



Simulation of risk-taking and its relationship with personality

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ABSTRACT

The study simulated risk-taking and explored its relationship with aspects of personality (i.e., EPQ-R Psychoticism, IVE impulsivity and venturesomeness). The simulation used a multi-tasking board game task, which comprised a behavioural (experimental) measure rather than the more traditional questionnaire approach. This was investigated in 60 community based healthy male control participants and among 30 forensic in-patients (offenders). Among the forensic patients, risk-taking correlated negatively with social desirability and positively with impulsivity and venturesomeness. By contrast, correlations were not significant for the control participants other than risk-taking and impulsivity. The forensic patients exhibited lower rates of risk-taking on the risk simulation task than the healthy controls, and social desirability may be a protective factor against risk-taking among the forensic patients. The findings suggest that a restricted institutional environment influences patients' approach to risk-taking tasks that may not translate into the community. The study represents a pilot of an experimental procedure, which now requires a computer based application in order to improve its reliability and validity.

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1. Introduction

The purpose of this study is to validate a new behavioural (experimental) measure of risk-taking and moral decision-making by investigating its relationship with relevant personality traits (e.g. impulsivity, sensation seeking, and antisocial personality traits). Risk-taking involves engaging in potentially harmful behaviour in the pursuit of some form of reward (Leigh, 1999). It has been linked to impulsivity and sensation seeking (Lejuez et al., 2002), but is potentially relevant to a general offending theory of crime through poor behavioural control and the pursuit of self-interest (Gottfredson & Hirschi, 1990). Moral-decision making, in contrast, involves the ability and motivation to apply moral principles through perspective-taking and consideration of consequences to others, the absence of which links more directly than risk-taking to antisocial behaviour and offending (Palmer, 2003).

Decision-making is concerned with how people make choices in their lives (Franken & Muris, 2005). The fundamental motives affecting decision-making are the desire to reduce pain or uncertainty and the desire to pursue pleasure (Bentham, 1970). This links decision-making to reward-based decision-making theories as opposed to rational choice (Cohen & Blum, 2002). Franken and

Muris (2005) note that often risky behaviour, including substance misuse and the commission of criminal acts, is related to pursuit of immediate reward and pleasure rather than consideration of the long-term consequences.

Risk-taking and poor behavioural control are often associated with neurological impairments (Bechara, Tranel, & Damasio, 2000). Recently neuroscientific paradigms have suggested links between aspects of brain function and behavioural characteristics in forensic settings. Firstly the somatic marker hypothesis, which links preconscious emotional learning associated with decision-making to orbito-frontal functioning, has been applied to psychopathy (Damasio, 2000). This has been tested using the Iowa Gambling Task (IGT; Bechara et al., 2000; Franken & Muris, 2005; Grant, Contoreggi, & London, 2000; Suhr & Tsanadis, 2007; Yechiam et al., 2008), where participants are presented with decks of cards on a computer screen and told that each time they choose a card they will win some game money. The task mimics real world gambling and shows that patients with orbitofrontal lesions continue to select risky and punishing outcomes, even though they have become aware that this is disadvantageous. IGT requires people to forfeit long-term gain for perceived short-term rewards. Risk-taking has also been explored using alternative procedures, such as the Game of Dice task (Brand et al., 2005), in which the rules for reinforcement and punishment are made explicit, and the Balloon Analogue Risk Task (BART) (Lejuez, Aclin, Zvolensky, & Pedulla, 2003; Lejuez et al., 2002), which is comprised of a computerised, laboratory based measure where risky behaviours are

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rewarded up to a point where further risks result in poorer outcomes. This, according to the authors, makes the measure reflect risk in real-world situations.

Lejuez et al. (2002) emphasise the need to develop behavioural measures of risk-taking rather than relying on exclusively self-report methodology. It is important that procedures produce reliable and valid decision-making of real life situations. One way of determining this is to explore their concurrent validity with other conceptually related measures, such as those reflecting relevant personality characteristics. In terms of personality research, Franken and Muris (2005) found that risky decision-making on the IGT was related to sensitivity to reward and self-reported decision-making style rather than impulsive behavioural traits. Suhr and Tsanadis (2007) found that risk-taking on the IGT was independently associated with 'fun seeking' behaviour and negative affect. The BART also seems more related to functional impulsivity/venturesomeness than dysfunctional impulsivity (Vigil-Colet, 2007). Notwithstanding, the IGT and BART are limited in their almost exclusive focus on short-term consequences and sensitivities to reward and punishment, that is, decisions relating to perceived financial gains and losses.

Elkind, Rubin, Rosenthal, Skoff, and Prather (2001) argue that conventional assessment procedures have "difficulty in creating the type of interactivity and immersion that occurs in day-to-day life, which limits their usefulness and application to real life" (p. 491). Thus an ecological approach to exploring cognitive phenomena has evolved with the creation of procedures that have a 'game-like' quality and attempt to be closer in terms of simulating real-life performance. Hence the purpose of the present study was to explore risk-taking decision-making using a multitasking game format designed to engage the participant in activities that are readily accessible in terms of their everyday understanding of a hypothetical risk-taking scenario. The procedure, which is labelled 'Secret Agent', is presented as a board game that involves a participant playing the role of a 'Secret Agent' who has been parachuted down into enemy territory for the purpose of delivering a message to another 'Secret Agent'. This simulation includes a broad range of risk-taking behaviours (e.g. risk of injury, loss to others, the possibility of being caught in a compromised position) and antisocial or altruistic motivations (moral decisions) to achieve a set objective (i.e., a successful delivery of a message). It builds on the previous risk paradigms of the IGT and the BART, but extends the tasks to incorporate more multitasking components (i.e., a greater range of decisions involving both risk-taking and moral decision-making).

This study aimed to explore the relationship between risk-taking and moral decision-making using this simulated task and key personality characteristics relevant to risk-taking, namely antisocial personality traits, impulsivity, and venturesomeness (i.e., functional impulsivity). We wished to explore the theory of Gottfredson and Hirschi (1990) that risk-taking and moral behaviour are negatively correlated, with the prediction that among healthy community participants and a forensic population both would correlate significantly with antisocial personality characteristics, impulsivity and venturesomeness. We also investigated the findings of Gudjonsson and MacKeith (1983), which suggested that socially desirable responding might protect people against risky decision-making and offending behaviour.

2. Materials and methods

2.1. Participants

2.1.1. Forensic patients

This sample was comprised of 30 male offenders who were resident at two medium-secure units and a closed ward for forensic

patients, all situated in South-East London, UK. They were all males with a mean age of 38.7 years ($SD = 12.9$). Twenty-six (87%) of the patients had a primary diagnosis of psychosis, and four (13%) a primary diagnosis of personality disorder. Two-thirds (67%) of the patients had been admitted due to a serious violent offence; the remaining patients had property offences, sexual offences, arson, harassment or threatening behaviour as their index offence.

2.1.2. Control participants

The control group included 30 males who were attending a job club, and 30 male bus drivers recruited from a bus depot (total $n = 60$). Controls were recruited in South London from the same area as most of the forensic patients. Their mean age was 37.9 ($SD = 13.4$).

2.1.3. Demographic matching

As well as approximate age matching, the two groups were matched on estimated intellectual ability using the Wechsler Test of Adult Reading (WTAR) (Wechsler, 2001). The estimated IQ scores for the two groups were 83 and 84 (low average), respectively. The community sample was selected from the same approximate region as the forensic patients, thus it was likely they would share similar sociodemographic backgrounds. All participants spoke fluent English.

2.2. Secret Agent – a simulated test of risk-taking and moral decision-making

Secret Agent is a board game requiring the participant to move along different paths to achieve the final goal destination. They are told that they are a 'Secret Agent' who has been parachuted down into enemy territory on an urgent mission. The mission is to deliver a message to another 'Secret Agent' at the end of the game as quickly as possible. A sequence of boards depicts different scenarios (e.g. the forest board, the city board, the mountain board). The participant moves through each board/scenario by selecting one of three paths representing low-, medium-, or high-risk options. The path-selection is prompted by options that are printed on cards and read out to the participant. The participant moves along the path as in a conventional board game, e.g. Ludo (see Fig. 1). A computer, operated by the examiner, is used to direct the game and provides the number of moves for each turn (similar to the use of a dice). This appears to operate at random but, unknown to the participant, this has been fixed in advance in order to standardise the number of moves made by each participant.

There are 40 boards in the test: one 'Start' and one 'End' board; 18 risk-taking boards where the participant is required to choose between the low-, medium- or high-risk routes (including 6 buffer scenarios that are replicates and therefore excluded from the final analysis); five antisocial moral decision-making boards; five altruistic moral decision-making boards; and 10 food option boards (see Sections 2.2.1 and 2.2.2). For each board/scenario the options are explained to the participant verbally, supported by written material displayed on a card. After completing the 40 boards/scenarios, the participant is informed that the mission has been completed (the 'End' board depicts the fellow 'agent' waiting for the message).

The participant is asked to respond as he would in normal life when having to make important decisions. In order to encourage this, the game requires the participant to multi-task under pressure by introducing two 'distractions': a time distractor and an energy distractor. Both are presented as on-screen indicators and the participant is instructed to monitor their time efficiency and keep track of energy levels. The Energy Indicator decreases proportionally to the moves taken. At various intervals the participant has the opportunity of replenishing energy by choosing to 'collect' food parcels when this is presented in the food option board/scenarios.

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