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Neuroticism is associated with challenging experiences with psilocybin mushrooms

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ABSTRACT

Objectives: Classic hallucinogens (e.g. psilocybin and LSD) have substantial effects on perception, cognition, and emotion that can often be psychologically challenging, however we know very little regarding the source of significant individual variability that has been observed in the frequency and intensity of challenging experiences (i.e. "bad trips") with psychedelics. Previous clinical and observational literature suggests that there may be an association between neuroticism and challenging psychedelic experiences.
Methods: Data from two online surveys of challenging experiences with psilocybin were analyzed. Multivariate analysis was used to estimate the associations between total score and scores from seven sub-factors (fear, grief, physical distress, insanity, isolation, death, and paranoia) of the Challenging Experience Questionnaire (CEQ), and scale scores from the Ten Item Personality Inventory (TIPI) in Study 1 (N = 1993) and the Big Five Inventory (BFI) in Study 2 (N = 981).
Results: CEQ scores were negatively associated with emotional stability scores (the inverse of neuroticism) in Study 1 and positively associated with neuroticism scores in Study 2.
Conclusions: Neuroticism may contribute to the strength of challenging experiences with psychedelics in uncontrolled settings.

1. Introduction

Classic hallucinogens (i.e. serotonin 2A receptor agonist hallucinogens, or psychedelics), including psilocybin, have substantial effects on perception, cognition, and emotion (as reviewed in Preller & Vollenweider, 2016). Significant individual variability has been observed in the effects of psychedelics on emotional state. A wide range of emotional states can accompany a psychedelic experience, including a range from strongly positive to extremely challenging emotional states, however we know little regarding the source of this variability. The strongest lines of evidence thus far point to the roles of set (the intentions and internal state of an individual), setting (the environment) (Leary, Litwin, & Metzner, 1963; Zinberg, 1986), and personality (Dittrich, 1994; Hemsley & Ward, 1985; Studerus, Gamma, Kometer, & Vollenweider, 2012) in predicting the effects of psychedelics. The current study investigates the association between traits in the Five Factor Model (FFM) of personality, and dimensions of challenging experiences (or "bad trips") with psychedelics as measured using the Challenging Experiences Questionnaire (CEQ) (Barrett, Bradstreet, Leoutsakos, Johnson, & Griffiths, 2016).

Substantial progress has been made in understanding the relationships between personality factors and emotional experience. The FFM has emerged as a widely accepted model of the general underlying structure of personality, and it has been applied to study various aspects of psychological functioning, including emotions (John, Naumann, & Soto, 2008). Whereas extraversion (relative to neuroticism) is associated more strongly with positive emotionality, neuroticism (relative to extraversion) is associated more strongly with negative emrotionality (Costa & McCrae, 1980; John et al., 2008).

The Challenging Experience Questionnaire (CEQ) is a self-report instrument that measures dimensions of challenging experience with psychedelics that are suggested by clinical and research literature (panic or fear, grief, isolation, feeling as though one is dying, feeling insane, physiological distress, and paranoia) (Barrett et al., 2016). The CEQ has advantages over other self-report measures of the subjective effects of psychedelics, when specifically considering challenging experiences. These questionnaires, such as the Altered States of Consciousness (OAV) questionnaire (Dittrich, 1975; Dittrich, 1998), the Addiction research center inventory (ARCI) (Haertzen, 1966), or the Hallucinogen Rating Scale (HRS) (Strassman, Qualls, Uhlenhuth, & Kellner, 1994) include a broadly defined or general measure of challenging experience (such as the Dread of Ego Dissolution scale of the OAV, or the LSD scale of the ARCI), measures of psychedelic experience that are not specific to challenging or non-challenging experience (such as the scales of the HRS),

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or more focused and refined measures of some aspect of challenging experience (such as the Anxiety and Impaired Cognition and Control factors of the 5D-ASC) (Studerus, Gamma, & Vollenweider, 2010) while not including items that index the full potential range of dimensions of challenging experience (e.g. "grief").

Despite these limitations, neuroticism has been shown in the past to correlate positively with scores on the Dread of Ego Dissolution factor of the OAV in reference to altered states of consciousness that were induced by means that included psychedelic, non-psychedelic pharmacological, and non-pharmacological methods (Dittrich, 1994). Higher neuroticism scores have more specifically been linked to higher reported frequency of bad trips with psychedelics in a sample (N = 29) of poly-drug users receiving in-patient treatment for drug use disorders (Hemsley & Ward, 1985). In another study (N = 65), extroverted neurotics were shown to be more susceptible to acute negative effects of LSD than those with other personality types (Lienert & Netter, 1996). However, these studies were conducted in small samples, one of which was a sample of psychiatric patients (Hemsley & Ward, 1985). In contrast, a more recent pooled analysis found no such association between neuroticism and challenging experience (Studerus et al., 2012). In this report, 23 studies were pooled to investigate predictors of subjective effects of psychedelics. In an analysis of the 11 studies in this report that included personality measures (pooled N = 126), Studerus and colleagues found no association between psilocybin effects and the personality trait neuroticism-anxiety. This null result may be due to the fact that those with high neuroticism scores (>2 standard deviations above the mean for a normative sample) were excluded from the studies included in this pooled analysis. Thus, the pooled sample yielded neuroticism scores with a low mean and variance ("almost one SD below the mean of a normative sample") (Studerus et al., 2012). The failure to show a relationship between personality and challenging experiences in this pooled analysis may also be due to the highly controlled and structured laboratory environment that may reduce the likelihood or intensity of challenging experiences.

There is contradictory evidence from previous literature for an association between neuroticism and challenging experiences with psychedelics, and this has yet to be addressed in a large, naturalistic sample. Following is a report of analyses of questionnaire data from two online surveys of challenging experiences with psilocybin mushrooms to test the hypothesis that neuroticism is positively associated with the strength of challenging experiences.

2. Methods

2.1. Participants

2.1.1. Study 1

Responses from a total of 1993 participants who provided useable data for an online survey of challenging experiences with psilocybin (Barrett et al., 2016; Carbonaro et al., 2016) were included in the current analyses. Analysis of Study 1 data constitutes a secondary analysis of previously reported data (Barrett et al., 2016; Carbonaro et al., 2016). Participants were recruited to report on their single most psychologically difficult or challenging session or experience (worst "bad trip") via internet advertisements (70.4% of respondents indicated that they became aware of the study through websites that are frequented by individuals interested in psychedelics such as Erowid, an online information library on psychoactive substances, www.erowid.com), email invitation via emails that were sent by study staff to email distribution lists related to websites and groups that are frequented by individuals interested in psychedelics (6.6% of respondents indicated that they received an email for the survey as a member of a large email distribution list, and 5.0% of respondents indicated that they received a personal email regarding the survey from a friend), and word of mouth (6.7% of respondents indicated that they became aware of the survey via personal communication other than email, and 0.9% of respondents indicated that they heard about the survey at a conference or public presentation). 9.3% of respondents indicated that they became aware of the survey through means not otherwise specified, and 1.1% of participants indicated that they preferred not to indicate how they became aware of the survey. Participants in Study 1 were not provided compensation. Participants were included if they endorsed having had a difficult or challenging experience (i.e. a "bad trip") after ingesting an active dose of psilocybin mushrooms that produced moderate to strong psychoactive effects. Participants were excluded who did not read, write, and speak English fluently, who were <18 years of age at the time of completing the survey, who were not between the age of 18 and 70 years old at the time of the reported challenging experience, who encountered their challenging experience in the context of a research study, who were reporting on the experience of another person, who attributed their challenging experience to another substance in addition to psilocybin, or who reported having already completed the survey. Participants were also excluded if free-response comments provided at the end of the survey raised concerns about the validity of their reports. Participants were asked to refrain from completing the survey more than once.

2.1.2. Study 2

Responses from a total of 981 participants who provided useable data for an online survey of challenging experiences with psilocybin mushrooms (Barrett et al., 2016) were included in the current analysis. Participants were recruited in a fashion similar to Study 1. 61.3% of respondents indicated that they became aware of the study through a website. 4.7% of respondents indicated that they received an email for the survey as a member of a large email distribution list. 5.0% of respondents indicated that they received a personal email regarding the survey from a friend. 10.3% of respondents indicated that they became aware of the survey via personal communication other than email. 0.9% of respondents indicated that they heard about the survey at a conference or public presentation. 15.9% of respondents indicated that they became aware of the survey through means not otherwise specified, and 2.0% of participants indicated that they preferred not to indicate how they became aware of the survey. Respondents completed a separate online survey from the survey in Study 1. Inclusion and exclusion criteria for this survey were identical to those in Study 1. On the first page of the survey, participants were informed to not continue if they had previously completed a survey of "bad trips" or challenging experiences with psilocybin. On the second page of the survey, participants were asked to confirm that they had not previously completed this or any similar survey. Participants in Study 2 were not compensated for their participation.

2.2. Materials

2.2.1. Challenging Experience Questionnaire (CEQ; Barrett et al., 2016)

The CEQ is a 26-item questionnaire that consists of seven factors of challenging experience with psilocybin mushrooms: *fear*, *grief*, feeling of losing your sanity (*insanity*), feel as though you are dying (*death*), feelings of *isolation*, *physiological distress*, and *paranoia*. In Study 1, several hallucinogen-sensitive questionnaires from which the CEQ was derived (Hallucinogen Rating Scale, HRS; the States of Consciousness Questionnaire, SOCQ; and the 5-Dimensional Altered States of Consciousness questionnaire, 5D-ASC) were administered, and the CEQ items from these questionnaires were included in the analyses for Study 1. In Study 2, the CEQ was administered as a stand-alone questionnaire (i.e. without the additional items from the HRS, SOCQ, and 5D-ASC). Responses to the stand-alone CEQ were included in the analyses for Study 2. Strict factorial invariance has been previously demonstrated for the CEQ between the stand-alone version and the version derived from the HRS, SOCQ, and 5D-ASC within the two datasets utilized in the current analysis (Barrett et al., 2016).