



Short Communication

Compensation method affects risk-taking in the Balloon Analogue Risk Task

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ARTICLE INFO

Article history:

Received 23 September 2013

Received in revised form 4 February 2014

Accepted 6 February 2014

Available online 13 March 2014

Keywords:

Balloon Analogue Risk Task

Compensation

Participant payment

Risk-taking

Motivation

ABSTRACT

Different participant compensation methods may have discrepant effects on decision-making in behavioral measures of risk-taking. Participants in clinical samples tend to receive session-based payment (often in conjunction with decision-based payment), whereas participants in student samples generally receive decision-based payment or no payment at all. This study examined the effect of different methods of participant payment on a behavioral measure of individual differences in risk-taking. Participants completed the Balloon Analogue Risk Task (BART) as well as questionnaire measures of sensation-seeking and impulsivity. Participants who received session-based payment engaged in significantly greater risk-taking in the BART compared to those who were paid based on their decisions and those who were not paid at all (i.e., those who were only compensated with course credit). These effects were not influenced by age, gender, sensation-seeking or impulsivity. These findings provide evidence that different compensation methods significantly influence participants' risk-taking propensity as measured by the BART.

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1. Introduction

People exhibit substantial individual differences in risk-taking propensity. These individual differences are a product of both variability in personality traits (e.g., sensation-seeking, impulsivity; reviewed in Zuckerman, 2007), and variability in situational and/or environmental circumstances (e.g., conditions of need; Mishra & Lalumière, 2010). Other factors such as age and gender have also been consistently associated with risk-taking: On average, men tend to engage in greater risk-taking than women (Byrnes, Miller, & Schafer, 1999), and younger people tend to engage in greater risk-taking than older people (e.g., Steinberg, 2007).

1.1. The Balloon Analogue Risk Task

The Balloon Analogue Risk Task (BART) is a behavioral laboratory measure of individual differences in risk-taking (Lejuez et al., 2002). The BART is a computer-based task in which participants pump up an animated balloon, with a monetary reward for each pump. At any point the participant may decide to collect their earnings, at which point the accumulated cash is saved in a cumulative bank. However, each balloon is set to explode at random,

with the result of loss of all money accumulated for that balloon. Therefore, while each additional pump increases the reward associated with a particular balloon, it also increases the risk that it will explode and all accumulated money will be lost. Risk-taking in the BART is quantified by the average number of pumps delivered in balloons that did not pop (Lejuez et al., 2002).

Risk-taking in the BART has been associated with numerous forms of real-world risk-taking. People with conduct disorder and substance use disorder engage in greater risk-taking in the BART (Crowley, Raymond, Mikulich-Gilbertson, Thompson, & Lejuez, 2006), as do users of cigarettes, alcohol, and other illicit drugs (e.g., Lejuez et al., 2003; Fernie, Cole, Goudie, & Field, 2010). In adolescents, BART scores have been associated with such real-world risky behaviors as cigarette, alcohol and drug use, gambling, aggression, and sexual risk-taking (Lejuez, Aclin, Zvolensky & Pedulla, 2003; Lejuez, Simmons, Aclin, Daughters, & Dvir, 2004). The BART has also been associated with individual differences in personality. Risk-taking in the BART has been positively associated with trait impulsivity and sensation-seeking in student and community populations, although inconsistently (reviewed in Lauriola, Panno, Levin, & Lejuez, 2014).

1.2. Compensation and risk-taking

Participants in experimental studies are typically compensated with course credit (in research involving student populations) or

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monetary payment. Studies involving student populations tend to utilize course credit, whereas monetary payment is more commonly used for clinical and community samples. In most studies involving monetary compensation, payment is session-based and contingent on the simple completion of a study. However, in decision-making studies, monetary payment is typically based on participants' actual decisions during experimental tasks (often in conjunction with session-based payment). Differences in compensation method may influence experimental outcomes, especially in studies involving decision-making tasks.

In the present study, we examined whether different compensation methods affected risk-taking in the BART. Three groups of participants completed the BART and questionnaire measures of individual differences in trait impulsivity and sensation-seeking. The first group was given monetary compensation based only on actual decisions made in the BART. The second group received payment for completing the entire experimental session, as well as payment for actual decisions made in the BART. The third group was given no monetary compensation, but received course credit. We also measured individual differences in impulsivity and sensation-seeking given evidence linking these traits to risk-taking in the BART (Lauriola et al., 2014).

In general, people are more sensitive to losses than gains: if the only money they will receive is that which is banked during the BART, they are likely to adopt a loss-averse strategy and cash in their balloons earlier rather than risk an explosion by continuing to try and earn more money (Fukunaga, Brown, & Bogg, 2012). Participants who were paid for their actual decisions on the BART should therefore engage in relatively lower risk-taking because high levels of risk-taking would lead to unnecessary exposure to loss. Participants who were paid a flat-rate amount for completing the experimental session have nothing to lose. They are guaranteed payment no matter how they respond in the BART, and are free to act as risk-prone as desired because there is no possibility of loss. Participants who were paid a flat rate for experimental participation should therefore engage in relatively higher risk-taking. Finally, participants who are not paid at all should also perceive themselves as having nothing to lose and engage in relatively higher risk-taking.

2. Materials and methods

2.1. Participants and conditions

Participants were 125 men and 157 women (Age: $M = 20.8$, $SD = 2.9$). All participants completed a brief biographic questionnaire, the Balloon Analogue Risk Task (BART), and two measures of individual differences in personality associated with risk-taking (described in detail below). Participants also completed other measures that were unrelated to the present study. The order of measure presentation was randomized for each participant. Participants were in one of three conditions. In the no payment condition ($N = 50$: 24 men, 26 women), participants received no payment for participating in the study nor did they receive any payment from decisions made in the BART. Participants did, however, receive course credit for their participation. In the session payment condition ($N = 117$: 43 men, 74 women), participants received \$30 for participating in the study and received payouts from decisions made in the BART. This condition best represents the most common compensation structure for decision-making studies involving clinical populations (and is thus more ecologically valid). In the decision payment condition ($N = 115$: 58 men, 57 women), participants only received payments from decisions made in the BART. Participants in the decision payment condition were also included in Mishra and Lalumière (2010).

The three conditions in this study were derived from three separate studies, and as such, the present investigation represents a small meta-analysis. We note that all three conditions were run under very similar conditions: All participants were run in the same lab using a standardized computer-based data collection procedure for individual differences in personality and behavioral measures of risk-taking. All conditions also used the same group of participants (undergraduate students at a small Western Canadian university).

2.2. The Balloon Analogue Risk Task

Participants saw a computer screen with a deflated balloon and a "PUMP" button. Each pump of the balloon increased participants' earnings by one cent, and increased the degree to which the balloon was inflated. The balloon was set to pop randomly, with 65 pumps required on average before popping. If the balloon popped, participants lost all money gained for that trial. Participants could end a trial at any time by clicking on a "COLLECT" button. Thirty trials were presented. The average number of pumps for all trials where the balloon did not pop was computed (as in Lejuez et al., 2002), as was the total number of popped balloons in the BART trials. Depending on condition, participants received their earnings from the BART following completion of the task.

2.3. Risky personality measures

2.3.1. Zuckerman's Sensation-Seeking Scale (SSS-V)

The SSS-V consists of 40 choices between paired statements regarding preferences for varied, stimulating experiences and disinhibited behavior (e.g., "A sensible person avoids activities that are dangerous" versus "I sometimes like to do things that are a little frightening"; Zuckerman, 1994). A total score was obtained by summing the number of high sensation-seeking choices.

2.3.2. Eysenck's Impulsivity Scale (EIS)

The EIS (Eysenck, Pearson, Easting, & Allsopp, 1985) consists of 19 yes/no statements about impulsive behaviors (e.g., "Do you often buy things on impulse?"). A total score was obtained by summing the number of "yes" answers.

3. Results

3.1. Replication of previous findings

A large body of research has shown that compared to women, men engage in greater risk-taking and possess higher levels of risky personality. In our sample, men showed greater risk-taking than women on the BART, although this finding was marginally non-significant, $t(280) = 1.79$, $p = .075$ (men: $M = 39.24$, $SD = 17.03$; women: $M = 35.84$, $SD = 14.88$). Furthermore, we found that compared to women, men reported significantly higher levels of impulsivity, $t(280) = 1.98$, $p = .048$ (men: $M = 7.80$, $SD = 4.15$; women: $M = 6.81$, $SD = 4.20$), and sensation-seeking, $t(280) = 5.97$, $p < .001$ (men: $M = 23.04$, $SD = 6.23$; women: $M = 18.76$, $SD = 5.76$), consistent with previous findings. Finally, we found that risk-taking in the BART was significantly correlated with sensation-seeking, $r = .16$, $p = .008$, but not with impulsivity, $r = .047$, $p = .43$. This pattern of correlations has been found in other non-clinical samples (reviewed in Lauriola et al., 2014).

3.2. Compensation and risk-taking in the BART

Across the three conditions, participants did not significantly differ on impulsivity or sensation seeking (both F s $< .46$, $ps > .63$).

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