Personality and Individual Differences 99 (2016) 308–312

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Are rash impulsive and reward sensitive traits distinguishable? A test in young adults

Adrienne L. Romer [a,*], Valerie F. Reyna [b,1], Seth T. Pardo [c]

[a] Department of Psychology and Neuroscience, Duke University, Sociology-Psychology Building, 417 Chapel Drive, Durham, NC 27708, United States
[b] Department of Human Development, Martha Van Rensselaer Hall, Cornell University, Ithaca, NY 14850, United States
[c] San Francisco Department of Public Health, 25 Van Ness Ave., San Francisco, CA 94102, United States

ARTICLE INFO

Article history:
Received 20 January 2016
Received in revised form 5 May 2016
Accepted 12 May 2016
Available online 21 May 2016

Keywords:
Risk-taking
Rash impulsivity
Reward sensitivity
Adolescence and young adulthood

ABSTRACT

Adolescents and young adults are characterized as prone to risky behavior with a wide range of traits identified as predictors of individual differences in this behavior. Here we test a crucial difference between traits that reflect *rash impulsivity*, the tendency to engage in risky behavior without consideration of consequences, versus *reward sensitivity*, the tendency to be attracted to novel and rewarding experience. To test the validity of this distinction, we examined the factorial structure of eight risk-related traits in a sample of 899 18 to 22 year-olds. We predicted that rash impulsive traits would be separable in structure from reward sensitive traits and would uniquely predict relatively maladaptive risk-taking (e.g., drug use). In addition, we predicted that reward sensitive traits would be related to both adaptive (e.g., entering competitions) and maladaptive risk behaviors. Results revealed a factorial structure that distinguished these traits, with rash impulsive and reward sensitive traits uniquely predictive of different forms of risk-taking. The results suggest that it is possible to distinguish traits that reflect these two forms of risk-taking with implications for the measurement and interpretation of risk propensities in youth.

1. Introduction

Adolescence and young adulthood are transition periods characterized by elevated risk-taking behaviors relative to later adulthood (Arnett, 1992). One common neurobiological explanation for this increase in risk-taking is that the prefrontal cortex, which supports cognitive control, is underdeveloped in comparison to reward processing brain regions that motivate impulsive behavior (Galvan et al., 2006; Steinberg, 2008). Despite potential developmental differences between adolescents and adults, not all forms of reward-seeking are impulsive. A two-factor model posits that some forms may be better characterized as *reward sensitive*, which can be distinguished from *rash impulsiveness*, defined as the inability to control oneself when engaging in rewarding activities, despite potential negative consequences (Dawe, Gullo, and Loxton, 2004; Dawe and Loxton, 2004; Reyna et al., 2011). Reward sensitivity is defined as a more general tendency motivated by the dopamine reward system to seek novel and exciting experiences (Dawe and Loxton, 2004; Wahlstrom, Collins, White, and Luciana, 2010). However, the reward system is also a source of rash impulsiveness (Buckholtz et al., 2010; DeYoung, 2013), which makes it difficult to separate these two risk-taking tendencies.

Distinguishing these two tendencies has important implications for designing interventions (Reyna and Farley, 2006; Romer et al., 2011). Individuals guided by the prospect of achieving rewarding goals may weigh the benefits of risky behavior more heavily than the costs, making them more attracted to such behavior (Reyna and Farley, 2006). For others, heightened activation of the reward system may be accompanied by reduced ability to control risk-taking, and these individuals may be better characterized as exhibiting rash impulsive tendencies.

Consistent with the theoretical distinction between reward sensitive and rash impulsive personalities, one would expect differences in their typical forms of risk-taking behaviors. Although risk-taking can be maladaptive and lead to poor outcomes, some risk-taking can serve adaptive purposes (Pfeifer and Allen, 2012). For example, entering a competition can be considered a risky activity that could result in failure. Yet, such risk-taking is more adaptive than, for example, repeatedly engaging in unprotected sex or using drugs, and may be important for attaining achievement-oriented goals. Thus, the reward system can serve both as a vulnerability for maladaptive risk-taking outcomes (e.g., STD from unprotected sex) as well as an opportunity for adaptive outcomes (e.g., winning an award in a competition) (Telzer, 2016). What determines which of these goals individuals typically pursue may depend on their ability to regulate this system when faced with risks that may lead to poorer outcomes (Telzer, 2016; Wahlstrom et al., 2010).

* Corresponding author at: Department of Psychology and Neuroscience, Duke University, 417 Chapel Drive, Durham, NC 27708-0086, United States.
E-mail address: alr42@duke.edu (A.L. Romer).
[1] Department of Human Development, Martha Van Rensselaer Hall, Ithaca, NY 14850.

http://dx.doi.org/10.1016/j.paid.2016.05.027
0191-8869/

Below we review eight reward-seeking traits that are hypothesized to reflect reward sensitivity or rash impulsiveness and their associations with different forms of youth risk-taking.

1.1. Reward sensitivity

The behavioral activation system (BAS) has been identified as the neurobiological system underlying reward sensitivity and activation of dopaminergic pathways (Carver and White, 1994; Gray, 1981). Three subscales assess subtraits within the BAS: *reward responsiveness* ("positive responses to the occurrence or anticipation of reward"); *drive* ("persistent pursuit of desired goals"); and *fun-seeking* ("desire for new rewards and a willingness to approach a potentially rewarding event on the spur of the moment"). Similarly, sensation seeking (SS), the tendency to seek out novel and exciting experiences, is another trait reflecting reward sensitivity (Chambers, Taylor, and Potenza, 2003; Zuckerman, 1994), although it may reflect rash impulsiveness too (Dawe and Loxton, 2004). BAS and SS have been linked to potentially harmful risk-taking, such as drug and alcohol abuse, dangerous driving, smoking, and risky sex (Franken and Muris, 2006; Hoyle, Fejfar, and Miller, 2000; Reyna et al., 2011; Zuckerman, 1994). However, BAS also has been related to adaptive risk-taking associated with goal-striving (Alloy et al., 2012) and adaptive psychological outcomes such as greater hope (Harnett, Loxton, and Jackson, 2013) and less loneliness (Clark, Loxton, and Tobin, 2015). Similarly, SS may be related to increased working memory, IQ, and cognitive control (Dawe and Loxton, 2004; Romer et al., 2011; Zuckerman, 1994).

1.2. Rash impulsiveness

Drawing from animal research (Winstanley, Olausson, Taylor, and Jentsch, 2010), two kinds of rash impulsivity are distinguishable: impulsive action and impulsive choice. *Impulsive action* is assessed with trait batteries that focus on tendencies to act without thinking (Patton, Stanford, and Barratt, 1995). Given its high reliability, we used three subscales from Whiteside and Lynam's (2001) Urgency Premeditation Perseverance Sensation Seeking (UPPS) scale to assess different facets of impulsive action: urgency, (lack of) premeditation, and (lack of) perseverance. *Urgency* reflects acting on strong impulses often under conditions of negative affect. *Lack of premeditation* reflects acting without thinking. *Lack of perseverance* reflects the inability to stay focused on boring or difficult tasks. Alternatively, *impulsive choice* is assessed with delay discounting tasks that present choices between immediate versus delayed rewards (Kirby, Petry, and Bickel, 1999).

Both impulsive action and impulsive choice have been associated with weak executive function (Horn, Dolan, Elliott, Deakin, and Woodruff, 2003; Shamosh et al., 2008) and maladaptive risk-taking behavior, such as addiction (Magid, MacLean, and Colder, 2007; Smith et al., 2007), gambling, and drug use (Reynolds, 2006; Verdejo-Garcia, Lawrence, and Clark, 2008). Each trait has been shown to predict unique variance in alcohol use (Cyders, Flory, Rainer, and Smith, 2009; Khurana et al., 2013) and sexual initiation during early adolescence (Khurana et al., 2012).

1.3. The current study

The purpose of this study was two-fold: 1) to determine whether personality traits associated with risk-taking in young people are separable into reward sensitive and rash impulsive tendencies; and 2) to test whether reward sensitive and rash impulsive traits differentially predict adaptive versus maladaptive risk behaviors. To address these goals, we used structural equation modeling (SEM) to determine the factorial structure of the eight traits described above and their unique associations with risk-taking behaviors in a young adult sample, when many risk behaviors emerge (Willoughby, Good, Adachi, Hamza, and Tavernier, 2013).

2. Materials and methods

2.1. Participants

Eight hundred ninety-nine (28% male) students (ages 18–22, $M = 19.5$, $SD = 1.02$) at X University (temporarily blinded for review) participated in an online survey for course credit: 60% non-Hispanic white, 22.2% Asian, 6.1% African-American, 3.7% Hispanic, and 7.6% other. This study was approved by X University's Institutional Review Board (temporarily blinded for review).

2.2. Materials

2.2.1. Self-report questionnaires

Eight impulsivity-related traits were assessed with the UPPS, Brief Sensation Seeking Scale (BSSS), and Behavioral Activation Scale (BAS) (see Supplemental Table 1 for questionnaire descriptions). SS was measured using the 8-item BSSS (Hoyle, Stephenson, Palmgreen, Pugzles Lorch, and Donohew, 2002) instead of the SS subscale of the UPPS because of its ability to assess all four components of SS with a validated and shorter version of Zuckerman's (1994) scale.

2.2.2. Behavioral task

Participants also completed a behavioral delay-discounting task that measured their ability to delay gratification. Participants decided whether to choose a smaller amount of hypothetical money now or a larger amount later. The monetary amounts and delay intervals varied across items. We estimated a "discount rate" that describes a threshold at which respondents are unwilling to wait for a delayed reward. Three discount rates for small, medium, and large monetary values are defined, which were averaged to create a discount rate for each participant (Kirby et al., 1999). Kirby (2009) showed that these discount rates remained relatively stable after one year, at levels comparable to those obtained for other personality traits.

2.2.3. Self-reported risk-taking

The frequency of various types of risk-taking was assessed with the Adolescent Risk Questionnaire (ARQ) (Gullone, Moore, Moss, and Boyd, 2000). Based on a principal axis factor analysis with promax rotation (Supplemental Table 2), an alcohol use factor score including the items "underage drinking," "getting drunk," and "staying out late" was created as an alcohol-related risk measure. The items "taking drugs," "smoking tobacco," "drinking and driving," and "unprotected sex" also formed a factor of riskier substance use and sexual behavior. The remaining ARQ items did not load on meaningful factors. However, we created a composite of the items, "parachuting," "roller blading," "taekwondo," and "snow skiing" as a measure of engagement in risky sports, and "entering a competition" was used as an achievement-oriented risk-taking measure. We used these four behavior scores as measures of maladaptive (alcohol use, drugs and risky sex) versus more adaptive (sports and entering competitions) risk behaviors.

2.3. Structural equation modeling analyses

Preliminary data analysis was conducted using IBM SPSS version 21. Principal axis factor analyses with promax rotation were conducted separately with the UPPS, BSSS, and BAS scales to validate their structure as defined. Each of the scales in those batteries closely corresponded to the composition of the scales as defined in the literature (Carver and White, 1994; Hoyle et al., 2002; Whiteside and Lynam, 2001). Therefore, standard scales for the UPPS and BAS were used. The only difference between the factor structures of our scales versus the original scales was that BSSS and BAS fun-seeking items loaded together on one factor, also found by Reyna et al. (2011), which we henceforth refer to as SS.