What is a shade of your emotions?
Empathy, personality and physiological responses

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Introduction

Emotion recognition plays a significant role in our daily life, and is a prerequisite of empathy. There are some personality characteristics, like dark personality traits (i.e. psychopathy, sadism, narcissism, Machiavellianism) linked to specific deficits in empathy and emotion recognition. Previous research was usually conducted using self-report measures as indicators of empathy, emotion recognition and reactivity to different (intensity) of emotions. However, the literature suggests a disparity between physiological and self-report indicators of emotional response among individuals. Therefore, this study aims to investigate distinct aspects of emotional processes in terms of electrophysiological and subjective self-report ratings, investigating relations of EEG, automatic emotion recognition, empathy and personality traits.

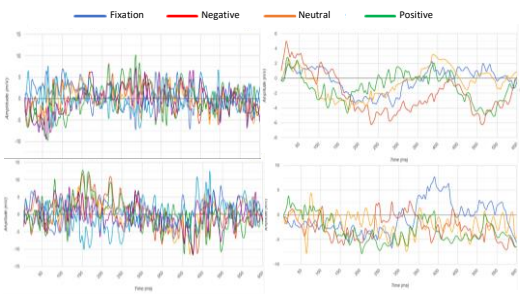
Method

This was a pilot study on a convenience sample of 20 adults (50% male; M_{age}=22).
Participants primarily completed an on-line questionnaire consisting of Short Dark Triad (SD3; Jones & Paulhus, 2014) The Assessment of Sadistic Personality (Plouffe, Smith, & Saklofske, 2018) and Affective and Cognitive Measure of Empathy (Vachon & Lynam, 2016), and participated in emotion recognition task which was presented to them individually on a tablet. A total of 48 *en face* photographs (24 male, 24 female) showing six basic emotions were selected from The Karolinska Directed Emotional Faces (KDEF, Lundqvist, Flykt & Öhman, 1998). Each photograph was presented for 400 ms and was preceded by a fixation cross in duration of 500 ms. Moreover, we included 35 photos from International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 2008) that were classified in three categories according to their valence and arousal: positive, neutral and negative. Each picture remained on the screen for 5 s, preceded by a fixation cross presented for 500 ms. MUSE Headband was used for recording event-related potentials and Polar Heart Rate Sensor H10 was used for measuring participants' heart rate.

Results

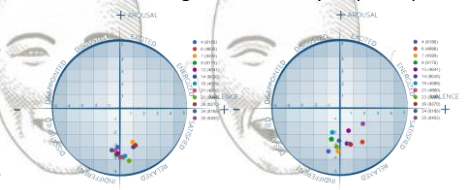
Measures of identification accuracy, types of errors, and reaction times were obtained for each of the emotion recognition photographs. Overall, photographs depicting happiness (*M*=7.20, *SD*=0.83) and anger (*M*=7.20, *SD*=0.83) were most accurately identified, while fear (*M*=4.70, *SD*=1.49) was the least accurately identified. The results of the *t*-tests showed there were no significant differences emotion recognition accuracy in participants high vs. low on each of the dark traits, nor on empathy.

However, some interesting patterns emerged in the differences on the overall wheel of emotions for different categories of IAPS photographs between participants high vs. low on dark traits (DT; Pictures 1.1.-1.3.), although there were no differences in assessment of arousal and valence of these photographs (with the exception of assessment of arousal for negative mutilation photographs for high vs. low psychopathy: $t_{(17.493)}$=-2.552, p=.020; M_{low}=7.06, M_{high}=8.33). Moreover, the differences emerged on pooled ERP (event-related potential) for IAPS photographs (Picture 2.1. and 2.2.)

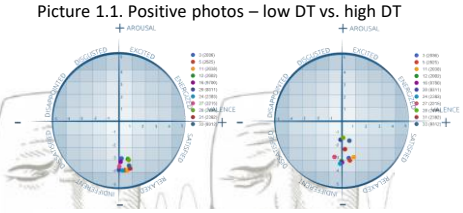


Picture 2.1. Pooled ERP (AF3 & AF4) – low DT vs. high DT

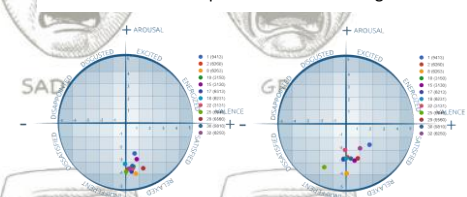
Picture 2.2. Pooled ERP (TP9 & TP10) – low DT vs. high DT



Picture 1.1. Positive photos – low DT vs. high DT



Picture 1.2. Neutral photos – low DT vs. high DT



Picture 1.3. Negative photos – low DT vs. high DT

Conclusion

The data collected by this multimethod approach shows interesting initial personality-related effects on distinct aspects of emotional processes in terms of electrophysiological and subjective self-report ratings.

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