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Personality and Individual Differences 43 (2007) 1517–1528

PERSONALITY AND  
INDIVIDUAL DIFFERENCES

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## Relationships between functional and dysfunctional impulsivity, delay discounting and cognitive distortions

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Received 10 December 2006; received in revised form 26 March 2007; accepted 16 April 2007

Available online 4 June 2007

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### Abstract

Impulsivity is a multidimensional construct assessed by a variety of behavioural and self-report measures. Each measure is thought to assess a separate component, but the inter-relationship between these measures in relation to the functional and dysfunctional nature of this psychological construct remains unclear. In addition, cognitive attributes of functional and dysfunctional impulsivity have not yet been identified. The present study addressed these issues by examining the inter-relationships between impulsivity measured using the delay discounting task and self-report questionnaires, alongside a measure of cognitive distortions. The results showed that delay discount rates were positively correlated with both functional and dysfunctional impulsivity measures, non-planning-impulsiveness and total scores of the Barratt Impulsiveness Scale (BIS-11). These findings are consistent with the idea that discounting the value of delayed rewards may be related to some, not necessarily dysfunctional, forms of impulsive behaviour. Furthermore, the present study suggests that negative cognitive attributes may operate as cognitive processing associated with some subtypes of impulsivity, i.e., dysfunctional impulsivity, non-planning and cognitive impulsiveness.

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*Keywords:* Functional and dysfunctional impulsivity; Delay discounting; Cognitive distortions; Barratt Impulsiveness Scale

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## 1. Introduction

Impulsivity is viewed as a prominent feature of many psychiatric disorders and has been assessed using a variety of behavioural and personality measures (e.g., Evenden, 1999; Mathias et al., 2002; Webster & Jackson, 1997). These measures have helped us to consider impulsiveness as a personality construct encompassing behavioural, cognitive, emotional, and motor components that can vary across individuals.

Most studies have focused on impulsiveness as a personality construct or behaviour which can be defined as an inability to wait, insensitivity to consequences, the tendency to act without forethought, an inability to inhibit inappropriate behaviours, and deficient tolerance of delay of gratification (e.g., Ainslie, 1975; Eysenck, 1993; Logue, 1995; McCown & DeSimone, 1993). However, there are situations where such impulsive behaviours may have adaptive functions and others where impulsivity would be counter-productive. These definitions either fail to clearly distinguish between functional and dysfunctional aspects of impulsivity or only consider impulsivity as an abnormal personality trait. Dickman (1990) distinguished between two distinct and independent forms of impulsivity, i.e., functional impulsivity and dysfunctional impulsivity. According to Dickman's model (Dickman, 1990), functional impulsivity is related to the tendency to take quick decisions when doing so is beneficial. In contrast, dysfunctional impulsivity is related to the tendency towards speedy and non-reflective decision-making despite the negative consequences of such actions. Accordingly, Dickman (1990) developed an inventory to discriminate these two forms of impulsive behaviour. Similarly, Eysenck (1997) distinguished between two distinct aspects of impulsiveness, one aligning with extraversion, i.e., extraverted impulsivity and the other with psychoticism, i.e., psychotic impulsivity. The former is the process of taking decisions with a calculated risk and a full awareness of the danger, while the latter is the process of taking decisions without any considerations of the associated risks or consequences of the action (Eysenck, 1997). Furthermore, Barratt and colleagues (Patton, Stanford, & Barratt, 1995) have developed a measure of impulsivity, which appears to measure impulsivity as an abnormal personality trait. The Barratt Impulsiveness Scale (BIS-11, Patton et al., 1995) has been validated in general psychiatric and normal populations as well as a group of male inmates from a maximum security prison unit. It measures three subtypes of impulsiveness: cognitive (attentional) impulsiveness (inattention and cognitive instability), motor impulsiveness (motor disinhibition), and non-planning impulsiveness (lack of self-control and intolerance of cognitive complexity) (Patton et al., 1995). Furthermore, Gray's personality theory (1987) suggests that high impulsivity is associated with sensitivity to signals of reward due to the activity of the behavioural approach system (BAS) when such cues are encountered. One of the possible implications of this model is that individuals with high impulsivity may exhibit a lower tolerance for delayed rewards.

In addition to self-report questionnaires, some studies have used behavioural measures to quantify a single index of impulsive behaviour. One of the most commonly used behavioural tasks to measure impulsive decision-making is Delay Discounting, which provides a valid and reliable measure of the value of delayed, relative to immediate rewards in both animal and human studies (Ainslie, 1974; Herrnstein, 1981; Logue, 1988; Mobini, Body, Ho, Bradshaw, &

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