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Peak Experiences of Psilocybin Users and Non-Users

Christina Cummins, B.A.^a & Jennifer Lyke, Ph.D.^b

Abstract—Maslow (1970) defined peak experiences as the most wonderful experiences of a person's life, which may include a sense of awe, well-being, or transcendence. Furthermore, recent research has suggested that psilocybin can produce experiences subjectively rated as uniquely meaningful and significant (Griffiths et al. 2006). It is therefore possible that psilocybin may facilitate or change the nature of peak experiences in users compared to non-users. This study was designed to compare the peak experiences of psilocybin users and non-users, to evaluate the frequency of peak experiences while under the influence of psilocybin, and to assess the perceived degree of alteration of consciousness during these experiences. Participants were recruited through convenience and snowball sampling from undergraduate classes and at a musical event. Participants were divided into three groups, those who reported a peak experience while under the influence of psilocybin (psilocybin peak experience: PPE), participants who had used psilocybin but reported their peak experiences did not occur while they were under the influence of psilocybin (non-psilocybin peak experience: NPPE), and participants who had never used psilocybin (non-user: NU). A total of 101 participants were asked to think about their peak experiences and complete a measure evaluating the degree of alteration of consciousness during that experience. Results indicated that 47% of psilocybin users reported their peak experience occurred while using psilocybin. In addition, there were significant differences among the three groups on all dimensions of alteration of consciousness. Future research is necessary to identify factors that influence the peak experiences of psilocybin users in naturalistic settings and contribute to the different characteristics of peak experiences of psilocybin users and non-users.

Keywords—alterations of consciousness, peak experiences, psilocybin

PEAK EXPERIENCES OF PSILOCYBIN USERS AND NON-USERS

Peak experiences are defined as the most wonderful experiences of a person's life, which may include "feelings of limitless horizons opening up to the vision, the feeling of being simultaneously more powerful and also more helpless than one ever was before, the feeling of great

ecstasy and wonder and awe, and the loss of placing in time and space" (Maslow 1970, 164). These experiences are both personally exceptional and theoretically important as they characterize moments of exceptional awareness which may be psychologically and spiritually significant and have lasting impact on behavior. In the 1960s and '70s, humanistic psychology's focus on self-actualization and the limits of human potential formed the basis for the positive psychology movement, which has continued to gain popularity since the 1990s.

During the same time period, psychoactive substances known to produce exceptional experiences, such as psilocybin, have re-entered the research stage as empirical studies have resumed investigating how psychoactive substances facilitate non-ordinary experiences. Psilocybin is a naturally occurring alkaloid compound categorized as

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a psychoactive tryptamine that is found in some species of mushrooms and is known to produce a range of alterations in consciousness from sensory-aesthetic experiences to heightened spiritual understanding which may have persistent effects on attitudes and behavior (Richards 2008). Historically, psilocybin may have been used for thousands of years by various cultures to achieve transcendent states of consciousness (Wasson 1980) and early research suggested similarities between psilocybin-induced experiences and mystical states described in religious literature (Pahnke & Richards 1969).

However, the mechanism by which psilocybin induces this state of transcendence is not fully understood. Studies have suggested that psilocybin interacts with the specific serotonin receptor 5-HT_{2A} as opposed to LSD (lysergic acid diethylamide), which interacts with dopamine and serotonin (Hasler et al. 2004; Passie, Siefert, Schneider & Emrich 2002). Some researchers believe that as a result of psilocybin's interaction with the 5-HT_{2A} receptor, the drug increases the activation of the prefrontal cortex (Carter et al. 2005) and produces visual hallucinations by modulating visual processing (Kometer et al. 2011).

Regardless of the mechanism, recent studies have shown that psilocybin users exhibit a heightened sense of spirituality and transcendence compared to non-psilocybin users (Griffiths, Richards, McCann & Jesse 2006; Hasler et al. 2004; Lerner & Lyvers 2006). The Griffiths et al. (2006) study is particularly important in that it has shown that psilocybin can induce personally significant experiences under experimentally controlled conditions. As the first double-blind, placebo-controlled study of the effects of a hallucinogen in 40 years (Nichols 2006), the details bear repeating. Thirty psilocybin-naïve participants in a hospital setting received either methylphenidate or psilocybin in counterbalanced order two months apart. Seven hours into each drug experience, they completed several questionnaires evaluating their subjective experiences. The results found that 67% of the participants rated the psilocybin experience among the top five most meaningful experiences of his or her life. Subjective changes included positive attitude about life and/or self, positive mood change, positive behavior change, and altruistic social effects. These changes were also independently verified by people from the participants' lives. Furthermore, Griffiths et al. (2008) have shown that the results have persisted for the original participants up to 14 months after the experience. Together these studies demonstrate the potential significance of a psilocybin experience on first-time users in an experimental setting.

However, experimental research has not investigated the significance of a psilocybin experience for recreational users. Set and setting are important factors in drug experiences (Faillace & Szara 1968) and recreational psilocybin users vary greatly in both. It is important, therefore, to investigate whether recreational psilocybin

users in naturalistic settings also subjectively report their drug-related experiences to be personally meaningful or spiritually significant.

In addition, characteristics of individuals who recreationally use psilocybin may differ from those who do not. For example, Lerner and Lyvers (2006) compared the values, beliefs, and empathy of hallucinogen users, users of other illicit drugs, and non-illicit-drug users. Their results indicated that hallucinogen users scored significantly higher on spirituality and concern for others and lower on the value of financial prosperity than the other groups. Participants who preferred hallucinogens scored significantly higher on characteristic mystical beliefs (e.g., the illusory nature of physical existence, the existence of a transcendental reality, etc.) than both the non-users and the users of other illicit drugs. As correlational findings, these results could suggest that hallucinogen use induces such mystical beliefs or spiritual values, or that hallucinogen users may be predisposed to more mystical beliefs than users of other drugs. More research is needed to better clarify the causes and effects of differences between hallucinogen users and non-drug users.

A final area of research that is important to understanding the experiences of psilocybin users involves investigating the subjective changes in consciousness that result from ingestion. The most recent of these studies is a double-blind, placebo-controlled study by Hasler et al. (2004), who evaluated effects of various doses of psilocybin on eight volunteers. One of the most strongly reported psychological alterations was oceanic boundlessness, which is described as "derealization and depersonalization phenomena associated with positive emotional states" (Hasler et al. 2004, 146). A significant increase was also found in excitability, dreaminess, and introversion in those administered the highest dose. The majority of participants reported an overall "pleasurable" and "magic" experience (Hasler et al. 2004, 148). Although this study also provides generally positive subjective feedback from participants, participants were not asked to report the significance of his or her psilocybin trial compared to other life events.

If psilocybin naïve participants report their laboratory experience with psilocybin to be among the most significant of their lives, then it is possible that many recreational users of psilocybin consider their peak experiences to have occurred while they were under the influence of psilocybin. To supplement experimental research on the effects of psilocybin, naturalistic studies are also necessary to confirm that psilocybin has similar effects under less artificial conditions. Toward that end, this study investigated the peak experiences reported by three groups: participants who reported a peak experience while under the influence of psilocybin (psilocybin peak experience: PPE), participants who had used psilocybin but reported their peak experiences did not occur while they were under the influence of psilocybin (non-psilocybin peak experience:

NPPE), and participants who had never used psilocybin (non-user: NU). There were two goals of this research. The first was to determine what proportion of psilocybin users recalled their peak experience to have occurred while under the influence of psilocybin. The second goal was to investigate whether there would be significant differences in the characteristics of the peak experiences reported by the three groups. It was hypothesized that the majority of psilocybin users would report their peak experiences as having occurred while under the influence of psilocybin. It was also hypothesized that psilocybin users would describe their peak experiences as involving a significantly higher degree of consciousness alteration compared to non-users.

METHOD

Participants

Participants in this study were recruited through convenience sampling and snowball sampling. Recruitment of some participants occurred in undergraduate classes at a small, public college in the Northeast. Recruitment of other participants took place at a musical event that many psilocybin users attend. Flyers soliciting participation were handed out throughout the four-day event. Those who were given a flyer had the option to record their e-mail address on a sign-up sheet in order to receive a link to the questionnaire in an e-mail.

Instruments

A two-part questionnaire was used to gather data. A qualitative demographic section required participants to report their age, gender, religion, and race. There were four questions in this demographic section referring to psilocybin use. Participants were asked to report if they had ever used psilocybin, how often they currently use the drug, how many times they had ever used psilocybin, and the approximate date of the last time they used the drug.

Aussergewohnliche Psychische Zustände (APZ; Dittrich 1998). The APZ is a standard measure for assessing altered states of consciousness. This is a 72-item questionnaire that asks participants to answer yes or no to statements such as "Time passed faster than usual." The APZ measures four factors of altered states of consciousness: oceanic boundlessness (OB), dread of ego dissolution (DED), visionary restructuralization (VR), and global scale assessing overall alteration of consciousness (ASC). OB is described as a mystical or transcendent positive subjective experience. DED assesses the participants' negative experiences. VR assesses visual hallucinations and synesthesia (the crossover of senses; e.g., smelling a color). ASC is a combined total scale. Dittrich (1998) examined six studies that used the APZ to establish reliability and validity of the measure.

Procedure

The questionnaire was administered online to all participants. Participants were required to check a box indicating their informed consent before the other instruments were presented. Participants were then instructed to think about a peak experience, which was defined to participants as the best experience or group of experiences in their life. Instructions emphasized that this experience could have occurred at any time or in any situation. Examples provided included significant life events, flow states, religious or mystical experiences, paranormal experiences, and drug-related experiences. Participants were then instructed to complete the APZ in reference to the way they recalled feeling during their peak experience.

Finally, an additional question referred to the timing of participant's peak experience. Specifically, participants were asked if the peak experience they just described occurred during a psilocybin-induced state; a yes or no answer was required. They were also asked whether they were under the influence of any other drugs at the time of the peak experience.

RESULTS

Descriptive Statistics

A total of 101 participants were recruited from both the undergraduate sample and the music festival. Of these, 71% were female and 29% were male. Participants ranged in age from 18 to 55 ($M = 24.47$, $SD = 5.82$). The sample was 82% Caucasian, 7% African American, 6% Hispanic, 3% Asian, and 2% Other. The religious background of the sample was 66% Christian, 1% Jewish, 1% Muslim, 23% None, and 9% Other. Sixty-six percent of the sample reported that they had never used psilocybin, whereas 34% reported that they had.

Of the participants who reported having used psilocybin, 16 (47%) reported their peak experience occurred while under the influence of psilocybin, while 18 (63%) reported that it was not. However, four of those who reported that their peak experience occurred during psilocybin use also reported using other drugs at the same time, so they were eliminated from further analyses.

Although psilocybin users did not differ significantly from non-users in age ($t(95) = -.78$, $p > .05$), there were significantly more male psilocybin users than non-users ($\chi^2(1) = 8.43$, $p < .01$). Analyses of PPE, NPPE, and NU groups matched on gender did not differ significantly from the full sample, so results from the full sample are reported here (see Table 1).

MANOVA

A multivariate analysis of variance (MANOVA) was conducted to determine whether characteristics of peak experiences (OB, DED, VR, and ASC) differed significantly between the PPE, NPPE and NU groups. Results

TABLE 1
Descriptive Statistics for Dependent Variables for Each of the Three Groups

Variable	NU		NPPE		PPE	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
OC	5.13	3.70	7.67	2.70	8.33	1.88
DED	3.34	4.20	2.94	2.34	6.58	4.36
VR	2.99	3.01	6.78	3.64	9.58	2.61
ASC	5.01	4.48	6.61	3.97	9.67	3.31

revealed that the three groups differed significantly on the combined dependent variable, Wilks' $\Lambda = .52$, $F(8, 182) = 8.95$, $p < .001$, multivariate $\eta^2 = .28$. Analysis of variance (ANOVA) was conducted on each dependent variable as a follow-up test to MANOVA. These analyses indicated that the three groups differed significantly on each of the four dependent variables (OB: $F(2, 94) = 7.31$, $p < .01$, partial $\eta^2 = .14$; DED: $F(2, 94) = 3.80$, $p < .05$, partial $\eta^2 = .08$; VR: $F(2, 94) = 29.20$, $p < .001$, partial $\eta^2 = .38$; ASC: $F(2, 94) = 6.35$, $p < .01$, partial $\eta^2 = .12$).

Post-hoc tests (LSD) indicated that both PPE and NPPE groups reported significantly more oceanic boundlessness than the NU group, but PPE and NPPE groups did not differ significantly. The PPE group reported significantly higher levels of dread of ego dissolution than the NPPE or NU groups, although the NPPE and NU groups did not differ significantly. All groups differed significantly in their reports of visionary restructuration, with the PPE group significantly higher than the NPPE group, which was also significantly higher than the NU group. Finally, the PPE group reported significantly more total alteration in consciousness compared to the other two groups, which did not differ significantly. Figures 1–4 present the estimated marginal means for each dependent variable for each of the three groups.

DISCUSSION

One purpose of this study was to assess the frequency of peak experiences occurring under the influence of psilocybin. As predicted, a majority of psilocybin users reported that their peak experience occurred during psilocybin use. In conjunction with the experiments done by Griffiths et al. (2006, 2008), this finding indicates that some people using psilocybin in natural environments have meaningful experiences just as they report in the laboratory. Interestingly, the proportion of psilocybin users in this sample who reported their peak experience to have occurred while using psilocybin (47%) was substantially lower than the proportion of participants in the Griffiths et al. study (2006) who reported a full-blown mystical experience induced by psilocybin (61%). It is possible

FIGURE 1
Estimated Marginal Means of Oceanic Boundlessness for Each of the Three Groups

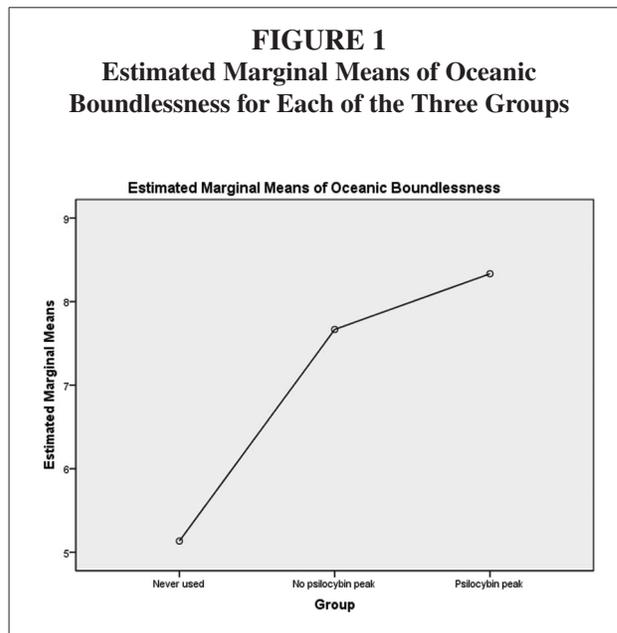


FIGURE 2
Estimated Marginal Means of Dread of Ego Dissolution for Each of the Three Groups

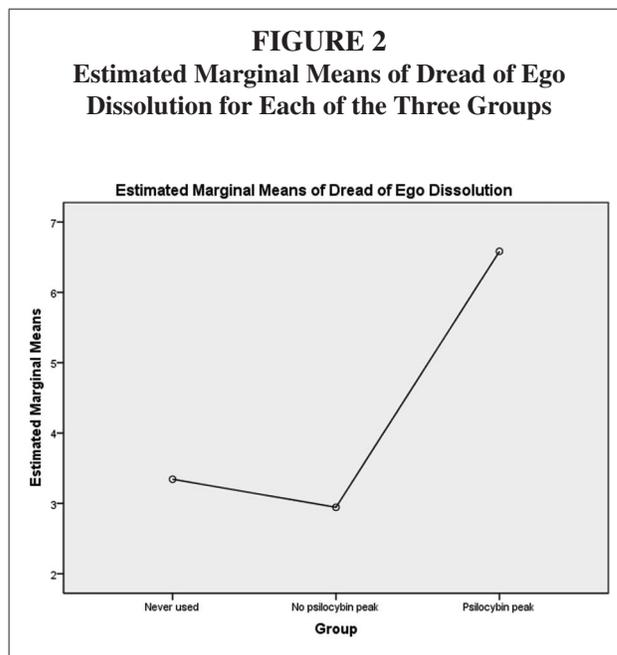


FIGURE 3
Estimated Marginal Means of Visionary Restructuralization for Each of the Three Groups

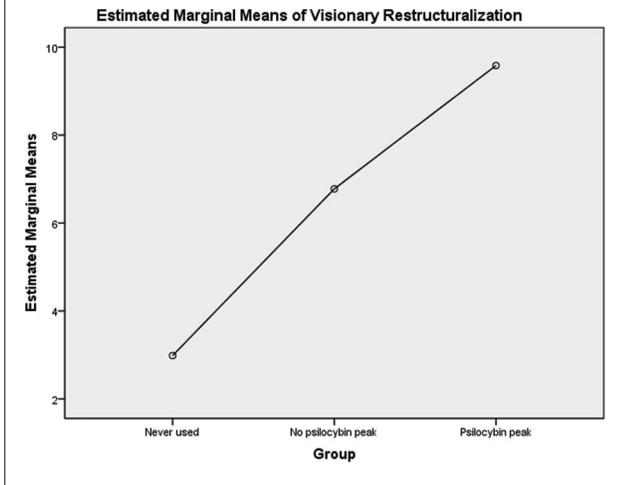
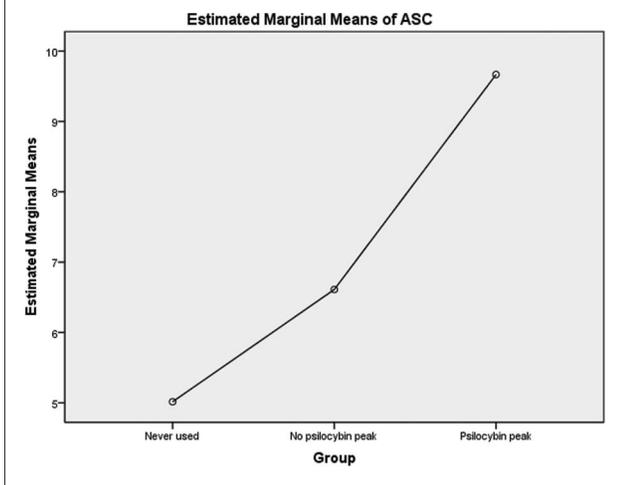


FIGURE 4
Estimated Marginal Means of Altered State of Consciousness for Each of the Three Groups



that the discrepancy is due to the fact that participants in Griffiths et al.'s study were selected on the basis of having a regular spiritual practice, but other sources of variability could also be responsible, such as the uncontrolled environments for the peak experiences in this study. Future research focused on psilocybin-related peak experiences in naturalistic settings should also attempt to determine whether these experiences share characteristics of mystical experiences described by Pahnke and Richards (1969) and reported by Griffiths et al.'s

participants, or whether they differ in some qualitative way. In addition, future research could gather more information about when the peak experience occurred in order to assess retrospectively how long the effects may last.

The second purpose of this study was to compare the perceived degree of alteration of consciousness during the peak experiences of psilocybin users whose peak experience occurred while under the influence of psilocybin, psilocybin users whose peak experience did not occur under the influence of psilocybin, and non-users of psilocybin.

Results confirmed that both groups of psilocybin-users experienced a higher degree of oceanic boundlessness in their peak experiences compared to non-users, regardless of whether their peak experiences occurred under the influence of psilocybin. Due to the descriptive nature of this research, it is impossible to assess whether personality characteristics, psilocybin use, or other factors make psilocybin users generally more prone to oceanic boundlessness than non-users. However, future research should consider longitudinal designs that could clarify the causal relationships among these variables.

A second result indicated that participants whose peak experiences occurred under the influence of psilocybin experienced significantly more fear of ego dissolution than either of the other two groups. This finding may reflect the specific effects of psilocybin on the serotonin 5-HT_{2A} receptors in the brain. However, it is interesting that the fear of ego dissolution experienced during these peak experiences was not sufficient to make them so uncomfortable that they were not still considered the most wonderful experience of the participant's life.

Visionary restructuralization also differed significantly among all the groups. While the high score of participants reporting their peak experiences occurred while under the influence of psilocybin makes intuitive sense given the hallucinogenic properties of psilocybin, possible reasons for the difference between the other two groups are less clear. Perhaps future experimental research can identify the direction of causality between psilocybin use and a tendency toward visionary restructuralization experiences.

Finally, the total estimation of alteration of consciousness was greatest for psilocybin-using participants who reported their peak experiences occurred under the influence of psilocybin. While it is tempting to attribute this difference to the direct effects of the drug, this study did not gather information about other circumstances that might have been relevant to the peak experiences of the other two groups. Future research investigating peak experiences could gather more information about the characteristics that make them valued by the experimenter.

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In addition, future research into this topic may utilize different methodology. For example, personal interviews of a larger and more diverse population of participants could produce interesting qualitative results. The primary limitation of the present study is that the data depends on the retrospective self-report of participants, so participants may have inaccurately characterized their experiences, especially given that the experiences occurred in the past. In addition, participants may have inaccurately represented the drug or combination of drugs they ingested prior to their peak experiences.

Finally, the convenience and snowball sampling techniques may not have produced representative samples of psilocybin users or non-users. Replication of these findings would therefore help establish generalizability. However, it is significant that the majority of recreational psilocybin users experienced their peak moments while using the drug. These results add to the understanding of peak experiences generally, and especially the nature of peak experiences of psilocybin users, but more work is necessary to fully understand how peak experiences differ between psilocybin users and non-users.

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