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## The positive side of psychopathy: Emotional detachment in psychopathy and rational decision-making in the ultimatum game

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### ABSTRACT

An emotional deficit in individuals with psychopathy has been regarded as a potential factor in the disinhibition of selfish behaviors, which can be an impediment to a successful life in human society. However, recent studies in the field of economics have made clear that emotional function is associated with irrational decision-making. In the present study, to test whether psychopathy may have a positive aspect in a social setting, we examined the decision-making of college students with high and low tendencies for psychopathy in the ultimatum game, which illustrates conflict between fairness and economic utility. We also investigated electrodermal responses to fair and unfair offers for each group. Compared to low psychopathic controls, individuals with a high tendency toward psychopathy more often choose economic utility by accepting unfair offers. Whereas controls more often exhibited an electrodermal response to unfair offers compared to fair offers, high psychopathic individuals did not show a similar difference between the types of offer. The results suggest that the affective deficit of psychopathy might be associated with insensitivity to unfairness and may contribute to a rational decision to accept unfair offers. Hence, psychopathy can be rational in some social situations.

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### 1. Introduction

Individuals with psychopathy often exhibit antisocial behaviors with no regard for social norms or relationships with other people (Cleckley, 1941). According to an evolutionary theory, adherence to social norms or altruistic behaviors would help to build reciprocal relationships with others, which would play a functional role in survival through interpersonal interactions (Trivers, 1971). In contrast, selfish or antisocial behaviors would be an important impediment to adaptive survival in human societies which have established norms or standards to penalize such behaviors. Given the nature of humans and societies, individuals with psychopathy could be considered social misfits.

Nevertheless, the classic description of psychopathy by Cleckley said that psychopathic individuals are not only criminals, but also can be found in any population in society. In line with this, psychopathic traits are found as a sub-clinical continuum in all populations in a society (Edens, Marcus, Lilienfeld, & Poythress Jr., 2006; Levenson, Kiehl, & Fitzpatrick, 1995). Furthermore, Lykken (1995) argued that certain characteristics of psychopathy, such as superficial charm, volubility, and fearlessness, are seen in successful busi-

nessmen and academics. Thus, psychopathy itself may not be decisive in one's social maladaptation; rather, it may enhance some types of social success. It has been a mystery why psychopathy includes such contradictory aspects as antisocial and successful achievements.

The hallmark of psychopathy is considered to be affective impairment. Subjects with psychopathy fail to exhibit an electrodermal response and show reduced activation of the affective neural circuit in response to aversive stimuli or distress cues from other people (Benning, Patrick, & Iacono, 2005; Birbaumer et al., 2005; Lorber, 2004; Lykken, 1957). Previous researchers have implied that a reduced experience of emotions accompanied by signals of punishment or distress can result in the disinhibition of socially deviant behaviors (Blair, 1995; Lykken, 1995). Consistent with this notion, recent studies in neuroscience and psychology have noted that emotion plays an important role in inhibiting disadvantageous decision-making (e.g., Bechara & Damasio, 2005), and several studies have shown that individuals with sub-clinical psychopathic tendencies repeatedly make disadvantageous decisions (e.g., Mitchell, Colledge, Leonard, & Blair, 2002). However, it is also true that emotional behaviors can result in maladaptive consequences depending on the circumstances or situation (Shiv, Loewenstein, Bechara, Damasio, & Damasio, 2005; Weller, Levin, Shiv, & Bechara, 2007). For example, it is conceivable that reactions driven by anger or frustration may cause significant incidents, such as crimes of passion, even if such emotions stem from social

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motivations. If we consider the effects of emotions on social interactions, there may be some circumstances which make it easy for individuals with psychopathy to lead a social life.

The ultimatum game (UG), which is a widely used laboratory model of economic decision-making, illustrates an interpersonal situation in which emotional functions of humans can violate economical rationality. In a game with only one round, two players – a proposer and a responder – have to divide a sum of money. If the responder accepts an offer made by the proposer, the deal goes ahead. However, if the responder rejects it, neither player gets anything. Based on this simple rule, rational responders should accept every positive offer because there will be no additional rounds with the same opponent. However, actual responders often turn down such a rational decision in favor of an irrational rejection: an offer below 20–30% of the stake has an approximately 50% chance of being rejected (Güth, Schmittberger, & Schwarze, 1982). This irrational rejection is considered to be driven by negative emotions such as anger or frustration in response to unfair treatment. As support for this notion, the rate of rejection for unfair offers is positively correlated with activation of the anterior insula (Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003), a brain region that is associated with subjective negative emotions (e.g., Critchley, Wiens, Rotshtein, Öhman, & Dolan, 2004).

In addition, skin conductance response (SCR) following unfair offers has been believed to be a better predictor for irrational rejection in the UG (van't Wout, Kahn, Sanfey, & Aleman, 2006). Skin conductance activity is a reliable measure to assess physiological arousal mediated by the sympathetic nervous system. Emotional events prompt greater SCRs than neutral events regardless of whether they are pleasant or unpleasant (e.g., Bradley, Codispoti, Cuthbert, & Lang, 2001). Accordingly, it is presumable that the finding by van't Wout et al. (2006) of SCR associated with rejection for unfair offers derives from negative emotions. However, individuals with psychopathy often exhibit deficient SCR in the aversive conditioning (Lykken, 1957) or during passive viewing of affective pictures, particularly unpleasant pictures (Benning et al., 2005), which suggests that they are less likely to be sensitive to negative emotional events.

Therefore, in the present study we determined whether individuals with high psychopathic tendencies in a non-forensic population rationally accept or irrationally reject unfair offers as a responder in the single-shot UG. Moreover, to investigate emotional responses to offers, we recorded electrodermal activity following an offer as an autonomic index of the emotional state during decision-making. Furthermore, since the average time taken to accept is normally 3–4 s for fair offers and 6–7 s for unfair offers (Knoch, Pascual-Leon, Meyer, Treyer, & Fehr, 2006), the time that responders are allowed to spend in decision-making might affect their response, despite the individual's preferences. Thus, less time may cause an error and more time may enable a deliberate decision which would override an initial preference. According to the findings by Knoch et al. (2006), 8.0 s would be enough time to make deliberate decisions for unfair offers. Meanwhile, it might be difficult for responders to override an initial preference if time allotted for making decisions is 3.0 s, or if they have to make decisions more immediately after receiving offers (e.g., 0.5 s). However, if psychopathic traits could affect a preference, differences in the acceptance rate between subjects with high and low psychopathic tendencies should be observed whenever they are required to express their decisions. To test this notion we controlled the time that could be spent in decision-making among subjects, and manipulated it by randomly setting the duration of each trial as 0.5 s, 3.0 s, or 8.0 s.

The affective impairment of individuals with psychopathy is likely to enhance a rational decision to accept an unfair offer in the UG. If individuals with high psychopathy fail to exhibit nega-

tive emotions, they would not show greater SCR in response to unfair offers compared to fair offers. On the other hand, individuals with acquired sociopathy, who exhibit many of the same behaviors as subjects with psychopathy (e.g., Mitchell et al., 2002), due to lesion of the ventromedial prefrontal cortex (VMPFC), have been found to accept unfair offers less often than healthy controls (Koenigs & Tranel, 2007; Moretti, Dragone, & di Pellegrino, 2009). Therefore, we could not rule out the possibility that individuals with psychopathy would overreact to unfair offers; i.e., compared to low psychopathic individuals, they may be more likely to irrationally reject unfair offers regardless of whether or not they exhibit SCR in response to these offers.

## 2. Methods

### 2.1. Participants

Twenty-eight participants were recruited from among 128 Japanese college students who consented to participate in the current study, out of 700 who completed the Japanese version of the Primary and Secondary Psychopathy Scales (PSPS; Levenson et al., 1995; Sugiura & Sato, 2005) during a screening session. The high psychopathic group consisted of 12 students (5 females), and the low psychopathic group consisted of 16 students (8 females). The mean ages were 19.1 ( $SD = 0.49$ ) years for the psychopathic group and 19.1 ( $SD = 1.27$ ) years for the low psychopathic group. All of the participants were confirmed to have no knowledge of the UG or other economic game theories.

We defined individuals who scored high on primary psychopathy as being psychopathic because the specific properties of psychopathy correspond to primary psychopathy; in contrast, secondary psychopathy has been defined as an aspect of another psychiatric disorder (Karpman, 1948; Lykken, 1995). Thus, we recruited a similar number of male and female participants from extreme ends of students who scored high and low on primary psychopathy. Moreover, based on descriptive statistics of the score for 700 students ( $M = 34.37$ ,  $SD = 4.58$ ), each student scoring over 38.95 and below 34.37 were assigned to the high psychopathic group and the low psychopathic (non-psychopathic) group, respectively. The scores on the primary psychopathy scale were 39–48 ( $M = 42.17$ ,  $SD = 3.04$ ) for the high psychopathic group and 20–34 ( $M = 30.19$ ,  $SD = 3.92$ ) for the low group. A *t* test showed a significant difference in the mean score of primary psychopathy between the two groups,  $t(26) = 8.78$ ,  $p < 0.01$ . Meanwhile, for secondary psychopathy, the scores were 17–32 ( $M = 23.67$ ,  $SD = 5.00$ ) for the high group and 17–28 ( $M = 22.44$ ,  $SD = 3.86$ ) for the low group, and there was no significant difference between the means of the groups,  $t(26) = 0.74$ ,  $p = 0.47$ .

### 2.2. Psychopathy assessment

The PSPS is a 26-item measure designed to detect psychopathic traits in a non-institutionalized population. Each item is a statement that is to be rated on a four-point Likert-type scale (from disagree strongly to agree strongly). The primary psychopathy subscale consists of 16 items related to manipulation, egocentricity and lack of empathy and remorse, whereas the secondary subscale consists of 10 items related to impulsivity, quick-temperedness and poor behavioral control. Consistent with a two-factor model of the Psychopathy Checklist-Revised (PCL-R; Hare, 1991), primary psychopathy, but not secondary psychopathy, was correlated negatively with harm avoidance (Levenson et al., 1995). Furthermore, the PSPS demonstrated adequate reliability and convergent validity with alternative measures of psychopathy (Brinkley, Schmitt, Smith, & Newman, 2001; Lynam, Whiteside, & Jones, 1999). A Jap-

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