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The revival of the psychedelic experience scale: Revealing its extended-mystical, visual, and distressing experiential spectrum with LSD and psilocybin studies

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Abstract

Background: Research with the Psychedelic Experience Questionnaire/Scale (PES) focuses on questions relating to mystical experience (Mystical Experience Questionnaire (MEQ)). The psychometric potential of the non-MEQ items of the PES remains largely unexplored.

Aims: We investigated whether the PES also yields subscales besides the MEQ30 subscales.

Methods: Data from 239 PES measurements (140 healthy participants) from six studies with moderate to high doses of lysergic acid diethylamide and/or psilocybin were included. New subscales (with items other than MEQ30) were created and validated as follows: (1) theoretical derivation of candidate items; (2) removal of items with rare experiences; (3) exploratory factor analysis; and (4) confirmatory factor analysis. Correlations of subscales within the PES and between the PES and the 5-Dimensional Altered States of Consciousness Scale (5D-ASC) were performed. In addition, a cluster analysis using all items (except rare experiences) was performed.

Results: The reliability of the four original factors of the MEQ30 was confirmed and four additional factors for the non-MEQ items were revealed: paradoxicality, connectedness, visual experience, and distressing experience. The first two additional factors were strongly correlated with the MEQ30 mystical subscale. Adding the new subscales to the MEQ30 subscales increased the explained variance with the 5D-ASC. The cluster analysis confirmed our main results and provided additional insights for future psychedelic psychometrics.

Conclusion: The study yields a new validated 6-factor structure for extended mystical experience (MEQ40: MEQ30 + Paradoxicality + Connectedness) and covers psychedelic experience as a whole more comprehensively than has hitherto been possible within a single questionnaire (PES48). The entire PES (PES100) can also be used for further future psychedelic-psychometric research.

Keywords

Psychedelic experience, mystical experience, LSD, psilocybin, psychometrics

Introduction

This article is about bringing an old—in its entirety largely forgotten—thematically rich questionnaire on the psychedelic experience of the 1960s back to life: the Psychedelic Experience Questionnaire of Walter Pahnke and William Richards (first published in Richards, 1975). While this questionnaire has also been referred to with the abbreviation “PEQ” we will modestly rename this questionnaire “Psychedelic Experience Scale.” This will allow us to use the abbreviation “PES” for this questionnaire, as the abbreviation “PEQ” is contemporarily already used in psychedelic science as an abbreviation for the “Persisting Effects Questionnaire” (Griffiths et al., 2011), a modern adaptation of an old psychedelic-experience follow-up questionnaire (Pahnke, 1963, Appendix D). Why revive a scale from the 1960s in the first place? With a literature-based theoretical examination of this questionnaire’s content that is coupled with modern factor analyses, we hope to show that the PES covers the psychedelic experience with a conceptual breadth and depth that remains unmatched to this day when it comes to capturing the psychedelic experience

as comprehensively and concisely as possible within a single questionnaire. Furthermore, the mystical-experience part of this overall 100-item questionnaire—often referred to as the Mystical Experience Questionnaire that contains either 43 (MEQ43) or 30 (MEQ30) of the PES items—is still used today as a state-of-the-art measurement for acute psychedelically induced mystical experience (Barrett and Griffiths, 2018; Barrett et al., 2015; Griffiths et al., 2006; MacLean et al., 2012). Hence, it is a

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conceivable possibility (and our hypothesis) that the analysis of the non-MEQ43/30 items of the PEQ might also stand the test of time and bring forth still more relevant essential aspects of the psychedelic experience—aspects that go beyond the MEQ43/30.

Furthermore, no matter how comprehensive any current or future psychedelic-experience questionnaire will be, such a questionnaire can never replace more thematically specialized questionnaires that can be used to investigate in more depth specific aspects of the psychedelic experience such as the challenging experience questionnaire (CEQ; Barrett et al., 2016), the ego dissolution inventory (Nour et al., 2016), the emotional breakthrough inventory (Roseman et al., 2019), the psychological insight questionnaire (Davis et al., 2020), and the acceptance/avoidance-promoting experiences questionnaire (Wolff et al., 2022). Our idea is to provide with the PES a basic comprehensive questionnaire for the psychedelic experience that could always be complemented with any such thematically more specialized questionnaires.

With the term *psychedelic experience*, we refer in this article to temporary nonordinary states of consciousness that are occasioned by classic (serotonergic) psychedelics such as psilocybin, mescaline, *N,N*-dimethyltryptamine (DMT), and lysergic acid diethylamide (LSD). Exploring the thematic richness of the PES with a factor analysis, as is done in this article, might be a worthwhile endeavor because—for one reason—certain aspects of the psychedelic experience have been associated with increased subjective well-being both for healthy individuals and for individuals with certain mental disorders (Bogenschutz et al., 2015; Garcia-Romeu et al., 2015; Griffiths et al., 2006, 2008, 2016; Holze et al., 2023; Ross et al., 2016; Schmid and Liechti, 2018).

Psychologically, the nonordinary aspects of a psychedelic experience can mainly manifest at the perceptual, cognitive, affective, volitional, and somesthetic levels. The nonordinary *perceptual* spectrum ranges from visions (e.g., of patterns or beings) to the subjective experience of an all-encompassing oneness, which also transcends the distinction between the perceiver and the perceived. The nonordinary *cognitive* spectrum ranges from no longer functional thinking to very clear thinking. The nonordinary *affective* spectrum can be very rich and may include, for example, the deepest sadness as well as the highest bliss. The nonordinary *volitional* spectrum may involve the feeling of being able to at least somewhat control what is happening at will but may extend to the feeling of having no longer a will of one's own. Finally, the nonordinary *somesthetic* spectrum may, for example, extend from feelings of bodily heaviness/compression all the way to feelings of bodily lightness/floating (Dittrich, 1998; Dittrich et al., 2006, 2010; Richards, 2015; Stocker, 2022; Strassman et al., 1994).

The feeling of an all-encompassing oneness, which also transcends the distinction between the perceiver and the perceived, is often referred to as a mystical experience (Otto, 1926/1957, 1932/2016; Stace, 1960; Stocker, 2022). The psychedelically occasioned mystical experience is considered of primal importance by many psychedelic scholars because studies have shown positive associations with such experience—for example, in relation to persisting positive effects on attitudes, mood, and behavior in healthy participants (Griffiths et al., 2006, 2008; Schmid and Liechti, 2018) or recreational users (Haijen et al., 2018) and in relation to sustained symptom reduction in patients suffering from depression, anxiety, and addiction (Bogenschutz et al., 2015; Garcia-Romeu et al., 2015; Griffiths et al., 2016; Holze et al., 2023; Roseman et al., 2018; Ross et al., 2016). Nevertheless, despite the psychological and psychiatric importance of

psychedelically occasioned mystical experience, at least two things remain largely unclear in the current state of research with respect to it.

First, it is not clear how comprehensively psychedelically occasioned mystical experience is captured with currently used psychometrics. The psychedelic scholar William Richards, for instance, lists various experiential aspects (to be discussed further below) of which he proposes that they belong to a “complete” (Richards, 2015, p. 54) mystical experience which are not measured with contemporary psychological questionnaires on mystical experience.

Second—while it is well established that visual experience and distressing experience are often a part of the overall psychedelic experience (Dittrich, 1998; Richards, 2015)—it is not clear how these two experiences relate to psychedelically occasioned mystical experience. Psychedelic visual experience often involves perceiving something with a compelling sense of reality during the psychedelic state, despite the lack of a corresponding sensory stimulus, and in this meaning is often also called visionary experience (Richards, 2015; Stocker, 2022). As will be shown in more detail later, unlike in mystical experience, in the psychedelic visual experience the self-world dichotomy is not transcended, but remains largely intact (Richards, 2015; Stocker, 2022). Distressing psychedelic experience might involve (potentially constructive) confrontation with unresolved autobiographical material—such as confrontation with unresolved trauma, grief, fear, anger, or guilt—or might involve episodes of panic, paranoia, confusion, and deep distress, which might reflect an (often vain) attempt to avoid emerging inner experiences (Richards, 2015, p. 16).

This paper mainly addresses two topics: (1) investigating the possibility of a more comprehensive psychometric assessment of mystical experience and (2) investigating the possibility of the interrelatedness of mystical, visual, and distressing psychedelic experiences. We do this by reviving an old thematically rather comprehensive questionnaire on psychedelic experience: the PES of Walter Pahnke and William Richards (Richards, 1975). The two main research questions of this paper are as follows: (1) Is psychedelically occasioned mystical experience captured comprehensively in the current state of research? (2) Does visual and distressing psychedelic experience relate to mystical psychedelic experience? These questions are addressed with a PES factor analysis that includes many of the PES items. If the analysis confirms the (a priori defined) new factors, the validity of the new factors will be analyzed by a comparison of the PES factors with the factors (subscales) of the 5-Dimensional Altered States of Consciousness Rating Scale (5D-ASC; Dittrich, 1998; Studerus et al., 2010).

In the remainder of this introduction, we first lay out the relevant background information to the psychedelic-phenomenological content covered by the PES, before then presenting how we proceeded with the factor and further analyses of our data from 140 healthy participants (239 PES measurements) across six psychedelic studies with the serotonergic psychedelics LSD and psilocybin (Becker et al., 2022a; Becker et al., 2022b; Holze et al., 2020, 2021, 2022; Liechti et al., 2017).

History of the PES

The initial questionnaire of what would later be developed into the PES was developed by Walter Pahnke in work for his 1963 Harvard dissertational thesis (generally known as the “Good

Friday Experiment”) on psilocybin-occasioned psychedelic experience (Pahnke, 1963). From 1967 onward, Walter Pahnke and William Richards worked with LSD in the treatment of alcoholism, depression, end-of-life anxieties, and narcotic addiction in Baltimore at the Spring Grove Hospital Center and then at the Maryland Psychiatric Research Center. Because some of these patients also had limited education, Pahnke and Richards edited the original questionnaire to make it more generally comprehensible. Pahnke and Richards called the revised questionnaire the PES.¹ The PES was then routinely used in Baltimore (Yensen and Dryer, 1995, p. 94) until the mid-1970s—until legal and university-administrative regulations brought psychedelic research with human participants to a global halt (with a few exceptions) for more than 20 years. Richards also used the PES in his dissertation on psychedelics-assisted psychotherapy for terminal cancer patients—a *N,N*-dipropyltryptamine study. It is in this dissertation that the PES in its entirety for the first and to our knowledge only time was made available (Richards, 1975, Appendix E, pp. 271–276). This dissertation is hard to get by these days. This may be one reason why this questionnaire—in its entirety with all 100 items—has nowadays been largely forgotten in the psychedelic-scientific community.

The main modern resumption of psychedelic studies with human participants again started in Baltimore—in 1999 at the Johns Hopkins School of Medicine. This was a psilocybin study with healthy participants (Griffiths et al., 2006), an endeavor with which the PES also came back into use—first in Griffiths et al. (2006) and then also in several subsequent studies of the same research group. For this use in the modern area, Roland Griffiths and William Richards revised some of the questions and response options of the PES and renamed the PES “SOCQ (States of Consciousness Questionnaire) 100.”² The 100 items of the “SOCQ 100” were never published in their entirety, as only the 43 items that made up the MEQ43 (also referred to as the Pahnke–Richards MEQ) were published as a supplement in Griffiths et al. (2006). Thus, while many contemporary psychedelic scholars have heard the name “States of Consciousness Questionnaire,”³ and also know that it contains 100 items, they are usually only familiar with the 43 MEQ items of it, as the other 57 items are only published in a dissertation that is hard to get by (Richards, 1975). Therefore, outside of Baltimore (Johns Hopkins)—and outside of Basel (University Hospital Basel, our research group), where the entire PES has been used in a number of studies—the 57 non-MEQ items of the PES are often unknown in the contemporary psychedelic research community. One exception to this that we are aware of is the publication by the Johns-Hopkins group of the CEQ, which incorporated seven items from these 57 non-MEQ items of the PES (Barrett et al., 2016).

In some places in this manuscript where the need for a distinction arises, we refer to the PES as published in Richards (1975) as the “original PES” and the PES as revised by Griffiths and Richards for their study (Griffiths et al., 2006) and several subsequent studies of the same research group as the “slightly revised PES.”

Content of the PES

The PES’s 100 items cover the psychedelic experience in a thematically rich and rather comprehensive way. They cover, for example, mystical phenomena, visual phenomena, death-and-rebirth experiences, extrasensory impressions, lucid mental

states, age regression, distressing experiences, as well as psychotomimetic phenomena (Richards, 1975, pp. 271–276; cf. also online Supplemental Material 3).

Pahnke and Richards (1966) identified “five major types of psychological experiences [that] can occur when psychedelic drugs are being administered to human beings” (Pahnke, 1969, p. 150), as well as an additional “miscellaneous” type (Pahnke and Richards, 1966, p. 189). These overall six types are as follows: psychotic, psychodynamic, cognitive, aesthetic, mystical, and miscellaneous (e.g. psychosomatic or alleged-parapsychological) phenomena. Looking at these types of possible psychedelically occasioned psychological experiences, it becomes clear that Pahnke and Richards took care that they were all covered with the PES. Thus, the PES’s aim was always to capture the psychology of the psychedelic experience *comprehensively*. In the Discussion, we pick up these proposed six types of Pahnke and Richards (1966) again to see where they might fit into a somewhat modernized comprehensive account of the basic psychological types of the psychedelic experience.

The MEQ within the PES

Despite the thematic richness of the PES, the general habit was that only the items that were seen as belonging to “mystical experience” were scored for a questionnaire analysis (e.g., Pahnke, 1969, pp. 153–156). Thus, in the early days of first using the PES (e.g., Pahnke, 1969; Richards, 1975), as well as when using the PES again when psychedelic studies started to resurge around the turn of the millennium (Griffiths et al., 2006), only the 43 items of the PES were scored for the acute psychedelic experience that involved seven categories that closely related to the categories for describing mystical experience as they have been proposed by the philosopher Stace (1960). Stace himself went through sources of ancient and modern Hinduism, ancient Buddhism, classical paganism, Christian mysticism, Islamic Sufism, Hasidic Judaism, and modern spontaneous or psychedelically induced nonordinary states of consciousness to work out the conceptual core of the mystical experience. The seven Stace-based categories (factors) for the corresponding 43 items from the PES for “mystical experience” were as follows: internal unity, external unity, transcendence of time and space, objectivity and reality—also called “noetic quality” (cf. James, 1902, pp. 380–381)—deeply felt positive mood, sense of sacredness, and ineffability/paradoxicality (Griffiths et al., 2006; Richards, 1975).

The seven factors, respectively 43 items, of the PES that characterized Stace-based mystical experience—called the “Mystical Experience Questionnaire (MEQ43)” —were condensed to four factors in further factor analyses (mystical, positive mood, transcendence of time and space, and ineffability), an endeavor that condensed the MEQ-within-the-PES items from 43 to 30 items (Barrett et al., 2015; MacLean et al., 2012). This is today generally known as the MEQ30 (Mystical Experience Questionnaire with 30 items), and the MEQ30 is the “leftover” from what is usually internationally used of the PES today (Barrett and Griffiths, 2018).

The 70 items of the PES not considered in the MEQ30

Besides work associated with the CEQ (Barrett et al., 2016; cf. above), the only published studies we are aware of that have also analyzed some of the 57 PES items that do not represent

Stace-based mystical experience are some studies from our research group (Becker et al., 2022a; Becker et al., 2022b; Holze et al., 2021, 2022). We analyzed the PES subscales “aesthetic experience” and “nadir,” the former relating to visual experience and the latter to distressing experience. It is important to note that both of these PES subscales have (to the best of our knowledge) never been subjected to a factor analysis.

Since the 57 psychedelic items that do not directly relate to mystical experience as conceptualized by Stace (1960) have neither been analyzed by the originators of the PES—nor been analyzed in the modern reintroduction of the PES—one might assume that the psychedelic themes that are covered with these 57 items are simply not that important. However, such an assumption would be in stark contrast to the importance that some of these additional psychedelic themes of the PES are given by one of the two creators of the PES, William Richards in his 2015 book (Richards, 2015) (the other creator of the PES, Walter Pahnke, died in 1971). Richards also says that these “‘filler’ or ‘distractor’ items . . . sometimes provided interesting information for clinical interviews.”⁴ Therefore, we decided to conduct a factor analysis with as many of the 70 “filler” items as possible, to investigate whether some of these items will yield additional factors besides the four factors of the MEQ30.

General approach for our analysis of the PES

The basic spirit of our investigation was to leave the four factors of the MEQ30 within the PES intact—and to show the reliability of these four factors for the first time in German, as we used the German version of the PES⁵—and to additionally investigate whether further factor analysis with other items of the PES would result in an overall more comprehensive psychometric tool than the MEQ30 alone. Specifically, the addition of four possible factors was investigated. First, the possible addition of *paradoxicality* and *connectedness* as new PES factors was investigated. Both were hypothesized in this paper as belonging to mystical experience (high correlations with measures of the MEQ30) and therefore we refer to this as the *extended-mystical-experience hypothesis* (extended mystical experience: MEQ30 + paradoxicality + connectedness). Second, the possible addition of *visual experience* and *distressing experience* as new PES factors were investigated. Here, we predicted that the correlation between visual experience with mystical experience would be low, and the correlation between distressing experience with mystical experience still be lower.

Factor paradoxicality (PES mystical-experience extension I of II)

An early version of the MEQ—a version that still contained 45 items (“MEQ45”⁶)—treated “paradoxicality” and “alleged ineffability” as two separate subscales (Pahnke, 1969, p. 155). They were then collapsed in the MEQ43 into a single subscale named “ineffability and paradoxicality” (Griffiths et al., 2006, p. 272; Richards, 1975, p. 270). Subsequently, in the MEQ30, the two items that asked about paradoxicality were removed, and consequently, the subscale “ineffability and paradoxicality” of the MEQ43 was renamed to “ineffability” only in the MEQ30. This non-consideration of paradoxicality when measuring mystical

experience in the MEQ30 is also consistent with the other major validated measure of mystical experience—the Mysticism Scale (Hood, 1975)—where paradoxicality was excluded early in scale development because, as Hood writes: “in none of our preliminary work did [paradoxicality] effectively discriminate nor do we consider it an essential characteristic of the mystical experience” (1975, p. 31).⁷ By contrast, Hood—here again conceptually in line with the MEQ30—does consider ineffability an essential characteristic of the mystical experience as it is a subscale in the Mysticism Scale too.

We may note that the philosopher on whose work the conceptualization of the MEQ and the Mysticism Scale largely rests, Walter Terence Stace, would probably have approved of treating paradoxicality and ineffability as two separate concepts as done in the MEQ45 (Pahnke, 1969)—but would probably have been highly critical to see such merging of paradoxicality and ineffability as done in the MEQ43 (Griffiths et al., 2006; Richards, 1975) or to see the removing of paradoxicality altogether from the conceptualization of mystical experience as done in the MEQ30 (Barrett et al., 2015; MacLean et al., 2012) and the Mysticism Scale (Hood, 1975). For Stace, paradoxicality and alleged ineffability were two common characteristics of the mystical experience. If he had reservations about whether really both of these characteristics should count as common characteristics of the mystical experience, then it was about ineffability, and not about paradoxicality:

I do not . . . simply list ‘ineffability’ as a common characteristic [of the mystical experience], as has been done by William James and others. I list only ‘alleged by mystics to be ineffable’ . . . [The mystic] says that his experience is ineffable . . . He is in fact mistaken. The paradox which he has uttered has correctly described his experience. The language is only paradoxical because the experience is paradoxical. Thus the language correctly mirrors the experience . . . He does express it in language—often very well and very impressively. Therefore, what has to be done is to explain how he comes to make this mistake. The explanation can only be psychological. The explanation is, in a word, that he confuses the paradoxicality of mystical experience with ineffability. But the basis of the psychological explanation lies of course in the logical difficulty of the paradoxes. (Stace, 1960, pp. 79+305)

Stace mainly seems to conceptualize paradoxicality in the mystical experience as two opposing observations that exist at the same time (a logical impossibility in ordinary consciousness/perception). He writes:

Rudolf Otto has expressed the thought uncompromisingly and bluntly thus: “Black does not cease to be black, nor white white. But black is white and white is black. The opposites coincide without ceasing to be what they are in themselves” (Otto, 1926/1957, p. 45). And this is stated to be, not merely a series of words, but what someone physically saw . . . This is shocking. But . . . any writer who is honest about mysticism, as well as familiar with it, will know that it is utterly irreconcilable with all the ordinary rules of human thinking, that it blatantly breaches the laws of logic at every turn. (1960, p. 65)

Table 1. Paradoxicality characteristics of Richards (2015, p. 26) and items from the PES (Richards, 1975 Appendix E, pp. 271–276) matching these characteristics. These six PES items entered the paradoxicality EFA.

Paradoxicality characteristics of Richards (2015, p. 26)	Thematically matching items from the PES (Richards, 1975, Appendix E)
<i>Opposite-transcending paradoxicality stated in abstract, principled terms (with no concrete examples):</i> “paradox—the manner in which concepts that we consider opposite each other in everyday thought and conversation become encompassed in a reality that includes both extremes.”	19. Experience of a paradoxical awareness that two apparently opposite principles or situations are both true. 59. Sense that in order to describe parts of your experience you would have to use statements that appear to be illogical, involving contradictions and paradoxes.
<i>Paradoxicality transcending the everyday personal/nonpersonal distinction:</i> “the personal and the nonpersonal . . . these opposites are often experienced as so meaningfully interrelated that expression demands acknowledgment of ‘Both/And’ rather than ‘Either/Or.’”	26. Loss of your usual identity. 27. With eyes open, seeing something in your surroundings more and more intensely and then feeling as though you and it becomes one. 51. Loss of feelings of difference between yourself and objects or persons in your surroundings.
<i>Paradoxicality transcending the everyday nontemporal/temporal distinction:</i> “the eternal and the temporal . . . these opposites are often experienced as so meaningfully interrelated that expression demands acknowledgment of ‘Both/And’ rather than ‘Either/Or.’”	42. Feeling that you have been “outside of” history in a realm where time does not exist.

“one” (small initial letter) in the slightly modified PES, “One” (capital initial letter) in the original PES.
EFA: exploratory factor analysis; PES: Psychedelic Experience Questionnaire.

The conceptualization of the paradoxicality of the mystical experience of Otto and Stace is also much in line with the mystical-paradoxicality conceptualization of Richards (2015, p. 26) (cf. Table 1).

We investigated whether the PES might yield a factor for which we reintroduce the name *paradoxicality*—a subjective experience in which “opposites coincide without ceasing to be what they are in themselves” (Otto, 1932/2016, p. 48).⁸ Going through the 70 non-MEQ30 items of the PES, an overall number of 6 PES items could be identified that fall into the conceptual range of opposite-related paradoxicality (as conceptualized in Otto, 1932/2016, p. 48; Richards, 2015, p. 26; Stace, 1960, p. 65). They are shown in Table 1 and are exemplified by contrasting them with the description of the opposite-transcending paradoxicality by Richards (2015, p. 26).

We think that most of the matching between the opposite-transcending-paradoxicality characteristics of Richards (2015) and the PES (Richards, 1975) in Table 1 are self-explanatory—except perhaps for why item 42 (“Feeling that you have been ‘outside of’ history in a realm where time does not exist”) is thematically matched to a temporal/nontemporal paradox. In item 42, this time/no-time paradox is clearly here, but only implicitly so. To (as the item states) “have been” in a “realm,” some temporal duration must have taken place (some time must have passed); otherwise, one could not have been there at all; yet, one was in a realm where “time does not exist.” This comes down to a time/no-time paradox. For a principled theoretical account of why even a static cognitive spatial scene always contains cognitive time, see Stocker (2014, pp. 72–76).

All six items that were used to test for a paradoxicality factor in the current analysis (Table 1) were part of the 13 items that were excluded when the MEQ43 (Griffiths et al., 2006; Richards, 1975) was reduced to the MEQ30 (Barrett et al., 2015; MacLean et al., 2012). In the MEQ43, the two items that refer to paradoxicality in the most explicit and principled terms (items 19 and 59 in Table 1) were part of the MEQ43 subscale “Ineffability and Paradoxicality.” In the current analysis, we used these two “dropped” paradoxicality items, plus other PES items that match

the opposite-transcending-paradoxicality descriptions from Otto (1926/1957, p. 63), Stace (1960, p. 25), and Richards (2015, p. 26), to test for a possible paradoxicality factor independently of ineffability. In this sense, we also take up the spirit of Pahnke’s MEQ45 again (Pahnke, 1969, p. 155), which (as mentioned) also treated paradoxicality and ineffability as two separate subscales.⁹

Furthermore, in case the factor analysis should yield such a paradoxicality factor, we planned to investigate (with additional correlational analysis with MEQ30 measures) whether or not paradoxicality is best viewed as a common characteristic of the mystical experience (as proposed by Otto, 1926/1957; Richards, 2015; Stace, 1960 cf. also James, 1902, p. 417) or not—as proposed in work related to the MEQ30 (Barrett et al., 2015; MacLean et al., 2012) and the Mysticism Scale (Hood, 1975).

Factor connectedness (PES mystical-experience extension II of II)

The conceptualization of the subscale connectedness has been inspired by the work of Watts et al. (2017). In a qualitative analysis of patients’ experiences in relation to psilocybin for treatment-resistant depression, one main positive change process that the authors identified was a change from a pre-substance treatment sense of disconnection to a peri- and post-substance treatment sense of “connection.” This psychedelically fostered theme of connectedness yielded six subthemes in the analysis of Watts et al. (2017; see Table 2). Watts and colleagues recently developed their psychedelic connectedness qualitative findings into a new scale, where they reduced the number of connectedness themes (Watts et al., 2022). However, for the present analysis, the more differentiated conceptual breakdown of connectedness of Watts and colleagues (2017) allows for a closer matching of PES items and Watts-based connectedness; therefore, the work of 2017 is used for the matching. Going through the 70 non-MEQ30 items of the PES, five of the six connectedness subthemes of Watts and colleagues were covered by an overall number of 10 PES items as shown in Table 2.

Table 2. Connectedness subthemes from Watts et al. (2017) and items from the PES (Richards, 1975, Appendix E, pp. 271–276) matching these subthemes. These 10 PES items entered the connectedness EFA.

Connectedness subthemes Watts et al. (2017)	Thematically matching items from the PES (Richards, 1975, Appendix E)
Mind “rebooted”/“opened up”/“switched on”	32. Feeling that you could think with an unusually high degree of sharpness and clarity.
Connected to senses	58. Increase in the beauty and significance of music. 79. Feeling of being extremely sensitive to fine nuances of meaning between different words. 78. Experience of sexual excitement. 95. Experience of increased awareness of beauty.
Connected to self	[no corresponding PES item]
Connected to others	62. Intuitive insight into the inner nature of . . . persons in your surroundings. 63. Feeling of emotional closeness with your therapist or co-therapist. ^a 99. Increased awareness of the importance of interpersonal relationships.
Connected to the world	62. Intuitive insight into the inner nature of objects . . . in your surroundings.
Connected to a spiritual principle	3. Feeling that the consciousness experienced during part of the session was more real than your normal awareness of everyday reality. 60. Feelings of universal or infinite love.

^aThe phrasing of this item in the original PES is “Feeling of emotional closeness with your therapist or nurse.” In the slightly revised PES it is: “Feeling of emotional closeness with your guide or assistant guide.” In our current German version of the PES it is: “Feeling of emotional closeness with your therapist or co-therapist.” For future use, we recommend that the German wording of this item should be rephrased so that it matches the slightly revised English PES (see Discussion).
EFA: exploratory factor analysis; PES: Psychedelic Experience Questionnaire.

Thus, these 10 items (item 62 is listed twice in Table 2) were used to see whether these items or some of these items would form a connectedness factor. The one connectedness subtheme of Watts and colleagues not covered in the PES (which therefore could also not be explored in our factor analysis) was the subtheme “connected to self” (see Discussion).

While the identification of the theme connectedness for our factor analysis was inspired by the qualitative work of Watts et al. (2017), it is worthy of note that Richards considers three of these six connectedness themes identified by Watts and colleagues to belong to “mystical states that we consider ‘complete’” (2015, p. 54). First, Richards considers experiencing “the absoluteness of beauty” (p. 52) as belonging to a complete mystical experience. This is akin to how participants in the study of Watts and colleagues described experiencing increased connectedness to the senses via beauty—for example, “A veil dropped from my eyes, things were suddenly clear, glowing, bright. I looked at plants and felt their beauty” (p. 530). Second, for a mystical experience to be complete, Richards considers human “interrelatedness” (p. 54) to be an integral part of the experience. Richards’ description of the experience that “we humans are indeed all relatives, linked both through our genes and in the spiritual vortices of our minds” (p. 50) is akin to how participants in the study of Watts and colleagues spoke of experiencing their connectedness to others as a “deep connection to everyone” (p. 534). Third, Richards also considers experiencing “Love” (p. 54) to be a necessary part of a complete mystical experience:

In mystical consciousness, this love is typically known and subsequently described as much more than human emotion. Poetic and idealistic as it sounds, it is often claimed to be the ultimate nature of the energy that makes up the world, awaiting us all in the source or ground of our being. (p. 51)

This is akin to some of the participants in the study of Watts and colleagues (2017) describing experiencing “‘love’ as a powerful

supernatural force” (p. 535). Also Aldous Huxley characterizes (in his case mescaline-occasioned) “Love” as part of the mystical oneness experience. He considers such “Love as the primary and fundamental cosmic force . . . [that] reconciles all the opposites and is the ONE” (Huxley, 1955/1969, p. 139; caps his).

In the current analysis, we used the five connected items (based on Watts et al., 2017; and partially also covered by Richards, 2015) to test for a possible connectedness factor.

Factor visual experience (PES other-than-mystical-experience extension I of II)

Distinguishing visionary from mystical experience, Richards (2015) writes:

In scholarly discussions in the psychology of religion, visions or visionary experiences tend to be distinguished from experiences of mystical consciousness, even though they often may seem to occur simultaneously or one may flow into the other . . . mystical consciousness by definition includes unitive consciousness . . . In it the “subject-object dichotomy” . . . is transcended or overcome. Visionary experiences . . . typically occur with the subject-object framework still intact: I am here, looking—even awesomely beholding—something there. I may see it, approach it, tremble before it, and relate to it with love or fear, but I do not fully “enter into it” or “become one with it.” Such visionary experiences are often reported just prior to or just after experiences of unitive-mystical consciousness, but there are many instances when they stand on their own as the culmination of a particular journey into alternative realms of awareness. (pp. 78–79)

While Richards theoretically proposes that visionary and mystical experience might often interrelate, he still also proposes that they can conceptually clearly be differentiated from one another, with the former leaving the subject-object dichotomy largely

intact, and the latter transcending this dichotomy. Visionary experience can be defined as visually perceiving something with a compelling sense of reality, despite the lack of a corresponding sensory stimulus (Stocker, 2022). Since the visual items of the PES simply ask if one has perceived certain things visually, but do not ask about how real these visual phenomena have felt, we refer to these PES items not with the term “visionary experience,” but with the felt-reality-status-neutral term “visual experience.” For the purpose of this paper, psychedelic visual experience is defined as seeing something without a corresponding sensory stimulus. In addition, it is also possible that the experienced perceptual material might not be visual per se, but might only be sensed. For instance, in nonordinary states of consciousness, one might feel the presence of an entity, but there might not be any visual or other overtly perceptual component to it (James, 1902, pp. 58–62; Barnby and Bell, 2017). As not all of the potential visual items of the PES do systematically distinguish whether the perceived phenomena might be visually experienced or might only be “sensed,” we should keep in mind that some of the experiences behind the items in Table 3 might at times also “only” involve sensed phenomena.

To derive possible visual-experience items from the PES, we identified all items from the PES that could potentially involve visual or sensed material. Going through the 70 non-MEQ30 items of the PES, we found 28 items that could potentially involve seeing or sensing something without any corresponding sensory input; these items are shown in Table 3.

We may also note that items 1, 17, and 38 were part of a PES item group that was named “aesthetic experience” when the PES was used at Spring Grove Hospital Center and then at the Maryland Psychiatric Research Center (cf. above). However, according to Richards, “aesthetic experience” had never “been viewed as a scale to be scored.”¹⁰ Not treating the aesthetic-experience items as a potential single scale is also in line with our present approach to the item group “aesthetic experience” because the other items of this group (items 58 and 79) become part of our factor connectedness (“connected to senses”; cf. Table 2). Thus, while we do think that all aesthetic-experience items have “factor potential,” we do believe that they present a mix of the themes of visual experience and connectedness. Similarly, when Pahnke and Richards (1966, pp. 184–186) describe psychedelically induced “aesthetic phenomena” (p. 184), they also conceptually relate these phenomena to a “visionary” realm—phenomena that are very much in line with the PES items 1, 17, and 38 (which entered our visual-experience factor in the EFA; Table 3). And they do not relate these “aesthetic phenomena” to themes of PES items 58 and 79 (items that entered our connectedness factor in the EFA; Table 2).

Factor distressing experience (PES other-than-mystical-experience extension II of II)

The PES also covers possible distressing aspects that can occur during the psychedelic experience. As Richards proposes, such distressing psychedelic experience can clearly be differentiated from both psychedelic-mystical as well as from psychedelic-visual (visionary) experiences:

[Psychedelic substances] can also trigger personal psychological experiences, such as regression to childhood

traumas or confrontation with unresolved grief, fear, anger, or guilt. Such experiences . . . may well have potentially significant value in accelerating psychotherapy and personal growth . . . Further, especially if one is unprepared and seeks to control or escape from emerging inner experiences, the flow of unique mental adventures facilitated by psychedelic substances can culminate in episodes of panic, paranoia, confusion, and somatic distress and perhaps a trip to an emergency room for psychiatric care. None of these “psychedelic experiences” are visionary or mystical . . . (2015, p. 16)

Given the potential importance that, for instance, Richards assigns to distressing psychedelic experience (“may well have potentially significant value in accelerating psychotherapy and personal growth”), it seems a worthwhile endeavor to investigate whether the items of the PES that describe such distressing psychedelic experience will form a “distressing-experience factor.”

Early attempts to extract a distressing-experience scale from the PES included an unpublished (and to our knowledge factor-unanalyzed) 13-item scale of Francesco Di Leo that he termed “nadir.”¹¹ As mentioned, in a few of the studies from our research group, we have used this subscale of Di Leo (Becker et al., 2022a; Becker et al., 2022b; Holze et al., 2021, 2022) and, for instance, found that such experience was significantly more prominent for a high than for a moderate dose of LSD (Holze et al., 2021). Going through the 70 non-MEQ30 items of the PES, we identified—besides Di Leo’s 13 nadir items—another 7 items with a clear potential negative valence in the PES, and all 20 items were then used to see whether the PES yields a distressing-experience factor. These items are shown in Table 4.

Summing up the planned factor analysis, 94 of the 100 items of the PES entered the first part of our analysis: the 30 items of the MEQ30 (Barrett et al., 2015; MacLean et al., 2012), 6 paradoxicality items (Table 1), 10 connectedness items (Table 2), 28 visual-experience items (Table 3), and 20 distressing-experience items (Table 4).

In addition to our theory-driven EFA/CFA approach, we also carried out a fully data-driven approach as an alternative, using a hierarchical clustering analysis (ICLUST; Revelle, 1979). This will then allow us to compare the theory-derived (EFA/CFA) and the data-derived (ICLUST) homogeneous subgroupings.

Methods

Participants

In all, 239 PES measurements of 140 healthy participants (mean age = 32.4, SD = 9.6, ranging from 24 to 64; 73 females) from six different classic-psychedelic studies (LSD and/or psilocybin) were included in the analysis (Becker et al., 2022a; Becker et al., 2022b; Holze et al., 2020, 2021, 2022; Liechti et al., 2017). For the just-listed studies, we included the use of the PES with the following high to moderate psychedelic doses (*n* refers to PES measurements): high LSD, 200 µg (*n* = 64: Holze et al., 2021, 2022; Liechti et al., 2017); moderate LSD, 100 µg (*n* = 97: Becker et al. 2022b; Holze et al., 2020, 2021, 2022); high psilocybin, 30 mg (*n* = 28: Holze et al., 2022), moderate-to-high psilocybin, 25 mg (*n* = 23: Becker et al., 2022a); moderate psilocybin, 15 mg (*n* = 27: Holze et al., 2022). Not included in the factor analysis

Table 3. All items from the PES (Richards, 1975, Appendix E, pp. 271–276) that are likely to involve visual or sensed experience, defined as seeing or sensing something without a corresponding sensory stimulus (cf. Stocker, 2022). These 28 PES items entered the visual-experience EFA.

Visual item #	Visual (or at times possibly also only sensed) item phrasing
1	Visions of abstract geometric patterns of colored lines.
7	Sense of passing through stages in evolution.
11	Visions of sexual organs (genitals, breasts).
17	Visions of art objects (e.g., mosaics, statues, jewelry, buildings) that reflect expert craftsmanship.
20	Sense of decreasing in body size to infancy or early childhood.
25	Experience of radiant, golden light.
33	Convincing feeling that you relived experiences that you had as an infant during your biological birth.
37	Visions of demons, devils, or other wrathful deities.
38	With open eyes, seeing objects around you turn into great works of art.
46	Convincing feeling that you obtained information about people or events in an extrasensory manner (telepathy, clairvoyance, precognition, etc.).
49	Visions of angels, cherubim, or seraphim.
53	Sense of being outside your body.
56	Visions of blissful or compassionate deities.
67	Visions of brilliant white light.
68	Experience of exploring organs, tissues, or cells of your own body.
70	Profound experience of your own death.
71	Visions of beautiful jewels and precious stones.
75	Convincing feeling of contact with people who have died.
81	Convincing experiences of life in civilizations that existed in another time and/or place (e.g., Ancient Egypt or Rome, Renaissance France, Colonial America).
82	Visions of events in the life of Christ (e.g., birth, crucifixion, resurrection).
84	Feeling of disintegration, falling apart.
90	Convincing feelings of reliving part of another life prior to your birth (a previous incarnation).
92	Reliving of sensations and feelings associated with past surgery, illness, or accidents.
94	Sense of becoming a specific animal and feeling like that animal.
96	Vision of a religious Personage (e.g., Moses, Christ, Buddha).
97	Visions of landscapes (e.g., oceans, mountains, deserts).
98	Reliving of situations and events from your childhood.
100	Feeling of being reborn.

EFA: exploratory factor analysis; PES: Psychedelic Experience Questionnaire.

was the use of the PES in the just-listed studies in the following conditions: first, when a low psychedelic dose (LSD 25 or 50 μ g) had been used (Holze et al., 2021); second, when besides the serotonergic psychedelics also other substances (ketanserin or escitalopram) had been administered to produce a combined pharmacological effect (Becker et al., 2022a; Becker et al., 2022b); and third, when not a classic psychedelic, but some other substance (e.g., 3,4-methylenedioxymethamphetamine or placebo) had been administered (Becker et al., 2022a; Becker et al., 2022b; Holze et al., 2020, 2021, 2022; Liechti et al., 2017).

Materials

Psychedelic Experience Scale. The psychedelic experience was assessed using a German version of the 100-item PES (Richards, 1975) that includes the 30-item Mystical Experience Questionnaire (MEQ30) with its four factors mystical, positive mood, transcendence of time and space, and ineffability, using a 6-point Likert scale as response format ranging from 0 to 5 (Barrett et al., 2015; see Introduction for details). Only the German version of the MEQ30 has previously been published (Liechti et al., 2017).

The original PES was translated into German by one translator with German as his mother tongue. This is how the German PES was used for the analyzed studies. For the supplement of this paper, this translation was carefully checked by a second translator with German as his mother tongue. This second translator did some very minor rephrasing of the first German version, none of which led to any substantial changes. One translation inaccuracy was spotted that needed to be optimized (described in the limitations toward the end of this paper). This slightly modified German PES in the supplement is the one that we recommend for future use.

5D-ASC scale. To investigate the external validity of our new PES factor analysis, we also planned to compare our PES factors (should our a priori defined factors be confirmed) with the factors (subscales) of the 5D-ASC (as all participants who filled out the PES also filled out the 5D-ASC). For this, we used a newer analytical approach—5D-ASC (11-ASC)—of this questionnaire which contains the following 11 validated subscales: experience of unity, spiritual experience, blissful state, insightfulness, disembodiment, complex imagery, elementary imagery, audio-visual

Table 4. All items from the PES (Richards, 1975, Appendix E, pp. 271–276) which are likely to involve a psychologically distressing experience. These 20 PES items entered the distressing-experience EFA. An “(N)” after the item number indicates that the item was already part of Di Leo’s nadir subscale.

Dis-stressing item #	Distressing item phrasing
4	Feelings of anger or aggression.
13 (N)	Emotional and/or physical suffering.
16 (N)	Feelings of despair.
21 (N)	Experience of confusion, disorientation, and chaos. ^a
28	Sense of being trapped and helpless.
39	Experience of repulsive biological material (urine, feces, pus, dead flesh, etc.).
40 (N)	Feeling that people were plotting against you.
45 (N)	Experience of isolation and loneliness.
52 (N)	Experience of fear.
57 (N)	Feeling of being rejected or unwanted.
61 (N)	Experience of meaninglessness and absurdity of life.
64	Feeling of reluctance to return to normal consciousness.
66 (N)	Frustrating attempt to control the experience.
72 (N)	Experience of antagonism toward your therapist or co-therapist. ^b
76	Sense of being separated from the normal world, as though you were enclosed in a silent glass chamber with thick walls.
85 (N)	Fear that you might lose your mind or go insane.
88 (N)	Feelings of guilt.
89	Experiences of intense pressures on various parts of your body.
91 (N)	Feelings of grief.
93	Experience of physical distress (e.g., nausea, vomiting, sweating, rapid heartbeat).

^a“and” in the original PES, “and/or” in the slightly modified PES. We used the original PES phrasing for the German version (used “and” only).

^bCf. footnote a in Table 2 for the terms “therapist” and “co-therapist”; the same situation applies here, and will be taken up in the Discussion section. EFA: exploratory factor analysis; PES: Psychedelic Experience Questionnaire.

synesthesia, changed meaning of percepts, impaired control of cognition, and anxiety (Studerus et al., 2010). As ratings on this scale—including the 5D-ASC (11-ASC) analysis—have shown significant associations with ratings on the MEQ30 (Liechti et al., 2017), it will be interesting to see whether the 5D-ASC also closely correlates with the PES when it contains the MEQ30 and additional new factors (should we be able to establish new factors).

Procedure and data analysis

Creation of new subscales. The four subscales (paradoxicality, connectedness, visual experience, and distressing experience) were created and validated in a four-step approach. In the first step, possible candidate items for the four new subscales were theoretically derived (see Introduction). In the second step, item difficulty was considered. Difficulty is the average score of the item divided by its range, and the difficulty index value ranges from 0 (“difficult”) to 1 (“easy”). In the present context, difficult (i.e., low values) means that the item describes an experience that has occurred only rarely. It was intended that the items of the new subscales have a similar difficulty level to the items from the original MEQ30. This reduces the risk of including items for which most participants will indicate zero. We set the threshold for item difficulty to 0.18, which corresponds to the lowest difficulty of items from our German analysis of the original MEQ30 subscales (see Table 5; a list of the difficulty index of all items is provided in Supplemental Material 2). Items with difficulty below this threshold were excluded. In the third step, EFA was

used to further reduce the number of candidate items. Horn’s parallel analysis was used to determine the number of factors, and items were selected for a new subscale when there were at least three items that loaded distinctly on one factor with factor loadings higher than .55 (Comrey and Lee, 2013; Swisher et al., 2004). EFA and parallel analysis were based on the polychoric correlations, as suggested for ordinal data (Flora and Curran, 2004; Garrido et al., 2013; Holgado-Tello et al., 2010), with weighted least squares as a factoring method and oblimin rotation, using the psych-package in R (Revelle, 2023). Importantly, EFA was performed on only half of the data, allowing us to test the reliability of the selected items with the second half of the data with a confirmatory factor analysis (CFA) in the fourth step. Specifically, from each of the six different studies, half of the measurements were randomly allocated to the test data set ($n=120$), and the other half to the validation data set ($n=119$). Thus, the specific substance conditions of each study were counterbalanced for the test and validation data set. Mean inter-item correlation and Cronbach’s α were used as internal consistency measurements of reliability (again based on polychoric correlations). In case there were more than three items per subscale, the standardized root mean square residual (SRMR) from confirmatory FA (CFA) was additionally used to confirm unidimensionality (with the conventional cut-off criterion $SRMR < .08$; Hu and Bentler, 1999). Since the reliability assessment is not based on the same dataset as the selection of items, the internal-consistency measurements of the new subscales allow for a fair comparison to the original four subscales of the MEQ30. CFA was based on diagonally weighted least squares (DWLS), as suggested for the analysis of ordinal/zero-inflated data (Fabrigar

Table 5. Means, item difficulty, skewness, and reliability measures of the four original MEQ30 subscales and the four new subscales.

Subscales	<i>N</i>	<i>M</i> (SD)	Item difficulty	Skewness	Reliability	
			<i>M</i> [Min, Max]		<i>r</i> _{II}	α
MEQ30 subscales						
Mystical	15	1.73 (1.27)	0.35 [0.18, 0.51]	0.45	0.62	0.96
Positive mood	6	2.41 (1.17)	0.48 [0.36, 0.65]	0.04	0.49	0.85
Trans. time space	6	2.62 (1.32)	0.52 [0.30, 0.75]	-0.13.	0.59	0.90
Ineffability	3	3.42 (1.26)	0.68 [0.57, 0.77]	-0.86	0.69	0.87
New subscales						
Paradoxicality	5	1.76 (1.26)	0.35 [0.25, 0.52]	0.31	0.47/0.50	0.82/0.84
Connectedness	5	2.28 (1.28)	0.46 [0.30, 0.70]	-0.01	0.55/0.53	0.86/0.85
Visual experience	3	2.38 (1.41)	0.48 [0.33, 0.73]	0.31	0.58/0.58	0.81/0.81
Distressing experience	5	1.05 (1.24)	0.21 [0.18, 0.26]	1.17	0.75/0.73	0.94/0.93

For the new subscales, the first reliability value is based only on the validation data set, and the second value is based on the full data set.
N: Number of Items in the subscale; Trans: Transcendence; *r*_{II}: mean inter-item correlation; α : Cronbach's alpha.

et al., 1999; Li, 2016; Watkins, 2018), using the lavaan-package in R (Rosseel, 2012).

Model fits. Model-fit indices were computed for the model with the four original subscales of the MEQ30 and compared to a model that additionally included the two new mystical-experience extensions paradoxicality and connectedness. For these analyses, treating the data as ordinal leads to overfitting in some of the models (number of estimated parameters > number of observations). Model fits are therefore based on maximum likelihood estimation with robust estimates of standard errors and model fit indices using Satorra–Bentler correction (Satorra and Bentler, 1994), which has been suggested as a valid alternative to deal with nonnormality (Curran et al., 1996; Hu et al., 1992). The estimated model fit parameters were χ^2 , χ^2/df ratio, robust root mean square error of approximation (RMSEA), robust SRMR, and robust comparative fit indices (CFI). The conventional cutoff criteria for good fits are $\chi^2/df < 2$, RMSEA < .06, SRMR < .08, and CFI > .95, or, respectively, $\chi^2/df < 3$, RMSEA < .10, SRMR < .10, and CFI > .90 for acceptable fits (Fabrigar et al., 1999; Hu and Bentler, 1999). Model fit analyses are performed with the lavaan-package in R (Rosseel, 2012).

External validation. To assess the added value of the four new subscales, we computed their correlation with the 5D-ASC subscales (Studerus et al., 2010). Given that paradoxicality and connectedness were conceptualized as extended mystical experience, and given that the 5D-ASC captures many aspects that are also related to mystical or mystical-related experiences (e.g., experience of unity, spiritual experience), we expected that the two new subscales are correlated with most of the 5D-ASC subscales (maybe with the exception of anxiety). Furthermore, it can be expected that visual experience is associated particularly with the visual-related 5D-ASC subscales complex imagery, elementary imagery, and/or audio-visual synesthesia, and that distressing experience is associated with the two negatively valenced 5D-ASC subscales anxiety and impaired control and cognition. Furthermore, we computed a blockwise regression analysis for each of the 11 5D-ASC subscales for which the four original MEQ30 subscales were entered as predictors in the first block,

followed by the two new mystical-experience extensions *paradoxicality* and *connectedness* in the second block, and with the two other-than-mystical-experience extensions *visual experience* and *distressing experience* in the final block. This allowed us to assess the increase in explained variance for different aspects of ASC experiences due to the four new subscales.

Cluster analysis. In addition to our theory-driven EFA/CFA approach, we, for comparative purposes, also carried out a fully data-driven approach as an alternative, using a hierarchical clustering analysis (ICLUST; Revelle, 1979) that included all items with a difficulty index greater than or equal to 0.18. Like in an EFA, the goal of a cluster analysis is to reduce the complexity of the data and attempt to identify homogeneous subgroupings. ICLUST combines the most similar pair of items from the correlation matrix into a cluster, and then computes the similarity of this cluster to all other items and clusters, and repeats this procedure until reliability coefficients (Cronbach's α and Revelle's β) can no longer be increased. EFA/CFA and cluster results will then be compared.

Results

New subscales: PES mystical experience extension

Paradoxicality. The paradoxicality EFA with the six candidate items (Table 1 in the Introduction) revealed one factor with five items (Items 19, 26, 42, 51, and 59) with factor loadings higher than .55 (see Table S1, Supplemental Material 1). These five items were selected for the new subscale “paradoxicality”:

19. Experience of a paradoxical awareness that two apparently opposite principles or situations are both true.
26. Loss of your usual identity.
42. Feeling that you were “outside of” history in a realm where time does not exist.
51. Loss of feelings of difference between yourself and objects or persons in your surroundings.

59. Sense that in order to describe parts of your experience you would have to use statements that appear to be illogical, involving contradictions and paradoxes.

Assessing reliability with the validation data set (CFA) of the five selected items revealed good internal consistency, with a mean inter-item correlation of .47, and a Cronbach's α of .82. Unidimensionality was also confirmed (SRMR = .067).

Connectedness. The connectedness EFA with 10 candidate items (Table 2 in the Introduction) revealed one factor with five items (Items 58, 60, 62, 95, and 99) with factor loadings higher than .55 (see Table S2, Supplemental Material 1). These five items were selected for the new subscale "connectedness":

- 58. Increase in the beauty and significance of music.
- 60. Feelings of universal or infinite love.
- 62. Intuitive insight into the inner nature of objects and/or persons in your surroundings.
- 95. Experience of increased awareness of beauty.
- 99. Increased awareness of the importance of interpersonal relationships.

Assessing reliability with the validation data set of the subscale revealed good internal consistency, with a mean inter-item correlation of .55, and a Cronbach's α of .86. Unidimensionality was also confirmed (SRMR = .046).

New subscales: PES other-than-mystical experience extension

Visual experience. From the 28 possible candidate items for visual experiences (Table 3 in the Introduction), only nine items were considered because all other items had a low difficulty index (below .18). The EFA with the remaining nine items revealed that there were three factors. Three items (Items 1, 17, and 38) had a factor loading higher than .55 for the first factor. There were only two items with a loading higher than .55 on the second factor (Items 25 and 67), and only one for the third factor (Item 53) (see Table S3, Supplemental Material 1). Consequently, only the three items on the first factor were selected for the new subscale "visual experience":

- 1. Visions of abstract geometric patterns of colored lines.
- 17. Visions of art objects (e.g., mosaics, statues, jewelry, buildings) that reflect expert craftsmanship.
- 38. With open eyes, seeing objects around you turn into great works of art.

Assessing reliability with the validation data set revealed a good internal consistency, with a mean inter-item correlation of .58, and a Cronbach's α of .81.

Distressing experience. From the 20 possible candidate items for distressing experiences (Table 4 in the Introduction), only 12

items were considered because all other items had a low difficulty index (below .18). The EFA revealed that there were two factors (see Table S4). Five items (Items 13, 16, 28, 45, and 52) had a factor loading higher than .55 for the first factor. There was only one item with a loading higher than .55 for the second factor (Item 61). Consequently, only the five items of the first factor were selected for the new subscale "distressing experience":

- 13. Emotional and/or physical suffering.
- 16. Feelings of despair.
- 28. Sense of being trapped and helpless.
- 45. Experience of isolation and loneliness.
- 52. Experience of fear.

Analysis of the validation data set revealed a good internal consistency, with a mean inter-item correlation of .75, and a Cronbach's α of .94. Unidimensionality was also confirmed (SRMR = .042).

Comparison of new subscales with MEQ30 subscales. Table 5 summarizes the means, item difficulty, skewness, and reliability measures of the four original MEQ30 subscales and the four new subscales. Reliability measurements of all subscales were in an acceptable range (Cronbach's $\alpha > .80$). The values for the new subscales were overall well comparable to the original MEQ30 subscales. Notably, compared to the other subscales, items of the new subscale distressing experience had a lower mean item difficulty index (i.e., higher difficulty), and consequently a lower mean and higher skewness.

The correlations between the four original MEQ30 subscales and the four new subscales, as well as their correlations with the MEQ30 and the "MEQ40" (MEQ30 + paradoxicality + connectedness) sum scores, are reported in Table 6.

Table 6 shows high correlations between the subscale mystical and the two new mystical-experience extensions paradoxicality (.77, $p < .001$) and connectedness (.74, $p < .001$), and also shows correlations with visual experience, but to a much lower extent (.31, $p < .001$), and shows no association with distressing experience (.04, $p > .05$).

The high correlations of the subscales paradoxicality and connectedness with the mystical subscale also raise the question of whether these two subscales are separable from the mystical subscale. To address this issue, we compared a one-factor solution that contained the 15 mystical experience items of the MEQ30 factor "mystical" plus the five new paradoxicality (or connectedness, respectively) items to a two-factor solution. In the two-factor solution, one factor constitutes the 15 items of the MEQ30 subscale "mystical," and the second factor constitutes the five paradoxicality (or connectedness, respectively) items. As summarized in Table 7, all fit indices are better (or equal in the case of CFI) for the two-factor solutions. For both paradoxicality and connectedness, chi-squared difference tests (Satorra and Bentler, 2001) confirm that the two-factor solution better fits the data when compared to the one-factor solution (both $ps < .001$). This additional analysis confirms that both paradoxicality and connectedness should be conceptualized as separate subscales despite their close relationship to the MEQ30 mystical subscale.

Table 6. Correlations between subscales.

Subscales	1	2	3	4	5	6	7	8	MEQ30	MEQ40
1. Mystical	—	0.76***	0.65***	0.43***	0.77***	0.74***	0.31***	0.04	0.96***	0.95***
2. Positive mood		—	0.53***	0.35***	0.58***	0.75***	0.37***	-0.16*	0.83***	0.83***
3. Trans. time space			—	0.56***	0.76***	0.46***	0.30***	0.17**	0.79***	0.78***
4. Ineffability				—	0.48***	0.40***	0.36***	0.19**	0.56***	0.55***
5. Paradoxicality					—	0.61***	0.39***	0.29***	0.81***	0.85***
6. Connectedness						—	0.37***	-0.05	0.76***	0.81***
7. Visual exp.							—	0.04	0.37***	0.39***
8. Distressing exp.								—	0.04	0.07

Values represent bivariate correlations (Spearman’s rho) between scale means. 1–4 represent the original MEQ30 subscales, and 5–8 the new subscales. The two columns on the right show the correlations between the eight subscales and the MEQ30 total sum score and the MEQ40 total sum score (MEQ30 + paradoxicality + connectedness). exp: experience, Trans: Transcendence.

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Table 7. Comparisons between one and two-factor solutions for mystical experiences.

Model	Npar	Chi ²	Df	χ^2/df	RMSEA	SRMR	CFI
Mystical _{MEQ30} + Paradoxicality 1 Factor	120	515.96	170	3.04	0.092	0.063	0.96
Mystical _{MEQ30} + Paradoxicality 2 Factors	121	484.11	169	2.86	0.089	0.059	0.96
Mystical _{MEQ30} + Connectedness 1 Factor	120	524.36	170	3.08	0.094	0.063	0.96
Mystical _{MEQ30} + Connectedness 2 Factors	121	452.08	169	2.68	0.084	0.056	0.97

All fit indices are based on robust DWLS estimation for ordinal data.

CFI: comparative fit indices; Npar: number of parameters; RMSEA: root mean square error of approximation; SRMR: standardized root mean square residual.

Table 8. Model fit indices.

Model	Npar	Chi ²	Df	χ^2/df	RMSEA	SRMR	CFI
MEQ30	66	1010.91	399	2.53	0.080	0.081	0.87
MEQ40	95	1667.70	725	2.30	0.074	0.082	0.85

The table summarizes the model fit parameters for the MEQ30 and the MEQ40 (MEQ30 + paradoxicality + connectedness). Npar=number of parameters estimated by the model. Number of observations is $n=239$ for all models. All fit indices are based on robust maximum likelihood estimation with Satorra–Bentler correction.

CFI: comparative fit indices; RMSEA: root mean square error of approximation; SRMR: standardized root mean square residual.

Model fits. Model fits are summarized in Table 8. χ^2/df , RMSEA, and SRMR show acceptable-to-good model fits for both the original MEQ30 and the MEQ40. By contrast, the CFI is below the acceptable threshold of .90 for both models, but the differences between the MEQ30 and the MEQ40 are only marginal. Thus, it can be concluded that adding the two new subscales to the original MEQ30 does not lead to lower model fits. Rather, the MEQ40 shows a slightly superior fit according to χ^2/df and RMSEA. Noteworthy, the model fit of the MEQ30 was worse than that reported by Barrett et al. (2015; e.g., CFI=.91, SRMR=.06). This might be due to differences in the sample or language (English vs. German).

External validity. Descriptives (M , SD) of the 5D-ASC subscales and their correlations with the four new subscales are summarized in Table 9. Most of the new subscales show substantial correlations with the 5D-ASC subscales. More important is the question of whether adding the new subscales increases the explained variance in the 5D-ASC subscales when the four original MEQ30 subscales are already entered as predictors (Table 10). For seven of the 11 5D-ASC subscales, adding the two mystical-experience extensions (Block 2: MEQ40)

significantly improved the proportion of explained variance (ranging from 3% to 8%), confirming that the MEQ40 captures additional aspects of psychedelic mystical-experience-related experiences that are not already captured by the MEQ30. More specifically, based on the regression coefficients (see Table 10), the additional factor paradoxicality is positively associated with disembodiment, impaired control and cognition, anxiety, and changed the meaning of percepts, and negatively with a blissful state. However, while the positive associations are also reflected in the zero-order correlations (see Table 9), the negative association with the blissful state is not, suggesting that this might be the result of suppression effects. Moreover, based on the regression coefficients, the additional factor connectedness is positively associated with blissful state, insightfulness, audiovisual synesthetic experiences, and changed meaning of percepts, and negatively associated with spiritual experience and anxiety. Again, these negative associations might be the result of suppression effects because the associations with connectedness were also positive (in the case of spiritual experience) or absent (in the case of anxiety) in the zero-order correlations (see Table 9).

Adding also the two other-than-mystical-experience extensions (Block 3: PES48; Table 10) further increased the explained

Table 9. The 5D-ASC subscales (Studerus et al., 2010) and their zero-order correlations with the four new subscales.

5D-ASC subscales	Descriptive	Zero-order correlations			
	<i>M</i> (<i>SD</i>)	Paradoxicality	Connectedness	Visual exp.	Distressing exp.
Experience of unity	40.38 (31.17)	0.69***	0.59***	0.32***	0.06
Spiritual experience	23.48 (24.55)	0.58***	0.55***	0.21***	0.08
Blissful state	43.96 (33.68)	0.47***	0.68***	0.29***	-0.20**
Insightfulness	34.57 (29.77)	0.55***	0.63***	0.30***	0.04
Disembodiment	34.76 (31.87)	0.62***	0.48***	0.31***	0.13*
Impaired control and cognition	29.32 (23.56)	0.48***	0.17*	0.30***	0.49***
Anxiety	11.75 (19.87)	0.34***	-0.02	0.08	0.74***
Complex imagery	51.69 (32.29)	0.48***	0.42***	0.42***	0.08
Elementary imagery	61.44 (32.38)	0.50***	0.41***	0.48***	0.15*
Audio-visual synesthesia	60.58 (36.78)	0.44***	0.47***	0.48***	0.12
Changed meaning of percepts	36.42 (28.69)	0.51***	0.45***	0.45***	0.16*

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Table 10. Summary of the blockwise regression analysis.

5D-ASC subscales (Studerus et al., 2010)	Block						
	1: MEQ30		2: MEQ40		3: PES48		
	R^2	ΔR^2	Paradoxicality (β)	Connectedness (β)	ΔR^2	Visual exp. (β)	Distressing exp. (β)
Experience of unity	0.65***	<0.01	0.04	0.03	<0.01	0.02	-0.03
Spiritual experience	0.57***	0.02**	-0.03	-0.23**	0.01*	-0.05	0.11*
Blissful state	0.66***	0.02***	-0.20**	0.22***	<0.01	-0.01	-0.06
Insightfulness	0.45***	0.02**	0.06	0.24**	<0.01	0.04	0.03
Disembodiment	0.43***	0.01	0.20*	0.04	<0.01	0.04	-0.03
Impaired control and cognition	0.33***	0.05***	0.39***	-0.14	0.11***	0.14**	0.38***
Anxiety	0.15***	0.07***	0.43***	-0.29**	0.41**	-0.01	0.74***
Complex imagery	0.33***	0.01	0.09	0.10	0.04***	0.22***	-0.06
Elementary imagery	0.30***	0.02	0.18	0.11	0.08***	0.31***	0.10
Audio-visual synesthesia	0.27***	0.05***	0.15	0.32***	0.06***	0.28***	0.05
Changed meaning of percepts	0.24***	0.08***	0.39***	0.24**	0.04**	0.23***	0.02

R^2 shows the (adjusted) explained variance for each 5D-ASC subscale by the four MEQ30 subscales (Block 1). ΔR^2 shows the (adjusted) increase in explained variance when the two mystical-experience extensions paradoxicality and connectedness are added (MEQ40; Block 2). The ΔR^2 of the third block shows the explained variance when also the two other-than-mystical-experience extensions visual and distressing experiences are added (PES48, Block 3). The standardized β coefficients show the relative weight of each of the new subscales. For the sake of simplicity, β is only shown for the subscales that were added in the new block (Blocks 2 and 3). For all regression analyses, residuals were normally distributed, as confirmed by visual inspection of Q-Q plots and Kolmogorov-Smirnov test of normality, except for anxiety, which was considerably right-skewed due to many zero values.

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

variance for seven of the 11 5D-ASC subscales. The additional factor of visual experience is positively associated with impaired control and cognition, complex and elementary imagery, audio-visual synesthetic experience, and changed meaning of percepts, showing that visual experience largely contributes to the increase in explained variance for these subscales. Finally, the additional factor of distressing experience is positively associated with spiritual experience, impaired control and cognition, and anxiety. The latter two associations are also reflected in the zero-order correlations. The zero-order correlation between distressing experience and spiritual experience was not significant, suggesting that the negative estimate might be the result of suppression effects.

Cluster analysis. The hierarchical clustering analysis (ICLUST; Revelle, 1979) included all items with a difficulty index greater

than or equal to 0.18 and yielded the following main results (see Supplemental Material 6 for a visualization of the clusters). From the 40 items of our six theory-driven mystical factors of the MEQ40, the cluster analysis grouped 27 of these items in the same cluster that we termed “mystical experience.” Three of the five items from our paradoxicality factor clustered within a mystical subcluster that we termed “paradoxicality and insights into the non-personal realm.” Four of the five items of our connectedness factor clustered within a mystical subcluster that we termed “connectedness and feelings of exaltation, joy, and peace.” All items from our theory-driven visual-experience factor (and more visual-experience items as well as one extrovertive-mystical-experience item) formed a cluster that we termed “visual experience and extrovertive mystical experience.” All items from our theory-derived distressing-experience factor (and more distressing-experience items) formed

a cluster that we termed “distressing experience.” Of note, none of the items from the taken-over subscales from the MEQ30 “transcendence of time and space” and “ineffability” clustered within the mystical cluster, but grouped together within two separate clusters that we, respectively, termed “transcendence” and “ineffability and amazement.” The two items of our paradoxicality factor that did not cluster within the paradoxicality factor (cf. above) clustered within “transcendence.”

One final cluster was formed entirely with items that are not part of the PES48, a cluster we termed “cognitive excellence, emotional closeness, and return reluctance.” Overall, the explorative ICLUST approach confirms our theory-derived factorial breakdown of the psychedelic experience into the extended mystical experience (extended with paradoxicality and connectedness), visual experience, and distressing experience. Furthermore, it provides some interesting additional insights into the future development of psychedelic psychometrics (see Discussion).

Discussion

The theory-driven factor analysis undertaken in this paper leads to two new psychometric measurement possibilities for the PES: a validated six-subscale structure involving 40 items for extended mystical experience, the MEQ40 (MEQ30 + paradoxicality + connectedness) and a validated eight-subscale structure involving 48 items for psychedelic experience, the PES48 (MEQ40 + visual experience + distressing experience). The additional explorative data-driven cluster analysis gave further support for our hypotheses that paradoxicality and connectedness inherently belong to mystical experience, and that visual experience and distressing experience are best treated as separate from mystical experience. The cluster analysis also provided interesting inputs for future research to see whether transcendence of time and space as well as ineffability are best viewed as not belonging inherently to mystical experience, but more as experiences in their own right. The “transcendence” cluster seems to point to a more generic notion of transcendence—one that includes transcendence of time and space but goes beyond that including transcending notions of self, body, and possibly also thought (see Supplemental Material 6). That timelessness and feeling bodiless might often go hand in hand is something that, for instance, has been repeatedly stressed by the late-medieval theologian, philosopher, and mystic Meister Eckhart (n.d./1995, Sermons 2, 19, 49), and is also something that is encountered in modern psychedelic-experience accounts (e.g., Huxley, 1954, pp. 7+24).

Mystical experience as a whole

The high correlations of the subscales paradoxicality and connectedness with the subscale mystical support our hypothesis—as derived from Richards (2015; see Introduction)—that opposite-transcending paradoxicality and connectedness are best viewed as an integral part of mystical experience.

More specifically, we could give support to the views that opposite-transcending paradoxicality (Otto, 1932/2016, p. 48; Richards, 2015, p. 26; Stace, 1960, p. 65) as well as “Love” (Huxley, 1955, p. 139; Richards, 2015, p. 52), “Interrelatedness,” and “Beauty” (Richards, 2015, p. 52) are essential characteristics of the mystical experience. The former—paradox—we conceptualized as an opposite-transcending paradoxicality factor, and the

latter—love/interrelatedness/beauty—as part of the connectedness factor, which was inspired by the qualitative work of Watts et al. (2017). While Richards conceptualized interrelatedness exclusively in relation to humanity (Richards, 2015, p. 50), our connectedness factor shows that this sense of connection might also extend to the world in general (“Intuitive insight into the inner nature of objects and/or persons in your surroundings,” PES item 62). As paradoxicality and connectedness correlate strongly with the MEQ30 subscale mystical—they correlate higher with the MEQ30 subscale mystical than the two MEQ30-internal subscales time/space transcendence and ineffability—we find it appropriate to add paradoxicality and connectedness to the overall conceptualization of mystical experience (and an additional one-or-two-factor analysis also supported this conclusion). Thus, for analyzing the mystical-experience part of the PES, we recommend that researchers use our expanded MEQ40 version (MEQ30 + paradoxicality + connectedness) rather than the MEQ30.

Could it be that there are further common characteristics of the mystical experience that are not covered with the MEQ40 (nor by the MEQ45/43/30 for that matter)? Richards, for instance, for “mystical states that we consider ‘complete’” lists “. . . insights pertaining to (1) God, (2) Immortality, (3) Interrelatedness, (4) Love, (5) Beauty, and (6) Emerging Wisdom” (2015, p. 54). Three of these six themes—namely interrelatedness, love, and beauty—are now covered to some degree with the MEQ40 conceptualization of the mystical experience (and were not covered before with the MEQ45/43/30, and are also not covered by the Mysticism Scale), as these three themes have become part of the Watts-inspired new MEQ40 subscale *connectedness*. However, the other three themes that Richards also theorizes that they belong to a complete mystical experience—God, immortality, and emerging wisdom—are not covered in our MEQ40 nor in any other standardized psychometric tool that was specifically designed to measure mystical experience that we are aware of.

According to Richards, the mystical-experience characteristic of *God* relates to “a sacred dimension of consciousness,” of which mystics care “little . . . about what words one may choose to describe it” (2015, p. 41). So, the word “God” must not necessarily come into play in such an experience, but descriptions that one has experienced “The Ground of Being” seem for example apt (Richards, 2015, p. 41; referring to Paul Tillich’s notion thereof). Richards’ proposed mystical-experience characteristic of *immortality* involves “often an intuitive conviction that the eternal realms of consciousness are indestructible and not subject to time . . . [in which] it does not matter one way or another whether the everyday personality survives when the body stops functioning and decomposes” (pp. 46–48). Finally, Richards proposed mystical-experience characteristic of *emerging wisdom* involves a “dynamic [that] is often described as the divine coming to the individual human life and working effectively within it to effect personal teachings, redemption, or transformation” (p. 54). However, in this conceptualization of “Emerging Wisdom,” the subject-object dichotomy still seems intact—there is the “divine” and the “individual human life”—so emerging wisdom might be best viewed as a visual/visionary experience (cf. Introduction), and future research could investigate it as such. Thus, following up on the proposals of Richards, future research could investigate whether the notions of “God” and “Immortality” might be essential characteristics that inherently belong to mystical experience. It would perhaps be more precise (cf. Richards’

descriptions above) to name and characterize these two notions as something like “primal source/ground of all existence”—for “God” without the name “God” (cf. also Stace, 1960, p. 180)—and as “indestructible consciousness” for “Immortality.” Future psychedelic-psychometric research could investigate whether phenomenologically experiencing the primal ground/source of all existence and indestructible consciousness are common characteristics of the mystical experience or not.

Artistic visual experience (vs. “shallow” visual experience)

Consider the following passage from Pahnke and Richards:

This level of experience [e.g., experiencing “patterns of multi-colored abstract lines,” p. 184] is, of course, very shallow. If the experience progresses beyond this level, one may . . . enter states of more profound aesthetic imagery. In the latter case, common objects in the room may suddenly become transformed into works of considerable beauty and artistic value. (1966, p. 185)

Clearly, the first item of our PES visual-experience factor (“Visions of abstract geometric patterns of colored lines,” item 1) belongs to what Pahnke and Richards would refer to as a “very shallow” visual experience. By contrast, the remaining two items of this factor relate to what they would call a “more profound” and “artistic” visual experience: “Visions of art objects (e.g., mosaics, statues, jewelry, buildings) that reflect expert craftsmanship” (item 17) and “With open eyes, seeing objects around you turn into great works of art” (item 38). The fact that allegedly more shallow and allegedly more profound/artistic visual experiences unite within one factor (within our new PES factor visual experience) is in line with what Pahnke and Richards imply above, namely that these two types of visual experiences might occur within a single psychedelic experience—as the allegedly “very shallow” visual experience might “progress beyond this level” into allegedly “more profound aesthetic imagery.” Future research could investigate whether presumably less-profound psychedelic visual experience might indeed precede (and possibly also follow) presumably more profound/artistic psychedelic visual experience and whether (given its alleged deeper profundity) visual imagery “of considerable beauty and artistic value” might be more related to mystical experience than allegedly more shallow visual imagery, such as ‘only’ seeing “patterns of multi-colored abstract lines.”

Distressing experience—and beyond

While overall we found rather low values (item-difficulty results) for distressing experiences in our PES analyses with healthy individuals, we could still identify a factor for such experience that shows that feelings of fear, despair, isolation, and emotional/physical distress can occur together within the psychedelic-distressing experiential complex. Let us compare our PES distressing-experience factor with the CEQ (Barrett et al., 2016) which contains the following seven distressing-psychedelic-experience factors: fear, grief (which in their conceptualization includes despair), physical distress, insanity, isolation, death, and

paranoia. We have shown that the themes of three factors of the CEQ—namely *fear*, *isolation*, and *physical distress*—can also cluster within one factor, as these three themes have all become part of our PES distressing-experience factor.

One of the altogether four CEQ factor themes that did not become part of our PES distressing-experience factor is *grief*. While in the CEQ grief and despair items feature within the same factor, in our analysis grief and despair (which both were within the same EFA) did not become part of the same confirmed factor (despair became part of the distressing-experience factor, whereas grief did not become part of any factor). This thus does not support the CEQ conceptualization that these two emotional concepts should belong to the same factor. Future research should look more deeply into the overall “place” of grief within the distressing psychedelic experience.

Two more of the factor themes of the CEQ that did not make it into the PES distressing-experience factor (but for which there are also PES items) are *insanity* and *death*. However, distressing psychedelic experiences like experiencing one’s death/one’s total annihilation or fearing that one might go insane have also been proposed to have quite a special role in a specific psychedelic experiential complex: they have been proposed to precede experiences like seeing a brilliant white or golden light and/or experiences of feeling reborn, which then, in turn, might lead to mystical experiences (Grof and Halifax, 1978, p. 51; Richards, 2015, p. 60). Such a psychedelic experiential complex has been referred to with the term personal/transpersonal transition (Richards, 2015, p. 60). If future research wanted to follow up these (thus far only theoretical) personal/transpersonal transition proposals, then the PES would contain all such items to carry out such an analysis (see Supplemental Material 3, theme “personal/transpersonal transition”).

The last CEQ factor theme that did not become part of our PES distressing-experience factor is *paranoia*. However, it is important to note that all seven factor themes of the CEQ are covered with at least one item of the PES100 (for the PES paranoia items see also Supplemental Material 3).

In sum, our PES48 subscale distressing experience brings together vital aspects of the distressing part of the psychedelic experience within a single subscale, and the PES100 also covers further distressing experiences so that altogether the PES has the same distressing-experience conceptual breath as the CEQ. Furthermore, the PES100 also leaves room for future analytical possibilities that would allow to investigate distressing psychedelic experiences as a part of a larger temporal-dynamic psychedelic experiential complex that would go beyond the distressing experience per se and might also include subsequent mystical experiences (personal/transpersonal transitions).

Psychedelic experience as a whole

As mentioned in the Introduction, Pahnke and Richards proposed a comprehensive psychological typology of the psychedelic experience by breaking it up into the following six types: mystical, aesthetic, cognitive, psychodynamic, psychotic, and miscellaneous (e.g., psychosomatic or alleged parapsychological) phenomena (Pahnke, 1969; Pahnke and Richards, 1966, p. 150). As the PES thematically covers all these types (including the miscellaneous one), it is also apparent that the PES was aimed at covering this psychological typology comprehensively as well.

The factor analysis that we undertook in this paper points to a related, but somewhat different first sketch of a comprehensive psychological typology of the psychedelic experience than the one that had first been laid out by Pahnke and Richards almost 60 years ago. Our factor analysis (consisting altogether of 48 of the 100 PES items) suggests a conceptual breakdown of the psychedelic experience into the three basic themes *mystical* experience, *visual* experience, and *distressing* experience.

In Supplemental Material 3, we have provided a first heuristic thematic grouping for all 100 PES items. Many of the 52 items of the PES that have not become a part of a confirmed factor, present still further mystical, visual, or distressing themes. Furthermore, all psychedelic themes that were not categorized as belonging to either mystical, visual, or distressing phenomena, can still be categorized as psychological phenomena, as each of these remaining items still seems to fall into one of the three traditionally identified components of mind (Hilgard, 1980): cognition, affect, or conation (termed “tripartite mind” in Supplemental Material 3). Having provided a thematic breakdown in Supplemental Material 3, which also includes items that did not become part of a confirmed factor, is meant to be a rough conceptual guide for possible future research into these non-factorial themes (e.g., for research with path analyses). Some of these non-factorial themes in Supplemental Material 3 are as follows: personal/transpersonal transition (cf. Grof and Halifax, 1978, p. 51; Richards, 2015, p. 60; see also above), archetypes/entities (cf. Richards, 2015, pp. 79–95), age regression (cf. Richards, 2015, p. 16), confrontation with emotions (cf. Richards, 2015, p. 16), and cognitive excellence (cf. Pahnke and Richards, 1966, pp. 188–189).

In sum, all 100 psychedelic items of the PES can be conceptualized as falling within one of the following themes: mystical, visual, distressing, and tripartite-mind miscellaneous experience. Pahnke and Richards’ proposed six psychological types of the psychedelic experience (Pahnke and Richards, 1966) fall into these four themes as identified in the present work (Supplemental Material 3): “mystical phenomena” of Pahnke and Richards fall also within “mystical phenomena” of our analysis (except that we added connectedness as further mystical subtheme when compared to Pahnke and Richards); “aesthetic phenomena” fall within visual or mystical (connectedness) phenomena; “psychoanalytic phenomena” fall either within a specific theme within visual experience (e.g., *age regression*) or within a specific theme of distressing experience (e.g., *confrontation with emotions*); “psychotic phenomena” fall within the specific distressing-experience themes *paranoia* or *separated from the world*, or within the specific tripartite-mind/cognition theme *delusion of grandeur*; “cognitive phenomena” fall within various tripartite-mind/cognition subthemes such as *cognitive excellence* or *impaired cognition*; and finally, Pahnke and Richards’ “miscellaneous phenomena” fall within tripartite-mind miscellaneous experience (various forms of nonordinary cognition, affect, or conation) or within the theme personal/transpersonal transition (*white/golden light*). Thus, our conceptual breakdown of the psychedelic experience into mystical, visual, distressing, and tripartite-mind miscellaneous experience can accommodate all basic psychological types of the psychedelic experience as proposed by Pahnke and Richards, and can therefore be viewed as comprehensive as their typology of the psychology of the psychedelic experience. Yet, it seems apparent that neither the conceptual breakdown of Pahnke and Richards nor the conceptual breakdown of the psychedelic

experience that has emerged from the analyses of the current paper represent basic enough categories that one could truly call them a typology of the psychology of the psychedelic experience.

A first heuristic approximation to a still more basic typology of the psychology of the psychedelic experience might have been sketched by Richards (2015)—more implicitly so than explicitly so. Richards treats both mystical and (more profound) visual psychedelic phenomena as “religious experiences.” Clearly separating the phenomenological and interpretational levels of such experiences, we prefer to refer to such particular psychedelic experiences at the phenomenological level not as “religious experiences,” but as “religious-like” experiences. This latter term can stand for experiences that phenomenologically match traditional religious and/or contemplative experience, which at the interpretational level might indeed be interpreted religiously/spiritually, but might also be interpreted materialistically or agnostically by the modern individual having these experiences. Richards furthermore clearly separates religious-like phenomena (mystical and some of the profound visual phenomena) from autobiographical phenomena: “[Psychedelic substances] can also trigger personal psychological experiences . . . whether or not they are viewed as having religious import” (p. 16). Thus, two major types of psychedelic experiences could be religious-like experiences and autobiographical experiences. Such types cut across the categories that have emerged in this paper (mystical, visual, distressing, and tripartite-mind) in that religious-like experiences not only involve mystical experiences but can also involve profound visual experiences, and in that autobiographical experiences might involve visual and distressing experiences. Furthermore, it also seems clear that certain themes of mystical subscales of the MEQ40/30 such as positive mood and ineffability do not belong to mystical experience exclusively, as there is no principled reason why such phenomena could not also be associated with for instance certain visual or autobiographical psychedelic experiences. A more definitive typology of the psychology of the psychedelic experience can only be determined by future research. Perhaps such a typology will consist of a *religious-like* type (e.g., encompassing mystical experiences and certain profound visual experiences), an *autobiographical* type (e.g., encompassing age regression and autobiographically related confrontation with unresolved emotions), and a *tripartite-mind* (*cognition*, *affect*, and *conation*) type which would include all mental experience which neither lends itself as being categorized as religious-like experience nor as being autobiographically related experience—such as the type of visual experience that Pahnke and Richards have termed “very shallow” (1966, p. 185; cf. above).

As mentioned, the PES100 is aimed at covering the psychedelic experience rather comprehensively. On a final pragmatic note, Table 11 compares some of the psychedelic themes that are covered with the PES100 with the psychedelic themes of the two other psychedelically used questionnaires that aim at capturing the psychedelic experience rather comprehensively—the 5D-ASC (Dittrich, 1998; Studerus et al., 2010) and the Hallucinogen Rating Scale (HRS; Strassman et al., 1994). As such, Table 11 is meant to be a conceptual overview for assisting a psychedelic researcher or therapist in the decision of which questionnaire to use for her/his measurement purposes.

Some of the highlights that emerge when looking at Table 11 are as follows: all three scales (PES100, 5D-ASC, and HRS) cover mystical experiences of oneness (though in the HRS by

Table 11. Some basic psychedelic themes covered or not covered with the three most comprehensive questionnaires used to measure psychedelic experience. A theme not covered by a particular questionnaire is marked with a grey cell. Bold items within single cells or within complex cells (cell collections that contain dashed-lines cells within them) indicate that these bold items taken together constitute a validated factor for the given subtheme. If there is more than one validated factor within a single cell, these factors are separated by square brackets.

Basic Psychedelic themes	Subthemes	Items PES100	Items 5D-ASC	Items HRS
Mystical oneness experience	–	[(12) (35) (41) (54) (77) (83)] [(14) (47) (74)]	(18) (34) (41) (42) (52)	(43)
	Transcendence of time and space	(2) (12) (15) (29) (34) (42) (48) (65)	(36) (41) (52)	(58) (86–86a)
Further mystical experience	Objectivity and reality, noetic quality	(3) (9) (22) (69)	–	(82–82a)
	Deeply positive mood, blissful state	(5) (10) (18) (30) (43) (50) (60) (80) (87)	(12) (86) (91)	(35) (36a) (37) (53)
	Sense of sacredness, spiritual experience	(5) (8) (31) (36) (55) (73)	(9) (81) (94)	(33)
	Paradoxicality	(19) (26) (27) (42) (51) (59)	(42) (45)	(74)
	Ineffability	(6) (23) (86)	–	–
	Connected to self	–	–	(27a) (76–76a)
	Connected to others	(62) (63) (99)	–	(31a)
	Connected to world	(62)	(54), (87)	–
	Connected to spiritual principle	(3) (60)	(91)	(33)
	Connected to beauty	(58) (95)	(57)	–
Visual/sensed experience	Elementary, geometric, or artistic-quality visual experience	(1) (17) (38)	[(14) (22) (33)] [(39) (72) (82)] (28) (31) (54)	(61–68a)
	Synesthesia	–	(20) (23) (75)	(56) (63)
Distressing experience	Incarinate entities/beings, archetypes	(37) (49) (56) (71) (75) (82) (96) (97)	–	–
	Travel/contact with past	(7) (75) (81) (90)	–	–
	Age regression	(20) (33) (92) (98)	–	(78) (79)
	Distressing emotion	(13) (16) (28) (45) (52)	(32) (43) (44) (46) (56) (64) (89)	(25–27) (44)
	Confrontation with emotions	(4) (57) (88) (91)	–	(36)
	Meaninglessness/absurdity of life	(61)	–	–
	Paranoia	(40) (72)	–	–
	Physical distress	(39) (89) (93)	–	(9) 10) (11) (12) (13) (14) (16) (23) (24)
	Personal/transpersonal transition	(70) (84) (85)	–	(70) (88–88a)
	Personal/transpersonal post-transition	(25) (67) (100)	–	(45) (69)
Nonordinary cognition/affect/conviction	Nonordinary affect	(64)	(35)	(41–41a)
	Nonordinary cognition—disembodiment	(53)	(26) (62) (63)	(21)
	Nonordinary cognition—nonordinary somesthesia	(10)	(80)	(8)
	Nonordinary cognition—insightfulness, cognitive excellence	(32) (79)	(50) (58) (69) (77) (90)	(81–81a)
	Nonordinary cognition—impaired thought/perception	(21)	(27) (38) (64) (67) (88)	(75) (81–81a)
	Nonordinary conviction—impaired volition	(66)	(8) (47) (78) (80)	(94–96)

only one item); all three scales cover further common characteristics of the mystical experience, but none cover all known types of these further common characteristics of the mystical experiences; all three scales cover at least some of the connectedness themes, but none cover all types of known connectedness experiences; all three scales cover visual/sensed phenomena, but none cover all types of visual/sensed experiences listed in Table 11; the PES covers distressing experience rather comprehensively while the HRS and the 5D-ASC show some basic gaps (e.g., no item for paranoia); only the PES100 and the HRS have items that can cover the personal/transpersonal-transition theme while the 5D-ASC lacks any such item; and finally, all cover various forms of nonordinary tripartite-mind aspects (nonordinary cognition/affect/conation) such as disembodiment, cognitive excellence, impaired cognition, and impaired volition.

So which questionnaire should a psychedelic researcher/therapist use if she or he wants to measure psychedelic experience comprehensively? As each of the three questionnaires leaves out certain themes that are covered in one or two of the other questionnaires, the answer will depend on which themes should not be left out in the psychedelic measurement for the given research or clinical context. For instance, if connectedness is desired to be part of the overall psychedelic measurement, then the PES100 has the fewest gaps for this experiential complex, or if synesthesia should not be left out from the measurement, then only the 5D-ASC or the HRS offer themselves as measurement possibilities. As each of these three questionnaires covers basic psychedelic themes that the others do not, it would of course be ideal to use all three scales together for a comprehensive measurement of the psychedelic experience. However, this is clearly not an ideal situation, since these three scales do not only complement one another but also show considerable overlap. While the possibility of a both *comprehensive and concise* covering of the psychedelic experience with one single questionnaire that is still of economical length (say, no more than 100 items) seems a conceivable possibility, such a psychometric tool is currently not at hand yet. Hopefully, future psychedelic research will bring about such a tool, and Table 11 could serve as a rough, heuristic starting point/guide for such an endeavor. As mentioned in the Introduction, such a general questionnaire on the psychedelic experience could always also be combined with more specialized questionnaires on the psychedelic experience.

Strengths and limitations

This evaluation has several strengths and limitations. One strength is that we could show through factor analysis that many items of the PES that traditionally have been treated as “distracter items” (e.g., Griffiths et al., 2006, p. 272) can meaningfully and informatively extend the conceptualization of mystical experience and psychedelic experience in general. In comparison with other questionnaires used for measuring the psychedelic experience, the PES covers mystical experience and further psychedelic experience more comprehensively than has hitherto been possible within a single questionnaire. Furthermore, the entire PES (PES100) may also be a powerful and informative tool for investigating still further basic psychedelic-experiential themes in future research (see Supplemental Material 3).

Limitations include that the PES contains no item matching for “connectedness to self” so that our connectedness subscale lacked the possibility to measure this potentially important aspect of the overall psychedelic connectedness experience (cf. Watts

et al., 2017, 2022). Another limitation is that we cannot explain with certainty why the model fit of the MEQ30 in our study was worse than that reported by Barrett et al. (2015). This might be due to differences in the sample or the different languages of the questionnaire (German vs. English). Furthermore, our German version of the PES is in need of a few minor corrections/modifications that we have already implemented in the version in Supplemental Material 4, but which were not implemented in the version used in our analyzed studies. Namely: for items 63 and 72, we replaced “Therapeut” (Therapist) and “Co-Therapeutin” (Co-Therapist) with “Betreuer/-in” and “Co-Betreuer/-in,” respectively. These terms refer to the study guides. As all studies we have included were studies with healthy volunteers, the terms therapist/co-therapist are not apt and have now been replaced accordingly with the terms that can be used in both healthy participants and patients. In addition, our German translation of the PES also contained one translation inaccuracy: items 55 (“Sense of reverence”) and item 80 (“Sense of awe or awesomeness”) were translated the same in the German version: as “Gefühl der Ehrfurcht.” We consider the concepts of *reverence* and *awe/awesomeness* semantically close enough so that this translation inaccuracy should not have impacted the results of the analysis.¹² However, for future use, we corrected it in the PES version of Supplemental Material 4: item 55 (“Sense of reverence”) is now rephrased to “Gefühl der Hochachtung,” and item 80 (“Sense of awe or awesomeness”) now to “Gefühl der Ehrfurcht oder Grossartigkeit.” An important further limitation of our study is that our new subscales (paradoxicality, connectedness, visual experience, and distressing experience) were only validated for the German version of the PES, awaiting potential validation of the same subscales for the original English PES, and for possible further translations of the PES into still other languages. Also a limitation is that despite the efforts of Pahnke and Richards to make the PES generally comprehensible (cf. Introduction), it is still questionable whether everybody understands some of the still more philosophical items, such as “Experience of a paradoxical awareness that two apparently opposite principles or situations are both true” (PES item 19). Future developments could see whether there were ways to express the basic ideas of such philosophical concepts in simpler terms (for item 19, e.g., “Two things that contradicted each other seemed to be both true at the same time”). Finally, the question arises if it is not a limitation that we did not calculate the LSD and psilocybin data separately. However, as these two substances do not show different psychedelic effects (Holze et al., 2022; Ley et al., 2023), and the purpose of the current study was not a further comparison between these two substances, but a factor analysis that characterizes psychedelic experience in general, these two classic-psychedelic substances can be considered together in the context of the present study. Nevertheless, concerning classic psychedelics in general, future studies should also investigate, whether the factor structure can be replicated with larger samples across a still wider spectrum of classic psychedelics (e.g., also with DMT and mescaline).

Conclusion and outlook

With the revival of the PES, this paper has brought back an expertly crafted questionnaire on the psychedelic experience, and it has been shown that it can be used to many advantages: psychedelic-mystical experience and other psychedelic experiences can now be measured much more comprehensively than has hitherto been

possible within a single questionnaire. An overview of the factors and themes of the PES100 can be found in Supplemental Material 3, the actual scale (English and German versions of the PES100) in Supplemental Material 4,¹³ and the PES scoring key (PES48, MEQ40, and MEQ30) in Supplemental Material 5. Inspirations for future research might also be drawn from the graphic representation of our cluster analysis (Supplemental Material 6).

While of course more future research into the psychological nature of the psychedelic experience is needed, we believe that with the PES—with the analytical approaches developed in this paper—we already now have a truly informative and rather comprehensive measurement of the psychedelic experience at hand that can be used in both clinical research and practice.

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Ethical standards

All pooled studies were conducted in accordance with the Declaration of Helsinki and International Conference on Harmonization Guidelines in Good Clinical Practice and approved by the Ethics Committee of Northwest Switzerland (EKNZ) and the Swiss Federal Office for Public Health. All of the participants provided written informed consent and were paid for their participation.

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Data availability

Data of this study may be available for specific projects upon request to the last author.

Supplemental material

Supplemental material for this article is available online.

Article Note

The following updates were made to this article: a sentence within the Cluster Analysis section on pages 10 & 13 was updated from “included

all items with a difficulty index greater than or equal to” to “included all items with a difficulty index greater than or equal to 0.18”

Notes

1. W. A. Richards, personal communication, January 5, 2022.
2. R. R. Griffiths, personal communication, May 18, 2021.
3. The three reasons why we keep the name PES (rather than SOCQ) are the following. First, the SOCQ treats the 57 non-MEQ items as “distracter items” (Griffiths et al., 2006, p. 272), whereas we view all 100 items as psychedelic items. Second, the term “states of consciousness” is often used as an umbrella term for ordinary and nonordinary states of consciousness (e.g., Bernstein, 2016, p. 299), but the PES only measures nonordinary ones. Third, the PES for its SOCQ 100 revision was edited very mildly, and great care was taken to leave the original as intact as possible: the response range (0–5) was left the same and only the explanations for the response values 4 and 5 were slightly modified; in the questions themselves only four formal minor changes can be detected (e.g., replacing an “and” with “and/or”); and, as the final change, the only semantic rephrasing in the questions was to replace “therapist” with “guide” and “nurse” with “assistant guide.”
4. W. A. Richards, personal communication, January 5, 2022.
5. The MEQ30 items of the German PES were published by Liechti et al. (2017).
6. While Pahnke’s 1969 MEQ is not commonly referred to as the “MEQ45,” we do so in this paper, to easily refer to it.
7. Furthermore, Hood also writes that (in relation to the question of whether or not paradoxicality should be considered an essential characteristic of the mystical experience): “Stace himself seems to waver on this point (Stace, 1960: 270-276)” (1975, p. 31). However, going through these pages that Hood cites from Stace (or going through the whole book of Stace), we find nothing that would support the statement that Stace wavered on this point, and what will be cited from Stace (1960, pp. 79+305) in the next paragraph also supports the notion that Stace took a strong stance that paradoxicality is a common characteristic of the mystical experience.
8. In original German: “Die opposita koinzidieren, ohne aufzuhören zu sein, was sie in sich sind” (Otto, 1926/1957, p. 63).
9. Pahnke’s paradoxicality subscale consisted only of two items (19 and 59), whereas our same-named item collection for the EFA analysis contains an additional four items (cf. Table 1).
10. W. A. Richards, personal communication, January 5, 2022.
11. W. A. Richards, personal communication, January 5, 2022.
12. Note that allowing an additional covariance between these two items did not have a strong impact on the model fit parameters, so for the sake of simplicity we decided to not account for this in the analysis.
13. The 100 items of this questionnaire are the original items from the Psychedelic Experience Questionnaire from Walter Pahnke and William Richards (with the already mentioned minor revisions from William Richards and Roland Griffiths around the turn of the millennium and also with some very minor revisions of the MEQ30). The instructions of the questionnaire have partially been based on an old extended version of the PES from Yensen and Di Leo that they had termed the “Peak Experience Profile.” The original German translation was from Peter Gasser, and the current supplement has been slightly revised by Kurt Stocker.

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