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Rash-impulsivity, reward-drive and motivations to use ecstasy

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ABSTRACT

An increase in the recreational use of ecstasy has prompted much research focusing on the effects of repeated use. Less is known about the individual predictors of ecstasy use although a number of studies have pointed to impulsive personality traits. The current study examines this issue by drawing on a recently developed dual-factor model of impulsivity (rash-impulsivity/reward-drive; Dawe & Loxton, 2004). Two-hundred and seven participants completed questionnaires assessing rash-impulsivity, reward sensitivity, affect and motivations for use. Ecstasy users were significantly higher on rash-impulsivity and reward sensitivity compared to non-users. Furthermore, negative affect mediated the relationship between rash-impulsivity and negative reinforcement motivations. Discussion focuses on the role of rash-impulsivity and reward-drive in understanding the motivational processes underlying ecstasy use.

1. Introduction

Ecstasy belongs to a category of synthetic substances that has become increasingly popular throughout many countries (e.g., Degenhardt, Barker, & Topp, 2004; Schifano, 2004; Verheyden, Henry, & Curran, 2003). Although there has been much research demonstrating the effects of ecstasy (e.g., Parrott, 2001; Solowij, Hall, & Lee, 1992) less information is available regarding possible individual predictors of use. Studies have found that impulsivity is an important trait which is correlated with lifetime ecstasy use (e.g., Parrott, Sisk, & Turner, 2000). The focus of the current study is to expand on previous work and examine the relationship between impulsivity and ecstasy use.

Increased prevalence of ecstasy use among young people is of considerable concern as studies have shown that animals and primates develop substantial serotonergic (5-HT) neurotoxicity after large or repeated doses (McCann, Ridenour, Shaman, & Ricaurte, 1994; Parrott, 2000). Repeated, prolonged use appears to result in long-lasting serotonergic cell degeneration and decreased brain 5-HT levels (Morgan, 2000; Ricaurte, Jie, Hatzidimitriou, Cord, & McCann, 2002). Consistent with this, behaviours and mood states associated with deficient 5-HT transmission have been reported by regular ecstasy users. A major correlate of deficient serotonergic system functioning is impulsive behaviour (Cervantes & Delville, 2007; Linnoila, Virkkunen, George, & Higley, 1993; Winstanley, Dalley, Theobald, & Robbins, 2004). Thus, of interest to the current study are the findings that ecstasy users score significantly higher on self-rated and behavioural impulsivity compared to non-users (e.g., Moeller et al., 2002; Morgan, 1998; Parrott et al., 2000).

According to Dawe and Loxton (2004), impulsivity should be viewed as comprising two primary factors which combine to facilitate the development and maintenance of drug use. This conceptualisation suggests that at least one component of impulsivity predates the development of regular drug use behaviour. Specifically, it is proposed that an increased sensitivity to reward (e.g., Gray, 1987) is a major characteristic of impulsivity which serves to mediate the initial approach behaviour toward potentially rewarding and novel drugs (Dawe et al., 2007). In the context of ecstasy use, this 'reward-drive' dimension responds to the perceived incentive qualities of consuming ecstasy (e.g., increased sociability with peers and euphoria). Consequently, the high 'reward-drive' individual is more likely to engage in ecstasy experimentation for the pleasurable and novel effects expected as a result (Gullo & Dawe, 2008). Interestingly, this component of impulsivity has not been a focus in the MDMA literature.

The second component of the Dawe, Gullo, and Loxton (2004) model is rash-impulsivity. This, dimension relates to deficient inhibitory processes, which may facilitate repeated use despite adverse consequences. It has been proposed that such poor control over behaviour may stem from dysfunction in frontal brain regions responsible for inhibitory control (Jentsch & Taylor, 1999) and it is likely that this region is responsible for rash-spontaneous behaviour (Dawe et al., 2004). Consistent with this, there is evidence that repeated MDMA use is associated with serotonergic neurotoxicity in frontal regions (Parrott, 2001) a condition linked with poor behavioural control (e.g., Winstanley et al., 2004). The finding that ecstasy users consistently score higher on self-reported measures

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of rash-spontaneous impulsivity is therefore in accordance with neurobiological evidence indicating reduced 5-HT density in frontal areas.

Indeed, the majority of ecstasy research has emphasised the influence of rash-impulsivity (e.g., Bobes et al., 2002; Butler & Montgomery, 2004; Dughiero, Schifano, & Forza, 2001). For example, Morgan (1998) found elevated rash-impulsivity in ecstasy users when compared to both non-drug and poly-drug controls. Similar results were found in another study, which reported elevated impulsivity, as measured by the I_7 (Eysenck, Pearson, Easting, & Allsopp, 1985) in heavy users when compared with controls (Parrott et al., 2000). Similarly, Butler and Montgomery (2004) found that rash-impulsivity discriminated between controls, light and heavy ecstasy users.

The utility of the Dawe and Loxton (2004) model outlined above is that it provides a framework for hypothesising that ecstasy users in addition to reporting higher levels of rash-impulsivity may also be characterised by higher levels of reward seeking traits. It is possible that such elevations in reward seeking may influence their motivations to use ecstasy. That is, it is likely that ecstasy users are drawn to its positive effects due to a heightened sensitivity to such states which in turn motivates them to seek out the drug. For example, studies measuring sensation-seeking have found these traits to be associated with increased expectations about the positive effects of drugs (e.g., Katz, Fromme & D'Amico, 2000). In addition, Engels and ter Bogt (2004) found expectations relating to the perceived effects of ecstasy use reliably distinguished users from non-users. However, despite these links, the relationship between impulsivity and motivations to use ecstasy has not been fully examined in the literature.

The current study was designed to expand on previous work into the individual characteristics of ecstasy users. Specifically, the relationship between the two major components of impulsivity and motivations for use will be examined. Thus, the aim is to compare personality profiles of ecstasy users and non-user controls. Impulsivity variables, differences in affect, motivations and drug taking behaviour will be compared. Specifically, higher levels of rash-impulsivity and reward sensitivity are expected in ecstasy users when compared to controls.

2. Method

2.1. Participants

The sample comprised 207 participants (82 males, 125 females) ranging in age from 18 through 50 ($M = 23.48$, $SD = 5.12$). The sample was obtained using the 'snowball' method which involves the accumulative referral of the questionnaire to others via associates of the researchers. Snowballing is a widely used technique in the ecstasy field (e.g., Davidson & Parrott, 1997; Dughiero et al., 2001; Parrott et al., 2000), and one which was created specifically to assess hard to access populations such as illicit drug users (Solowij et al., 1992). Sample characteristics are reported in Table 1.

2.2. Measures

2.2.1. Drug use history

This measure was designed to assess frequency, quantity, and total consumption of ecstasy use (Butler & Montgomery, 2004; Parrott et al., 2000). Questions included recency of last ecstasy consumption, an estimate of number of ecstasy tablets one had consumed over the lifetime and average dosage in a typical night out. Participants were also required to indicate which substances among a list of commonly taken drugs they have ever taken or smoked; an option was also included for the reporting of the consumption of 'other' drugs (Butler & Montgomery, 2004).

Table 1
Characteristics of users ($N = 102$) and non-users ($N = 105$).

	Non-users		Users		χ^2
Demographics					
Age	$M = 23.41$	$SD = 5.55$	$M = 23.54$	$SD = 4.69$	
Gender	Male – 37	Female – 68	Male – 45	Female – 57	1.705
Ecstasy use					
Lifetime use	–		Mode = 30.00		
Usual tablets taken in a typical night	–		$M = 1.59$	$SD = 1.03$	
Other drugs (% users)					
Tobacco	73.3%		93.1%		14.44***
Alcohol	85.7%		95.1%		5.22*
Cannabis	56.2%		90.2%		33.32***
Amphetamine	5.7%		81.4%		120.84***
Cocaine	2.9%		58.8%		76.54***
GBH	–		6.9%		7.46**
LSD	1.9%		28.4%		28.59***

* $p < .05$.
** $p < .01$.
*** $p < .001$.

2.2.2. Eysenck's impulsivity scale (I_7)

Rash impulsiveness was measured with the Impulsiveness subscale of Eysenck's Impulsiveness, Venturesomeness, and Empathy Scale (Eysenck et al., 1985). The I_7 comprises 19 items such as 'Do you often buy things on impulse?' and 'Do you usually make up your mind quickly?' Respondents are required to indicate with either a 'yes' or 'no' response whether they agree or disagree with the statement. Reliabilities for the I_7 are high with studies reporting Cronbach alphas ranging from 0.83 to 0.84 ($\alpha = 0.83$ in the present sample; Eysenck et al., 1985).

2.2.3. The Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ)

The sensitivity to reward subscale of the SPSRQ was utilised to assess levels of reward-drive. This scale contains 24 items which require a 'yes'/'no' response to questions such as 'Do you often do things to be praised?' and 'Do you like to compete and do everything you can to win?' designed to measure reward sensitivity. Very good convergent and discriminant validity has been demonstrated with a number of related measures. Internal consistency was demonstrated to be adequate, ranging from $\alpha = 0.75$ to 0.78 ($\alpha = .76$ current sample; Torrubia, Ávila, Moltó, & Caseras, 2001).

2.2.4. The Positive and Negative Affect Schedule (PANAS)

The PANAS (Watson, Clarke, & Tellegen, 1988) was used to assess trait mood. This measure contains 20 adjectives, 10 corresponding to positive feelings and emotions, and 10 to measure negative mood states. Participants are required to indicate 'to what extent do you feel this way in general?' to items such as 'active', and 'excited', designed to measure positive affect, and 'scared', and 'nervous' to measure negative affect. Internal consistencies for the PANAS are very high, with reported alphas of .93 for positive affect ($\alpha = .90$ current sample), and .89 for negative affect ($\alpha = .87$ current sample; Gomez, Cooper, & Gomez, 2000).

2.2.5. Motivations for Drug Use Scale (MDUS)

The motivations for Drug Use Scale (Newcomb, Chou, Bentler, & Huba, 1988) was used to measure motivations for the use of ecstasy. This scale was initially developed to measure the motiva-