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Big Five personality traits contribute to prosocial responses to others' pain

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ABSTRACT

Objectives: Two studies examined whether observers' personality traits contribute to prosocial responses to others' facial expression of pain. Experiment 1 examined the personality traits that could account for observers' variability in estimating others' pain intensity. Experiment 2 questioned to what extent the contribution of personality traits on inclination to help people in pain depend on observers' beliefs about pain' characteristics.
Method: 59 (experiment 1) and 76 (experiment 2) participants observed to 3-D realistic synthetic face movements mobilizing action units of pain, in order to estimate others' pain. In experiment 2, painful localizations (e.g., chest, hand) were also manipulated. In each experiment, Big Five personality traits were assessed.
Results: Experiment 1 revealed that agreeableness and conscientiousness contributed to observers' pain estimates across the increase of facial expression intensity. Experiment 2 showed that conscientiousness contributed to observers' judgments whatever pain' characteristics. Neuroticism was only salient for pain referring to life-threatening pain.
Conclusion: Prosocial response to others' pain depends on agreeableness, conscientiousness and neuroticism. However, these links are modulated by the pain behavior elicited and observers' belief about the characteristic of pain.

1. Introduction

Recognizing and interpreting other's pain can be of great importance to the suffering person and the observer (Craig, Versloot, Goubert, Vervoort, & Crombez, 2010). It permits recognition of potential danger, provides opportunity for harm avoidance and allows appreciation of what is happening to the person in pain (Craig, 2009). Expressive pain behaviors convey information to observers about the sufferer's internal experience and needs for assistance or provision of care (Craig et al., 2010). Among the different pain behaviors, i.e., guarding, touching, facial expression, words, sounds (Prkachin, Schultz, Berkowitz, Hughes, & Hunt, 2002), facial expressions of pain play an important role in social communication (Craig, 2009; Prkachin & Craig, 1995; Williams, 2002).

Less investigated is the striking variability of sensitivity to other's pain behavior among observers (Goubert et al., 2005; Hadjistavropoulos & Craig, 2002). A few studies revealed that psychological dispositions, e.g., empathy, pain catastrophizing (Green, Tripp, Sullivan, & Davidson, 2009; Sullivan, Martel, Tripp, Savard, & Crombez, 2006), affect the sensitivity to other's pain. Interestingly, no study has examined the contribution of Big Five personality traits to prosocial response to other's pain. Yet, personality traits reflect the relatively enduring, automatic patterns of thoughts, feelings, and behaviors that differentiate people from one another, and that are elicited in trait-evoking situations (McCrae & Costa, 1990). According to the Big Five theory, they can be specified in terms of five broad traits, i.e., extraversion, agreeableness, conscientiousness, neuroticism, openness/intellect. Among these five traits, conscientiousness and agreeableness are of particular interest because they are linked with prosocial responses. Conscientiousness describes individual differences in the propensity to self-control, to be responsible to others, and (social) rule abiding (John & Srivastava, 1999; Roberts, Jackson, Fayard, Edmonds, & Meints, 2009). Agreeableness contrasts a prosocial and communal orientation toward others and includes traits such as altruism (Costa & McCrae, 1995). Moreover, several studies have shown that Big Five personality traits influence the way people

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perceive facial expressions of other people (i.e., positive or negative faces) and thus might affect judgment of emotional information (Czerwon, Lüttke, & Werheid, 2011; Knyazev, Bocharov, Slobodskaya, & Ryabichenko, 2008). Recently, Czerwon et al. (2011) revealed a positive bias in people high in agreeableness or conscientiousness for valence judgments of positive faces. Knyazev et al. (2008) found agreeableness and conscientiousness predisposed people to perceive faces as more friendly.

Thus, the aim of the study is to determine to what extent Big Five personality traits contribute to other's pain assessments. It was hypothesized that conscientiousness and agreeableness would particularly contribute to observers' judgments when facing other's facial expression of pain. A converging multi-method approach was used to test this hypothesis. Experiment 1 analyzed the relationship between personality traits and others' pain intensity. Experiment 2 focused on personality traits' contribution on inclination to help someone in pain.

2. Experiment 1

Experiment 1 examined the contribution of Big Five personality traits in explaining observers' variability in pain estimates.

2.1. Materials and methods

2.1.1. Participants

59 healthy volunteers, 42 males and 17 females (*M*age = 24.09 years, standard deviation (SD) = 5.18), took part in this experiment. All participants had normal or corrected-to-normal vision. Informed consent was obtained from each participant.

2.1.2. Apparatus and stimuli

Stimuli consisted of a set of 3-D realistic face movements mobilizing specific action units (AUs) of pain, created with 3ds Max 2010® software. Starting from a static neutral expression, videos depicting pain expression were produced. According to previous research (Kappesser & Williams, 2002), three facial actions were targeted for modeling pain expression: brow lowering (AU4), orbit tightening (AU6&7) and levator contraction (AU9&10). From these facial actions, we were further able to manipulate the intensity of their common mobilization. For each UA, the facial expression intensity (FEI) varied from "traces of pain" to "maximum evidence" (20%, 40%, 60%, 80%, or 100%). These stimuli have been previously used and validated in a study related to the psychophysical integration of pain behaviors (Prigent, Amorim, Leconte, & Pradon, 2014).

2.1.3. Measures

Others' pain intensity assessment was measured via a computerized 100 mm visual analog scale (VAS) anchored by: no pain at all (left side) and the most intense pain imaginable (right side).

Big Five personality traits of participants were measured using the French version (Plaisant, Courtois, Réveillère, Mendelsohn, & John, 2010) of the Big Five Inventory. Participants rated their agreement with 45 short phrases reflecting prototypical traits on a 5-point-scale ranging from 1 (strongly disagree) to 5 (strongly agree). The internal consistency was .79 for extraversion, .76 for agreeableness, .86 for conscientiousness, .82 for neuroticism, and .76 for openness.

2.1.4. Procedure

We used ERTS-IPL, a PC-compatible software package that allows displaying stimuli and performing data acquisition (Beringer, 1994). Participants viewed three blocks of the 15 video trials (each stimulus three times), on a 15-inch monitor from a comfort distance. The procedure began with the following instructions: "You will see a person in pain. In your opinion, what is the intensity of this pain?" After each video, subjects answered by clicking with a mouse on the VAS that appeared at the bottom of the screen. The answer subsequently automatically triggered the next trial. Videos were randomly played. Participants were asked to fill the BFI before or immediately following the computerized procedure.

2.1.5. Data analysis

Multilevel growth curve model assumes that individuals follow the same curve shape but are allowed to vary in the parameters (i.e., intercept and slope) that describe this curve. If individual variability in these growth curve parameters is present, this variability might be predicted from theoretically meaningful variables. A straightforward way to conceptualize growth curve models is through two levels of analysis (Singer & Willet, 2003). Level 1 (i.e., within-person or intra-individual change) captures the sample growth rate across time or experimental conditions. The different levels of facial expression intensity (FEI) can be built-in this level. Level 2 (i.e., between-person or inter-individual change) captures between-person variability both in intercepts and in slopes (i.e., the growth rates across FEI levels). In the present experiment it was expected that Big Five personality traits would moderate observed pain estimates across FEI levels. As a first step, two models were compared: model 0 estimated individual variation only in the intercept (with fixed individual slope), whereas model 1 introduced a random part in intercept and individual slope. Then, models 2 type examined whether each dispositional trait accounted for part of the between-subjects variance in intercept and slope. Regarding the models 2 type, it was examined if, in comparison with model 1, (a) estimates that included dispositional traits were significant; and (b) if the $-2\log L$ value was significantly reduced. The decrease of the -2 * loglikelihood value ($-2\log L$) is commonly used to make an overall comparison of the fit of two models for the data, one of which is an alternative of the previous one. Analyses were conducted with MLwiN 2.02 software (Rasbash, Charlton, Browne, Healy, & Cameron, 2005).

2.2. Results

2.2.1. Decomposition of the total variability of observed pain estimation

The analyses showed that model 1, in comparison with model 0, better accounted for the data, decrease in the $-2\log L$, $\Delta = 137.272$, $df = 2$; $p < .001$ (see Table 1). It substantially reduced the within subject variability by 61.3%. In proportion, around 75% of the total variance in the observed pain estimation is rooted at the between

Table 1
Comparison between models with random intercepts and fixed (model 0) or random slopes (model 1).

Variable	Model 0		Model 1	
	Estimate	SE	Estimate	SE
Fixed effects				
Constant	6.556*	1.346	6.556*	0.942
FEI	11.952*	.252	11.952*	.424
Random effects				
Between-person level				
Intercepts ($\sigma^2 u_0$)	83.012*	16.795	42.970*	9.610
Slopes ($\sigma^2 u_1$)			9.020*	1.945
Within-person level ($\sigma^2 e_0$)	36.792*	3.416	14.243*	1.527
$-2\log L$	2013.986		1876.714	
$\Delta_{2\log L}$			137.272*	

Note: Estimates refer to the *b* values of the fixed effects, and variance of the random parameters.
* $p < .05$.