or those of familiar others. British participants showed a self-face advantage in reaction times, as well as a larger negative anterior N2 amplitude to their own face as compared to the other's face. This effect was

significantly weaker in Chinese participants, suggesting that the self-awareness activated by viewing one's own face may be reduced for East Asian cultures as compared to Western cultures. Neuroimaging studies have suggested that these cultural differences in exteroceptive bodily self-awareness may be driven by the differences in self-construal between East Asians and Westerners (Sui & Han, 2007; Han & Northoff, 2008; Sui, Hong, Hong Liu, Humphreys, & Han, 2012).

Overall, a persuasive body of evidence now suggests that there are cultural differences in exteroceptive self-awareness, whereby Westerners and East Asians represent the external features of their bodies in different ways. A recent study extended this investigation to test whether there were also cultural differences in *interoceptive* self-awareness. Ma-Kellams, Blascovich and McCall (2012) conducted a series of experiments comparing Western and East Asian participants on several different aspects of interoceptive processing. They found that the East Asian participants performed significantly more poorly than Westerners on a heartbeat detection task, suggesting that IA was reduced relative to Western participants. Therefore, literature relevant to bodily self-processing suggests that there may be cultural differences in both exteroceptive and interoceptive self-awareness.

However, rather than interoceptive and exteroceptive bodily signals being processed in isolation, Ainley et al. (2012) and Tsakiris et al. (2011) suggest that they are integrated into a coherent bodily experience. Therefore, in order to further our understanding of cultural differences in self-awareness, we carried out an experiment to investigate the way in which exteroceptive and interoceptive aspects of self-awareness interact in East Asian and Western cultures. Given that the processing of the self-face may not generate the same degree of self-awareness in East Asian participants as it does in Westerners, we hypothesized that the exteroceptive perception of the body in East Asian individuals may not activate an integrated bodily self-awareness in the same way as in Western individuals. If this were the case, self-

face observation in East Asians would not enhance IA, unlike in Westerners (Ainley et al., 2012). In this study, we aimed to test this prediction, by measuring the effect of self-face observation on interoceptive awareness in both Western and East Asian participants.

Method

Participants

We recruited 20 participants of Western origin (M_{AGE}=20.3, 13 females), and 20 participants of East Asian origin (M_{AGE}=18.9, 11 females) to take part in the study. All Western participants were born in Europe (*N*=18), the USA (*N*=1) or Canada (*N*=1). The East Asian participants were first-generation (i.e. born in East Asia) and originated from China (*N*=6), Japan (*N*=3), South Korea (*N*=3), Taiwan (*N*=1) or Hong Kong (*N*=7). They had been living in the UK for a mean duration of 2.7 years (SD=1.9). All participants had a Body Mass Index (BMI) within the normal range.

Measures

Heart rate was monitored with a piezo-electric pulse transducer attached to the participant's non-dominant index finger (PowerLab 26T, AD Instruments, UK). To assess interoceptive awareness, we used the Mental Tracking Method (Schandry, 1981). Participants were asked to silent count their own heartbeats on an audiovisual start cue until they received a stop cue. They were provided with standard instructions to count their heartbeats simply by 'listening' to their body without taking their pulse. Whilst they counted, they were asked to attend to an image displayed on the computer monitor, which appeared immediately following the audiovisual start cue and remained on the screen until the stop cue. This image was either a photograph of the participant's own face (the SELF-FACE condition), a photograph of an unfamiliar individual, matched for age, gender and ethnicity (the OTHER-

FACE condition), or a black screen with a small fixation cross (BASELINE condition). Participants completed nine trials in total (see Figure 1).

[Figure 1 about here]

The order of trials was randomised. Each trial was between 20 and 55 seconds in duration and trial durations were fully counterbalanced between participants. Participants were asked to type in the number of heartbeats counted at the end of each interval. No feedback on their performance was given.

Procedure

First, a photo was taken of the participant's face, for use in the SELF-FACE condition of the heartbeat task. Participants were asked to have a neutral expression and to look directly at the camera. The picture was then mirror-reversed to ensure that participants would observe a familiar view of their face during the experiment. We opted to use pictures rather than mirrors (cf. Ainley et al., 2012), to ensure that participants would not use subtle online cues from their mirror image, such as visually detecting their pulse in the neck to aid them in their heartbeat detection. The use of photographs in the current study ensured that any enhancement of interoceptive awareness was related to the self-relevant nature of the stimulus rather than any online cues to the participant's pulse. The participants then completed a 15-second training trial, which all participants completed successfully. The purpose of the training trial was to familiarize the participants with the task, and no feedback was given. After receiving full written and verbal instructions, participants then completed the main heartbeat task before being paid and debriefed.

Results

Heartbeat traces were analysed using LabChart6, which counted the number of R-wave peaks for each trial. Performance on the heartbeat task was assessed by calculating the interoceptive awareness (IA) score for each of the nine trials, using the following calculation:

$$\sum\left(1-\frac{|\text{recorded beats - counted beats}|}{\text{recorded beats}}\right)$$

This gave three distinct IA scores for each of the three experimental conditions. Cronbach's alpha was used to confirm inter-trial reliability within each condition (α_{SELF}=.87; α_{OTHER}=.86; $\alpha_{BASELINE}$=.94), before an average IA score was calculated for each condition, for each participant. There were no ethnic group differences in BASELINE interoceptive ability,, M_{ASIAN}=.66 (*SD*=.18), $M_{WESTERN}$=.63 (*SD*=.22), $t(38)$=-0.53, p=.60.

We then subtracted the baseline IA score from the SELF-FACE IA score and the OTHER-FACE IA score to generate two IA-change scores, one for each of the two face conditions. These scores reflected the dependent variable of interest, i.e. how IA changed from baseline whilst looking at either the self-face or the other-face, with positive scores indicating an improvement from baseline. We assigned each participant to a Low-Baseline IA or High-Baseline IA group (following Ainley et al., 2012) depending on whether their average IA score in the baseline condition fell above or below .644, the median of our entire sample. Entering IA-change scores into a 2(Ethnicity: Asian vs. Western) x 2(Condition: SELF-FACE vs. OTHER-FACE) x 2(Baseline Group: high vs. low) mixed ANOVA revealed a 3-way interaction between ethnicity, condition and baseline group, $F(1,36)$=8.99, p=.012.

Simple effects analysis showed that in the Low-Baseline group, IA-change was significantly more positive in the self-face condition than the other-face condition as predicted; however, this difference was only present in Western participants, M_{SELF}=.037 (*SD*=.074), M_{OTHER}=-.010 (*SD*=.076), $t(10)$=2.41, p=.037. In Asian participants, IA-change did not differ between self- and other-face conditions, M_{SELF}=-.009 (*SD*=.101), M_{OTHER}=.010

(*SD*=.066), *t*(8)=-0.722, *p*=.491. In the High-Baseline group, there were no significant differences between self- and other-face conditions in Western participants, *t*(8)=-1.53, *p*=.165, nor Asian participants, *t*(10)=1.33, *p*=.213. This pattern is illustrated in Figure 2.

[Figure 2 about here]

Lastly, to investigate possible differences in arousal between experimental conditions, we carried out an ANOVA on average heart rate, with Ethnicity, Condition and Baseline Group as factors. There was a main effect of baseline group, *F*(1,36)=11.00, *p*=.002, whereby individuals with high baseline IA had significantly lower average heart rate, *M*=72.7 (*SD*=9.81), than those with low baseline IA, *M*=82.4 (*SD*=8.63), independently of ethnicity. No other main effects or interactions were present, *p*>.05.

Discussion

The experience of the body plays a fundamental role in self-awareness. In this study, we investigated whether bodily self-awareness differed between cultures. The coherent, multisensory experience of the body is produced by an integration of both interoceptive and exteroceptive bodily signals. However, previous investigations into cultural differences in bodily self-awareness have only studied these two aspects in isolation. We investigated the interaction between interoceptive and exteroceptive self-processing in East Asian and Western participants. During a heartbeat counting task, concurrent self-face observation improved IA in the Western group, but did not benefit the East Asian participants. Our results suggest that exteroceptive and interoceptive self-awareness may be integrated in a different way in individuals from East Asian cultures as compared to those from Western cultures.

We employed a well-validated heartbeat detection paradigm (Schandry, 1981) in order to assess IA. In a procedure adapted from Ainley et al. (2012), we assessed how the concurrent observation of one's own face or the face of an unfamiliar other changed

participants' accuracy during the heartbeat counting task. In the Western group, individuals with initially poor IA showed a significant improvement during self-face observation, but not during other-face observation, directly replicating Ainley et al.'s findings. However, in the East Asian group, no significant changes in interoceptive awareness were observed in either face condition. Ainley et al (2012) proposed that the exteroceptive perception of one's own face may facilitate processing of other self-related bodily information, such as interoceptive signals, via a process of attentional gating. This interaction between interoceptive and exteroceptive systems suggests that the exteroceptive perception of one's body, such as during self-face observation, can evoke an integrated bodily self-awareness. In the current study, Ainley's self-observation effect was replicated in the Western participants, but was found to be absent in the East Asian participants. This intriguing finding suggests that there are significant cultural differences in the way that key bodily aspects of the self are processed.

Importantly, East Asian and Western individuals show different patterns of neural activity to the self-face, as demonstrated by several neurocognitive studies (e.g. Han & Northoff, 2008; Sui et al., 2009), potentially indicating cultural differences in the type of self-awareness that viewing one's own face evokes. We suggest that when East Asian participants view their self-face, it results not a minimal, integrated awareness of the bodily self, but instead in a more conceptual, socially-anchored self-identity. This may be linked to the concept of 'face' in many East Asian cultures. Face can be seen as a public self-image that is socially acceptable, with strong emphasis placed on 'saving face' in order to maintain interpersonal social relationships and the respect of others (e.g. Bond, 1991). The external presentation of the self is therefore carefully constructed and restricted in order to preserve face. Thus, for East Asian cultures, the external appearance of the self may activate high-level, conceptual processing of the self from a social perspective, rather than activating more

private aspects of an individual's self, such as interoceptive states. This is consistent with our findings from the current study, in which we report an absence of self-observation effect on interoception for the East Asian group. For these individuals, seeing one's own face might not activate the first-person, 'self-as-subject' experience of the bodily self as it might in Western cultures, and thus would not enhance awareness of other bodily signals.

Although our study found significant cultural differences in the interaction between exteroceptive and interoceptive processing, we did not find any differences in baseline interoceptive ability between the East Asian and Western groups. This conflicts with a recent study by Ma-Kellams and colleagues (2012), which reported reduced interoceptive awareness in East Asian participants. However, in Ma-Kellams' study the East Asian participants had resting heart rates that were significantly higher than the Western participants. Several studies have demonstrated that high heart rate is associated with poorer performance on the heartbeat detection task (e.g. Knapp-Kline & Kline, 2005). In Ma-Kellam's study, differences in average heart rate did indeed significantly affect interoceptive awareness, and after statistically controlling for these differences, the effect of ethnicity on interoceptive awareness was still significant, but small. Our study, in contrast, found no significant differences in average heart rate between ethnic groups, ruling out the influence of a major potential confound present when administering the heartbeat detection task.

The research on cultural social neuroscience (e.g. Han & Northoff, 2008) has highlighted some marked differences in the ways in which the brain processes self-related information across cultures. Of interest for the findings of the present study are the reported differences between Western and Asian individuals in the underpinning neural signals during self-face processing. While we have no direct neural evidence, we hypothesize that self-face observation in Westerners recruits neural structures that have been shown to underpin both exteroceptive and interoceptive self-awareness, such as the insula (Craig, 2010), while for

Asian individuals self-face processing might be further modulated by brain areas that process the evaluation of one's self by others. Such cultural modulations of self-processing have been previously reported in behavioral (Liew, Ma, Han, & Aziz-Zadeh, 2011) and neuroimaging experiments (Morita et al., 2013). Thus while the effect of self-observation on IA might be unmediated by social factors in Westerners, we suggest that in contrast, in Asian cultures the processing of the exteroceptive self is strongly modulated by social factors that might interfere with interoceptive awareness, and as a result weaken the integration of exteroceptive and interoceptive dimensions of the self.

Our study has several limitations that are important to note. First, the participants comprising our East Asian group were all undergraduate students at a British university, and thus had all been immersed in Western culture for a minimum of a year. However, given that we still found a significant effect of cultural origin suggests that our results are driven by relatively stable, persistent cultural differences. Second, the sizes of our East Asian and Western samples were relatively small, and so our results should be interpreted with caution.

In conclusion, our study has revealed significant differences in the way individuals from East Asian and Western cultures process bodily self-information. Using a tightly-controlled methodology, we observed an interaction between exteroceptive and interoceptive self-processing for Western participants that was absent for East Asian participants, suggesting that in Western cultures, an individual's perception of their physical appearance may be intimately linked to how they feel 'on the inside'. Conversely, for East Asian participants this interaction is not present, suggesting that for East Asian individuals, one's external appearance may be experienced as separate and distinct from one's internal bodily self-awareness. Previous studies have focussed on cultural differences in processing isolated aspects of bodily information, such as one's own face (Han & Northoff, 2008; Sui & Han, 2007; Sui et al., 2012, 2009), or one's internal bodily sensations (Ma-Kellams et al., 2012).

Our study is the first to investigate cultural differences in the *interaction* between these aspects of bodily self-processing, to reveal that culture modulates the integrated, coherent experience of the body.

References

Ainley, V., Tajadura-Jiménez, A., Fotopoulou, A., & Tsakiris, M. (2012). Looking into myself: changes in interoceptive sensitivity during mirror self-observation. *Psychophysiology*, *In Press*.

Bond, M. H. (1991). *Beyond the Chinese face: Insights from psychology.* Hong Kong: Oxford University Press.

Botvinick, M., & Cohen, J. (1998). Rubber hands "feel" touch that eyes see. *Nature*, *391*(6669), 756.

Cohen, D., Hoshino-Browne, E., & Leung, A. K. -y. (2007). Culture and the Structure of Personal Experience: Insider and Outsider Phenomenologies of the Self and Social World. *Advances in Experimental Social Psychology*, *39*, 1–67.

Craig, A. D. (2010). The sentient self. *Brain Structure & Function*, *214*(5-6), 563–577.

Critchley, H. D., Wiens, S., Rotshtein, P., Ohman, A., & Dolan, R. J. (2004). Neural systems supporting interoceptive awareness. *Nature Neuroscience*, *7*(2), 189–95.

Damasio, A. R. (2000). *The feeling of what happens: Body and emotion in the making of consciousness*. New York: Harcourt Brace.

Damasio, A. R. (2010). *Self Comes to Mind: Constructing the Conscious Brain*. London: Heineman.

Gallagher, S. (2005). *How the body shapes the mind*. Oxford: Clarendon Press.

Han, S., & Northoff, G. (2008). Culture-sensitive neural substrates of human cognition: a transcultural neuroimaging approach. *Nature Reviews Neuroscience*, *9*(8), 646–654.

Heine, S. J. (2001). Self as Cultural Product: An Examination of East Asian and North American Selves. *Journal of Personality*, *69*(6), 881–905.

Knapp-Kline, K., & Kline, J. P. (2005). Heart rate, heart rate variability, and heartbeat detection with the method of constant stimuli: slow and steady wins the race. *Biological Psychology*, *69*(3), 387–396.

Kuhnen, U., Hannover, B., & Schubert, B. (2001). The semantic-procedural interface model of the self: The role of self-knowledge for context-dependent versus context-independent modes of thinking. *Journal of Personality and Social Psychology*, *80*(3), 397-409.

Liew, S. L., Ma, Y., Han, S., & Aziz-Zadeh, L. (2011). Who's afraid of the boss: Cultural differences in social hierarchies modulate self-face recognition in Chinese and Americans. *PloS one*, *6*(2), e16901.

Ma-Kellams, C., Blascovich, J., & McCall, C. (2012). Culture and the body: East-West differences in visceral perception. *Journal of Personality and Social Psychology*, *102*(4), 718–28.

Morita, T., Tanabe, H. C., Sasaki, A. T., Shimada, K., Kakigi, R., & Sadato, N. (2013). The anterior insular and anterior cingulate cortices in emotional processing for self-face recognition. *Social Cognitive and Affective Neuroscience*.

Ng, S. H., Han, S., Mao, L., & Lai, J. C. (2010). Dynamic bicultural brains: fMRI study of their flexible neural representation of self and significant others in response to culture primes. *Asian Journal of Social Psychology*, *13*(2), 83-91.

Schandry, R. (1981). Heart Beat Perception and Emotional Experience. *Psychophysiology*, *18*(4), 483–488.

Sforza, A., Bufalari, I., Haggard, P., & Aglioti, S.M. (2010). My face in yours: visuotactile facial stimulation influences sense of identity. *Social Neuroscience*, *5*(2), 148–162.

Sui, J., & Han, S. (2007). Self-construal priming modulates neural substrates of self-awareness. *Psychological Science*, *18*(10), 861–866.

Sui, J., Hong, Y., Hong Liu, C., Humphreys, G. W., & Han, S. (2012). Dynamic cultural modulation of neural responses to one's own and friend's faces. *Social Cognitive and Affective Neuroscience*, *In Press*.

Sui, J., Liu, C. H., & Han, S. (2009). Cultural difference in neural mechanisms of self-recognition. *Social Neuroscience*, *4*(5), 402–11.

Tsakiris, M. (2008). Looking for myself: Current multisensory input alters self-face recognition. *PLoS One*, *3*(12), e4040.

Tsakiris, M., Tajadura-Jiménez, A., & Costantini, M. (2011). Just a heartbeat away from one's body: interoceptive sensitivity predicts malleability of body-representations. *Proceedings of The Royal Society: B*, *278*(1717), 2470–6.

Zhu, Y., & Han, S. (2008). Cultural Differences in the Self: From Philosophy to Psychology and Neuroscience. *Social and Personality Psychology Compass*, *2*(5), 1799–1811.

Zhu, Y., Zhang, L., Fan, J., & Han, S. (2007). Neural basis of cultural influence on self-representation. *Neuroimage*, *34*(3), 1310-1316.

Figure Captions

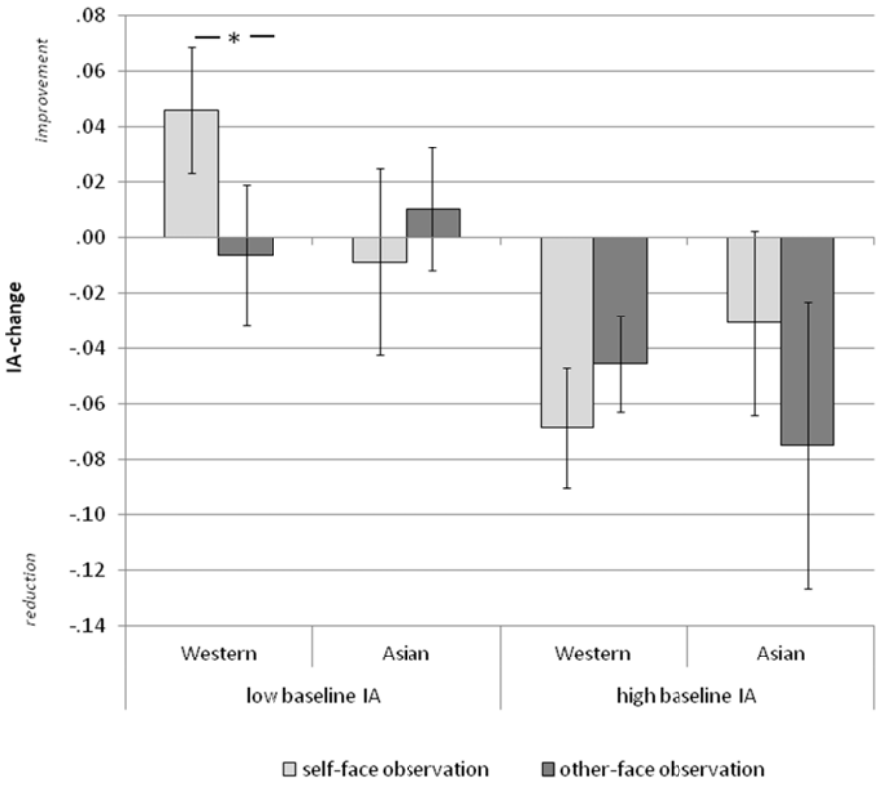
Figure 1. Diagram illustrating the procedure of the experiment. Western and East Asian participants completed nine trials of the heartbeat detection task, whilst observing an image displayed on a computer screen. In three of the trials, the image was a photo of the participant's face (the SELF-FACE condition). In another three of the trials, the image was a photo of an unfamiliar individual (the OTHER-FACE condition). In the remaining three trials, a black screen was displayed (BASELINE condition).

Figure 2. Graph showing the effects of self-face and other-face observation on interoceptive awareness, for Western and East Asian participants with high and low interoceptive scores. The dependent variable is the difference in interoceptive awareness (IA) from baseline. Positive values indicate an increase in awareness from baseline, and negative values indicate a decrease in awareness. Asterisk indicates p-value < .05, two-tailed.

Figure 1.


Image viewed during heartbeat detection
self face
other face
baseline
Ethnic Origin of Participant
East Asian
Western

Figure 2.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