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Psychopathic traits and cardiovascular responses to emotional stimuli

Takahiro Osumi ^{a,*}, Hiroshi Shimazaki ^a, Akira Imai ^a,
Yoshinori Sugiura ^b, Hideki Ohira ^c

^a *Department of Psychology, Faculty of Arts, Shinshu University, 3-1-1 Asahi, Matsumoto 390-8621, Japan*

^b *Department of Social psychology, Faculty of Arts, Shinshu University, Matsumoto, Japan*

^c *Department of Psychology, Nagoya University, Nagoya, Japan*

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Abstract

The present study investigated the abnormalities of cardiovascular responses to contextual or explicit emotional stimuli with respect to the two facets of psychopathy in a Japanese undergraduate population assessed by a Japanese version of the Primary and Secondary Psychopathy Scales. In study 1, recording heart rate and fingertip skin temperature while the participants watched an unpleasant movie, we found that the participants with high tendencies toward antisocial behavior ($n = 16$) showed smaller reactivity than those with low tendencies toward antisocial behavior ($n = 16$). By contrast, in study 2, heart rate orienting responses to affective slides were recorded, and the participants with high tendencies toward emotional detachment ($n = 15$) showed smaller responses to unpleasant slides than those with low tendencies toward emotional detachment ($n = 16$). Consistent with previous studies which recorded skin conductance and startle eye blink with psychopaths, these findings using a non-institutionalized sample also suggest that affective dysfunction in psychopathy is based on two specific physiological mechanisms.

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Keywords: Psychopathy; Emotion; Heart rate; Skin temperature; Movie watching; Picture viewing

* Corresponding author. Present address: Department of Psychology, Graduate School of Environmental Studies, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-8601, Japan. Tel.: +81 52 789 2207; fax: +81 52 789 2272.

E-mail addresses: s060305m@mbox.nagoya-u.ac.jp, takahirosumi@hotmail.co.jp (T. Osumi).

1. Introduction

Psychopathy has been considered as a personality disorder constructed of two dimensions. Factor 1 of the Psychopathy Checklist-Revised (PCL-R; Hare, 1991) is described as emotional detachment, including interpersonal and emotional items (e.g., egocentricity, manipulativeness and callousness). Individuals with high in emotional detachment as primary psychopaths are less likely to fear punishment and to control interpersonal dominance, in fact negatively related to anxiety and neuroticism (Harpur, Hare, & Hakstian, 1989). On the other hand, factor 2 is described as antisocial behavior, including lifestyle and antisocial items (e.g., impulsivity, poor planning and early behavior problems). Secondary psychopaths, who are high in antisocial behavior, are emotionally unstable in contrast to primary psychopaths and correlate with criminal deviance (Harpur et al., 1989). According to these facets, it is important to understand their emotional abnormalities in order to treat them.

Two factors of psychopathy seem to play different roles in physiological hyporeactivity in psychopaths. Patrick, Bradley, and Lang (1993) assessed startle eyeblink modulations in subjects viewing affective slides, and found that PCL-R-diagnosed psychopaths failed to show larger blink magnitudes that are normal while viewing unpleasant slides. In addition, Patrick et al. (1993) and Patrick (1994) suggested that this effect is specific to the high emotional detachment factor, and not to the antisocial behavior factor. In contrast, Patrick, Cuthbert, and Lang (1994), using the same participants as Patrick et al. (1993), measured skin conductance (SC) and heart rate (HR) and suggested that the smaller autonomic reactivity displayed by psychopaths while a fear imagery task is related to high antisocial behavior factor scores, regardless of the emotional detachment factor scores. These effects on startle eyeblink and SC were reexamined (Benning, Patrick, & Iacono, 2005; Vanman, Mejia, Dawson, Schell, & Raine, 2003; Verschuere, Crombez, De Clercq, & Koster, 2005). Following LeDoux (1995), Patrick and Lang (1999) proposed that disparate biological mechanisms underlie the two factors of psychopathy, interpreting these findings in terms of explicit fear cues and contextual fear cues. That is, the emotional detachment factor might reflect a deficit in fear involving the subcortical amygdaloid complex as the center of the defense system, whereas the antisocial behavior factor might reflect a deficit in the vigilance and higher information processing systems, involving, in particular, the hippocampal formation influenced by higher association areas and inputs to the amygdala.

For psychopathic individuals, while electrodermal hyporeactivity have been often found (e.g., Aniskiewicz, 1979; Lykken, 1957; Tharp, Maltzman, Syndulko, & Zyskind, 1980), some studies have found that HR reactivity data are inconsistent with these electrodermal data: psychopaths had normal or even greater HR acceleration compared with non-psychopaths while anticipating aversive stimuli (Hare & Quinn, 1971; Ogloff & Wong, 1990; Tharp et al., 1980). In relation to these discordant patterns of electrodermal and cardiovascular responses, Hare (1978) suggested that psychopaths adopt an active coping stance to disregard threat, and consequently they succeed in reducing cortical arousal. However, some studies have also reported that psychopaths have smaller HR stress reactions, in accordance with the SC (e.g., Arnett, Howland, Smith, & Newman, 1993). Thus, cardiac data for psychopathy have been inconsistent between studies. In order to comprehend this inconsistency, two dimensions of psychopathy might be useful. For example, Ishikawa, Raine, Lencz, Bihrlé, and Lacasse (2001) reported that successful psychopaths who had never been convicted showed HR acceleration in a social anxiety task, but unsuccessful, convicted

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