

The Noetic Quality: A Multimethod Exploratory Study

David B. Yaden
University of Pennsylvania

Khoa D. Le Nguyen
University of North Carolina at Chapel Hill

Margaret L. Kern
University of Melbourne

Nancy A. Wintering
Thomas Jefferson University

Johannes C. Eichstaedt
University of Pennsylvania

H. Andrew Schwartz
Stony Brook University

Anneke E. K. Buffone and Laura K. Smith
University of Pennsylvania

Mark R. Waldman
Loyola Marymount University

Ralph W. Hood Jr.
University of Tennessee at Chattanooga

Andrew B. Newberg
Thomas Jefferson University

Religious, spiritual, and mystical experiences (RSMEs) are often described as having a noetic quality, or the compelling sense that the experience feels “real.” In this exploratory, multimethod study, 701 participants completed questions about the subjective qualities of their RSMEs, reported the impact of their RSMEs on various life domains, and provided written descriptions of their experiences for quantitative linguistic analysis. The majority of participants (69%) reported that their RSMEs felt “more real than their usual sense of reality.” This quality of realness was associated with positive self-reported impacts on family life ($r = .16$), health ($r = .22$), sense of purpose ($r = .29$), spirituality ($r = .30$), and reduced fear of death ($r = .24$). Participants who reported experiences as feeling more real used more language referring to connection, a greater whole, and certainty (“love,” “all,” “and,” “everything”) and fewer first-person pronouns, cognitive processes, and tentativeness (“I,” “me,” “think,” “probably”). These findings provide insight into the noetic quality, as well as the psychological characteristics that may underlie the noetic quality of RSMEs.

Everything else might be a dream, but not that
—William James, (1902/1985),
The Varieties of Religious Experience.

A general analysis of descriptions of religious, spiritual, and mystical experiences

(RSMEs; [Beauregard, 2011](#)) suggests that among many factors that characterize such experiences—such as perceptions of unity, ineffability, positive emotions, and sacredness—one important element is the *noetic* quality, or the

David B. Yaden, Department of Psychology, University of Pennsylvania; Khoa D. Le Nguyen, Department of Psychology and Neuroscience, University of North Carolina at Chapel Hill; Margaret L. Kern, Melbourne Graduate School of Education, University of Melbourne; Nancy A. Wintering, Myrna Brind Center of Integrative Medicine, Thomas Jefferson University; Johannes C. Eichstaedt, Department of Psychology, University of Pennsylvania; H. Andrew Schwartz, Computer Science Department, Stony Brook University; Anneke E. K. Buffone, Department of Psychology, University of Pennsylvania; Laura K. Smith, Department of Psychology, University of Pennsylvania; Mark R. Waldman, Department of Business, Loyola Marymount Uni-

versity; Ralph W. Hood, Jr., Department of Psychology, University of Tennessee at Chattanooga; Andrew B. Newberg, Myrna Brind Center of Integrative Medicine, Thomas Jefferson University.

This publication was made possible through the support of grant 0048 from the Templeton Religion Trust. The opinions expressed in this publication are those of the authors and do not necessarily reflect the views of the Templeton Religion Trust.

Correspondence concerning this article should be addressed to David B. Yaden, Department of Psychology, University of Pennsylvania, 3701 Market Street, Suite 200 Philadelphia, PA 19104. E-mail: dyaden@sas.upenn.edu

compelling sense that the experience feels “real” (Griffiths et al., 2008; Griffiths, Richards, McCann, & Jesse, 2006; Hood, 1975; James, 1902/1985; Stace, 1960; Yaden et al., 2015; Yaden, Iwry, Slacl, et al., 2016; Yaden, Le Nguyen, Kern, et al., 2016). To illustrate, the quote that begins this article comes from an individual insisting on the sense of realness—or noetic quality—associated with his RSME in James’s (1902/1985) classic study of the topic, *The Varieties of Religious Experience: A Study in Human Nature*.

People can typically distinguish “real” experiences from those experienced in dreams or hallucinations. Although on their face, RSMEs may seem closer to such hallucinatory or dream-like states, these experiences are often anecdotally described as feeling somehow *more* real than other quotidian “real-life” experiences. RSMEs and other mental states associated with perceived changes in realness have been grouped under the broader category of *epistemic* states (d’Aquili & Newberg, 1993, 2000), or mental states associated with altered intuitions about reality. Even though this feeling of realness constitutes an important aspect of RSMEs and other epistemic states (such as derealization disorder; see Simeon & Abugel, 2006), few empirical studies have sought to further understand this noetic quality.

Historically, feelings of realness reported during RSMEs have often been treated as knowledge claims, or attempts to report them as facts about the world (Russell, 1917). For example, people often make statements following their RSMEs such as, “all is one,” or about the “inherent goodness” of the world. Scholars have debated whether sensory information from RSMEs is similar in kind to ordinary sensory information, and thus a potentially valid source of “true beliefs” about the world (e.g., Alston, 1991). But the unfalsifiable nature of many statements that follow RSMEs has made the claims of realness associated with these experiences difficult to study. Regardless of whether the content of mystical experiences can be objectively evaluated, the subjective feeling of realness can be empirically studied and is the topic of the present study.

William James (1902/1985) made a similar distinction between subjective feelings of realness and knowledge claims, writing “the feeling of reality may be something more like a sensa-

tion than an intellectual operation properly so-called” (p. 58). To operationalize this feeling of reality, James suggested that a key criterion for mystical experiences is that they have a noetic quality, the sense that objectively true aspects of reality have been revealed. But it is the feeling quality of the experience that we are concerned with, rather than the content or veracity of beliefs that may derive from RSMEs.

Feelings of realness are subject to change during a number of different mental states, each of which could therefore be considered an epistemic state (d’Aquili & Newberg, 1993, 2000). For example, alterations in realness occur in clinical disorders such as derealization disorder, in which existence can feel very *unreal* (Simeon et al., 2000). Individuals with this disorder might say things like “everything feels unreal to me, like a dream” (Simeon & Abugel, 2006). This dreamlike sense of unreality can be differentiated; a factor analysis of derealization symptom clusters included factors such as “unreality of self” or “unreality of surroundings” (Simeon et al., 2008). More generally, most altered states seem less real. For example, for most people, dreams usually feel real only during sleep, hallucinations from fever fade with a return to health, and paranoid delusions disappear with treatment. Most altered states of consciousness—though seemingly real while they occur—are described as less real in hindsight. RSMEs appear to be an exception.

A recent resurgence of interest in using RSMEs in interventions (e.g., meditation, retreats, psychedelic substances) underscores the urgency of better understanding the qualities of these states, including their sense of realness (e.g., Griffiths et al., 2006; Yaden, Le Nguyen, Kern, et al., 2016; Yaden, McCall, & Ellens, 2015). RSMEs can be elicited in retreat settings (Hood, 1977), through meditation (Newberg et al., 2001), under conditions of sensory isolation (Hood, Morris, & Watson, 1990), with psychedelic drugs (Griffiths et al., 2006, 2008; Hood, 2014), and perhaps in the near future, with noninvasive brain stimulation (Yaden, Anderson, Mattar, & Newberg, 2015; Yaden, Iwry, & Newberg, 2016; Yaden & Newberg, 2014). Beyond intentional interventions, RSMEs also occur spontaneously. Taking intentional and spontaneous experiences into account, reviews of survey research report that about 33% of Amer-

icans have had intense spiritual experiences (Hood, Hill, & Spilka, 2009).

Noetic quality has been measured with scales such as the Mysticism Scale (M-Scale; Chen, Yang, Hood, & Watson, 2011; Hood, 1975; Hood & Williamson, 2000) and the Mystical Experience Questionnaire (MEQ; MacLean, Leoutsakos, Johnson, & Griffiths, 2012). However, these scales do not measure the full range of feelings of realness associated with the noetic spectrum, spanning from unreal (which might capture instances of derealization), to an ordinary sense of realness, to realer than real. Further understanding of the factors that influence the feeling of realness could provide information regarding the nature of RSMEs, as well as more basic aspects of the human perception and evaluation of reality.

Beyond these questionnaire measures, written descriptions may capture more information regarding noetic qualities and psychological processes underlying the special sense of realness associated with RSMEs. In the current study, we first analyzed psychometric responses about RSMEs to determine how real participants' RSMEs felt compared with normal reality and how this feeling subsequently affected various life domains. We then explored linguistic features associated with ratings of realness using computational linguistic analysis. In line with the existing literature, we expected that RSMEs would be reported as feeling more real than usual reality and would have a positive impact on various life domains. Although we did not have specific predictions about what linguistic features would be associated with the feeling of realness, we performed linguistic analysis to elucidate factors that characterize real-feeling RSMEs.

Method

Participants

A website hosted by the University of Pennsylvania was used to explicitly survey spiritual experiences. Of 2,718 respondents who began the online survey, 701 participants (25.8%) completed both the relevant survey items and wrote at least 25 words about their RSMEs. This drop-off of responses is consistent with other online surveys requiring multiple choice and written responses.

The included sample was generally middle socioeconomic status (SES) and White (Lower SES = 12.98%, middle = 75.32%, upper = 9.12%; White = 82.74%, Black = 2.57%, Asian = 2.14%, Hispanic = 3.71%, other = 7.14%). There were slightly more men (52.78%) than women (43.94%), and a large number of participants indicated their religious affiliation as other (32.38%) or atheist (26.39%). Other religious affiliations included Christian (18.40%), Jewish (2.00%), Islamic (0.29%), Hindu or Buddhist (7.56%), Pagan (3.00%), and Unitarian Universalist (2.43%).

Compared with those who were excluded due to their insufficient responses, the included sample scored higher on mysticism (3.28 vs. 3.02 out of 4), $t(1093) = 4.99, p < .001, d = .29$, but did not significantly differ from the excluded sample in how real they felt their RSMEs were at the time, $t(480) = 1.92, p = .055$ or in hindsight, $t(423) = .59, p = .56$, or in terms of SES, $\chi^2(2) = 4.80, p = .09$, gender, $\chi^2(1) = .19, p = .66$, or ethnicity, $\chi^2(7) = 8.71, p = .27$.

Measures

Participants completed various scales through an online survey, a subset of which is included in the current study.¹ The University of Pennsylvania's Institutional Review Board approved all procedures.

Epistemic State. Participants answered two items about the realness of their RSME on a 5-point scale (1 = *much less real*, 5 = *much more real*): "When you had the experience how did it compare to your usual reality?" (measuring perceived realness during the experience) and "Looking back at your experience—how real do you consider it now?" (measuring perceived realness in hindsight).

Death Transcendence Scale: Mysticism subsection. The Mysticism subsection of the Death Transcendence Scale (Hood & Morris, 1983) is based on Hood's (1975) Mysticism Scale (M-Scale), a well-established measure of mystical experiences (Hood, et al., 2001). The

¹ Other scales included the Quest Scale (Batson & Schoenrade, 1991), the Religiousness Measure (Sethi & Seligman, 1993), the Intrinsic Religious Motivation Scale (Hoge, 1972), and the Index of Core Spiritual Experiences (Kass et al., 1991). As the focus of the current study was on mystical experiences, these measures were not analyzed here.

Mysticism subscale (five items; Cronbach’s $\alpha = .90$) measured experiences of unity, including items such as, “I have felt at one with all things.”

RSME Impact. Participants rated six single-item questions on a 5-point scale (1 = *much worse*, 5 = *significantly better*) on how the experience changed their “family,” “fear of death,” “health,” “sense of purpose,” “religiousness,” and “spirituality.”

RSME Writing Prompt. An open-ended writing prompt asked participants to

describe in detail the various spiritual and/or religious experiences that you have had and how they have affected you. If you have had a specific religious or spiritual experience(s), please describe it in as much detail as possible—as long or as short as you wish.

Participants wrote a total of 322,813 words ($M = 460.5$, $SD = 692.64$, median = 234, range = 25–6,776 words per entry).

Data Analyses

To test whether the realness of RSMEs was related to the extent that the experience was reported as “mystical,” we first correlated Epistemic State with the Mysticism subscale of the Death Transcendence Scale (Hood & Morris, 1983). To test the relationship between the realness of the experience and how positive the experience was perceived to be, we correlated

the Epistemic State items with the RSME Impact questions. We also calculated the partial correlations between the realness of RSMEs and the above variables, controlling for SES, gender, ethnicity, and religious affiliation.

Then, to explore the qualities underlying these responses, we drew on methods from computational linguistics. First, the Linguistic Inquiry and Word Count program, 2001 version (LIWC2001; Pennebaker, Francis, & Booth, 2001) tokenized (i.e., split text into separate words) and counted how often words from 64 different categories (e.g., social processes, function words, work, pronouns) occurred in each participant’s writing. We then considered the relative frequency of each word in each LIWC dictionary and correlated them with the Epistemic State items. We used Bonferoni-corrected p values as a heuristic for identifying meaningful patterns and words.

Results

Descriptive Statistics

Most participants (69.62%) reported that their RSMEs at the time felt *much more real* (47.22%) or *somewhat more real* (23.40%) than their usual reality (see Figure 1). Very few participants (12.41%) rated their RSMEs as *somewhat* or *much less real* than usual reality.

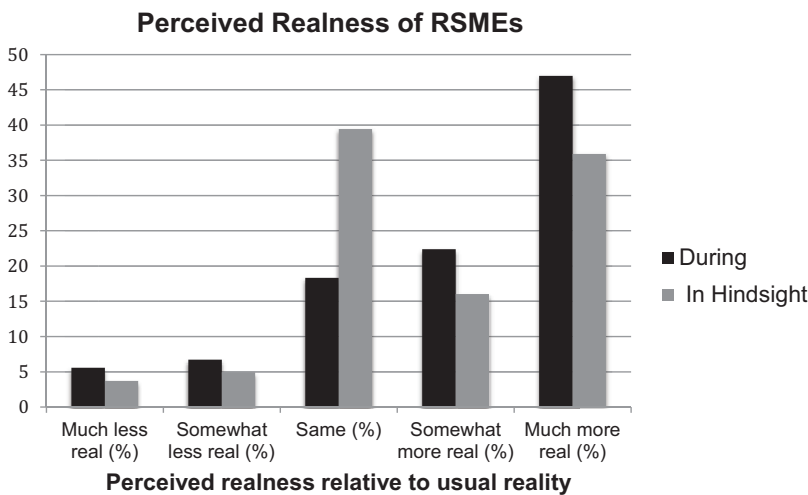


Figure 1. Perceived realness associated with Religious, spiritual, and mystical experiences (RSMEs). Participants were asked to remember how real their RSME felt compared with their usual reality, both during the experience and how real it remained to them in hindsight.

This document is copyrighted by the American Psychological Association or one of its allied publishers. This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

In hindsight, the perceived realness of RSMEs somewhat decreased, with 52.07% reporting that their RSMEs felt *much more real* (35.95%) or *somewhat more real* (16.12%) than usual reality. Few participants rated their RSME as *less real* in hindsight (8.70%).

Perceived realness during RSMEs was positively correlated with items in the Mysticism subscale (Hood & Morris, 1983), as well as with most of the RSME Impact items. Despite somewhat small effect sizes, the strongest correlations were found with the sense of purpose and spirituality variables (see Table 1). Perceived realness in hindsight showed a similar pattern of correlation. Associations remained almost the same after controlling for SES, gender, ethnicity, and religious affiliations.

Language Results

Table 2 reports significant correlations between the LIWC2001 (Pennebaker et al., 2001) categories and the Epistemic State Scale. Participants reporting that their RSMEs felt more real at the time than their usual reality used more language from the certainty category, $r = .16, p < .001$, including words such as “all,” “everything,” and “every,” and less language from the first-person pronoun category, such as “I” and “me,” $r = -.17, p < .001$. In hindsight, the sense of realness related to using more “inclusive” words such as “and” and “we,” $r = .12, p < .01$ and fewer “tentative” words such as “probably” and “might,” $r = -.10, p < .05$. Table 2 also reports specific words within categories that significantly correlated with the

Epistemic State items. For perceived realness during the experience, the words “love,” “everything,” and “all” correlated with realness, whereas the words “I,” “think,” and “not” correlated with “unrealness.” In hindsight, “and,” “we,” “must,” and “love” correlated with realness, while “probably,” “might,” “or,” and “not” correlated with unrealness.

Discussion

First, the results from this study support findings that RSMEs often include a noetic quality, or a sense of realness (e.g., Hood, 1975; Hood & Williamson, 2000; MacLean et al., 2012). The noetic quality was reported during RSMEs as well as in hindsight, measured on a scale ranging from *unreal* to *realer than real*. Second, the sense of realness correlated with a number of positive outcomes. Third, feelings of realness during RSMEs were associated with language suggesting inclusiveness (e.g., “all,” “everything”) and emotional connection (e.g., “love”), and negatively associated with self-oriented language (e.g., “I,” “me”) and indicative of cognitive processing (e.g., “think”). In hindsight, realness was positively associated with inclusiveness (e.g., “and,” “we”) and negatively associated with tentative language (e.g., “probably” and “might”). Taken together, these findings provide some empirical insights into the role the sense of realness plays in RSMEs.

The finding that RSMEs were rated as real—and that very few participants rated their experiences as unreal—is notable, as RSMEs have

Table 1
Correlations and Partial Correlations Amongst Epistemic States, Impact of RMSEs, and Mystical Experiences

Factors	1	2	3	4	5	6	7	8	9
1. Epistemic State: Realness during the experience		.45***	.15***	.24***	.22***	.28***	.08*	.30***	.23***
2. Epistemic State: Realness after the experience	.46***		.18***	.25***	.26***	.30***	.15***	.28***	.19***
3. RSME Impact: Family	.16***	.18***		.27***	.31***	.32***	.24***	.26***	.11**
4. RSME Impact: Less fear of death	.24***	.25***	.27***		.39***	.41***	.04	.37***	.18***
5. RSME Impact: Health	.22***	.25***	.32***	.40***		.44***	.16***	.26***	.17***
6. RSME Impact: Purpose	.29***	.31***	.32***	.45***	.45***		.22***	.55***	.08
7. RSME Impact: Religiousness	.09*	.15***	.24***	.05	.15***	.22***		.29***	-.03
8. RSME Impact: Spirituality	.30***	.29***	.26***	.38***	.29***	.55***	.27***		.20***
9. Mystical Experience	.23***	.17***	.12**	.19***	.18***	.08*	-.02	.21***	

Note. RSME = Religious, spiritual, and mystical experience. Pearson correlations are below the diagonal; partial correlations controlling for socioeconomic status (SES), gender, ethnicity, and religious affiliations are above the diagonal. * $p < .05$. ** $p < .01$. *** $p < .001$.

This document is copyrighted by the American Psychological Association or one of its allied publishers. This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

Table 2
Language Categories Associated With Epistemic States

	LIWC categories	Words
Feeling of realness <i>during</i> the spiritual experience		
Positive correlations	Certainty ($r = .16$)** Quant ($r = .10$)* Sexual ($r = .10$)*	All ($r = .10$)*, everything ($r = .08$) ⁺ All ($r = .10$)* Love ($r = .11$)*
Negative correlations	I ($r = -.17$)** Verb ($r = -.12$)** Negate ($r = -.10$)*	I ($r = -.16$)**, me ($r = -.10$)* Think ($r = -.16$)**, made ($r = -.09$) ⁺ , I'm ($r = -.09$) ⁺ , died ($r = -.08$) ⁺ , do ($r = -.08$) ⁺ , went ($r = -.07$) ⁺ Not ($r = -.11$)*
Feeling of realness in <i>hindsight</i>		
Positive correlations	Inclusive ($r = .12$)* Certainty ($r = .08$) ⁺ Sexual ($r = .07$) ⁺	And ($r = .10$)*, we ($r = .08$) ⁺ Must ($r = .08$) ⁺ Love ($r = .09$) ⁺
Negative correlations	Tentative ($r = -.10$) ⁺ Negate ($r = -.08$) ⁺	Probably ($r = -.13$)**, might ($r = -.08$) ⁺ , or ($r = -.08$) ⁺ , someone ($r = -.08$) ⁺ Not ($r = -.09$) ⁺

Note. LIWC = Linguistic Inquiry and Word Count. LIWC linguistic correlates of the feeling of realness. This table excludes categories in which words were used fewer than 50 times. The “Words” column includes single words within each corresponding LIWC category most correlated with the Epistemic State measure.

⁺ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

asometimes been conflated with episodes of derealization and depersonalization. For example, Simeon and Abugel (2006) describe RSMs as a form of derealization episode, which “manifests itself as unpleasant more often than not. People subjected to it are not looking for a visionary experience, nor an opportunity to detach from their previous selves. The result is much more hellish than heavenly” (p. 149). This view is challenged by the results of the current study, in which RSMs were consistently perceived as more real than one’s usual sense of reality—not as less real, as in cases of derealization episodes.

In hindsight, a number of participants adjusted their impressions of the relative realness of their RSMs, which makes more sense when we consider the analogy of dreams. Consider a dream that seems to contain a prediction about the future. Many people might report that their dreams seemed real as they were happening, but many would, after reflection, reduce their assessments of how real the dreams seemed in hindsight. Notably, even in hindsight, few participants indicated that their RSMs felt unreal.

The association between the feeling of realness and positive impacts from the experience is another point of contrast between derealization episodes and RSMs found in this study. Whereas derealization episodes are associated

with maladaptive outcomes such as a lack of empathy and a sense of disconnection from other people (Hunter, Sierra, & David, 2004), RSMs correlated with positive changes in family life, reduced fear of death, better health, and a greater sense of purpose, which aligns with other research on RSM outcomes (Koenig, King, & Carson, 2012). Although pathological instances of RSMs, some requiring therapeutic care, have been described extensively in the clinical literature (Lukoff, Lu, & Turner, 1992), our findings suggest that RSMs more often result in adaptive outcomes. This provides compelling evidence for future studies on the connection between RSMs and well-being, making the present findings relevant to positive psychological research (Seligman & Csikszentmihalyi, 2000; Seligman, 2015). Future studies might explore the aspects of those experiences that contribute to well-being while also exploring narrative, relational, and contextual factors.

Our linguistic analysis correlating linguistic features with the Epistemic State items identified inclusive language related to connection with a larger whole. Language associated with feelings of realness included more words such as “all” and “everything,” and fewer first-person pronouns such as “I” and “my.” Words such as “all” and

“everything” may refer to a greater whole, as in “at one with all things” or “everything felt alive.” RSMs commonly involve, and are sometimes defined by, a connection to a greater whole and a diminished sense of self (Hood et al., 2001). Fewer first-person pronouns may reflect the oft-reported sense of self fading away into a state of unity during such experiences (Hood et al., 2009). This phenomenological interpretation is theoretically consistent with the nature of RSMs, especially the emphasis of selfless unity often found in mystical experiences (Hood et al., 2001; Newberg et al., 2001).

An alternative, qualification interpretation of the language findings is that respondents who reported heightened realness may have expressed more assurance in their language, whereas those with lower realness hedged more. This seems plausible given that the noetic quality—the feeling quality or any other subjective contents associated with the experience—could reasonably be the subject of doubt and skepticism. Realness was correlated with words such as “must” and “sure,” which are associated with making definitive claims that communicate assurance in a particular view or belief. On the other hand, the tentative language category (e.g., “probably,” “might,” “or”) was negatively correlated with realness in hindsight. Other studies examining degrees of certainty have also found inverse correlations between these two categories (e.g., Cordova, Cunningham, Carlson, & Andrykowski, 2001). The phenomenological and qualification interpretations are both plausible explanations of the language data, as is some combination of both.

Limitations

Although this study found that RSMs are often reported as more real than usual reality, several limitations should be kept in mind. Participants voluntarily completed an online survey on spiritual experiences and may not represent the broader population. The degree of “others” and “atheists” in this sample is above the U.S. average. As the feeling of realness in RSMs is generally associated with spirituality and religion, we believe that RSMs would be rated as even *more* real in a more religious or spiritual sample. Future studies should include more diverse and representative samples and determine the extent to which findings generalize or are specific to this sample.

The Epistemic State items used in this study have not been fully validated and it is possible that the framing of the questions could impact responses. The abstract nature of the noetic quality makes it difficult to develop straightforward questions about one’s sense of realness. Further, our analysis was limited to the questions available on the survey. Future researchers should consider what “realer than real” means to participants, including additional measures that capture other qualities related to noetic experiences, such as emotional intensity. In addition, studies might examine what experiences people compare RSMs with, determining the baseline of comparison and how RSMs differ from that baseline.

The quantitative linguistic analysis performed on participants’ writing provided some insight into the underlying psychological processes related to the feeling of realness. However, our interpretations of these data are necessarily speculative and theory-driven, and exploratory in nature. There was an adequate sample size (over 700 individuals), and we drew on automated textual analysis techniques, but calculated many correlations, some of which may be significant by chance alone. Also, although our language-effect sizes were within the typical range for linguistic analysis techniques (Schwartz et al., 2013), they represent a small amount of the overall variance and should be interpreted accordingly. Future studies should provide more specific hypothesis testing in addition to qualitative research to disambiguate our interpretations of the language findings.

Finally, this study focused on RSMs and the feeling of realness, an aspect of the noetic quality often associated with this category of experience (James, 1902/1985; Stace, 1960; Hood, 1975; MacLean et al., 2012). We have argued that, although there may be some overlap between RSMs and derealization episodes, evidence from this study suggests that they are distinct mental states with different consequences. However, future researchers should test these two distinct mental states directly to provide further information regarding the relationship between epistemic states like derealization, RSMs, and other varieties of experience.

Conclusion

Our perception of reality is, in at least one sense, a feeling—one that is subject to change during certain mental states. The present study

suggests that RSMs represent a nonordinary mental state that often feels “realer than real.” Although the veracity of any knowledge claims that accompany this feeling (e.g., “all is one” or “everything is inherently good”) comprises questions for philosophy and theology rather than social science, the data suggest that the feeling of realness in RSMs is associated with generally adaptive outcomes, with self-reported positive impacts across multiple life domains. We hope that this study can provide a basis for future studies exploring the feeling of realness—the noetic quality—in RSMs and other epistemic states.

References

- Alston, W. (1991). *Perceiving God: The epistemology of religious experience*. Ithaca, NY: Cornell University Press.
- Batson, C. D., & Schoenrade, P. A. (1991). Measuring religion as quest: 1) Validity concerns. *Journal for the Scientific Study of Religion*, 30, 416–429. <http://dx.doi.org/10.2307/1387277>
- Beauregard, M. (2011). Neuroscience and spirituality: Findings and consequences. In H. Walach, S. Schmidt, & W. B. Jonas, *Neuroscience, consciousness and spirituality* (pp. 57–73). Heidelberg, Germany: Springer. http://dx.doi.org/10.1007/978-94-007-2079-4_4
- Chen, Z., Yang, L., Hood, R. W., Jr., & Watson, P. J. (2011). Mystical experience in Tibetan Buddhists: The common core thesis revisited. *Journal for the Scientific Study of Religion*, 50, 328–338.
- Cordova, M. J., Cunningham, L. L., Carlson, C. R., & Andrykowski, M. A. (2001). Social constraints, cognitive processing, and adjustment to breast cancer. *Journal of Consulting and Clinical Psychology*, 69, 706–711. <http://dx.doi.org/10.1037/0022-006X.69.4.706>
- d’Aquili, E. G., & Newberg, A. B. (1993). Religious and mystical states: A neuropsychological model. *Zygon*, 28, 177–200. <http://dx.doi.org/10.1111/j.1467-9744.1993.tb01026.x>
- d’Aquili, E. G., & Newberg, A. B. (2000). The neuropsychology of aesthetic, spiritual, and mystical states. *Zygon*, 35, 39–51. <http://dx.doi.org/10.1111/0591-2385.00258>
- Griffiths, R., Richards, W., Johnson, M., McCann, U., & Jesse, R. (2008). Mystical-type experiences occasioned by psilocybin mediate the attribution of personal meaning and spiritual significance 14 months later. *Journal of Psychopharmacology*, 22, 621–632. <http://dx.doi.org/10.1177/0269881108094300>
- Griffiths, R. R., Richards, W. A., McCann, U., & Jesse, R. (2006). Psilocybin can occasion mystical-type experiences having substantial and sustained personal meaning and spiritual significance. *Psychopharmacology*, 187, 268–283. <http://dx.doi.org/10.1007/s00213-006-0457-5>
- Hoge, R. (1972). A validated Intrinsic Religious Motivation Scale. *Journal for the Scientific Study of Religion*, 11, 369–376. <http://dx.doi.org/10.2307/1384677>
- Hood, R. W., Jr. (1975). The construction and preliminary validation of a measure of reported mystical experience. *Journal for the Scientific Study of Religion*, 14, 29–41. <http://dx.doi.org/10.2307/1384454>
- Hood, R. W., Jr. (1977). Eliciting mystical states of consciousness with semistructured nature experiences. *Journal for the Scientific Study of Religion*, 16, 155. <http://dx.doi.org/10.2307/1385746>
- Hood, R. W., Jr. (2014). Chemically assisted mysticism and the question of veridicality. In J. H. Ellens (Ed.), *Seeking the sacred with psychoactive substances: Chemical paths to spirituality and God. Vol. I: History and practices*, (pp. 395–410). Santa Barbara, CA, Praeger.
- Hood, R. W., Jr., Ghorbani, N., Watson, P. J., Ghramaleki, A. F., Bing, M. N., Davison, H. K., . . . Williamson, W. P. (2001). Dimensions of the Mysticism Scale: Confirming the three-factor structure in the United States and Iran. *Journal for the Scientific Study of Religion*, 40, 691–705. <http://dx.doi.org/10.1111/0021-8294.00085>
- Hood, R. W., Jr., Hill, P. C., & Spilka, B. (2009). *Psychology of religion: An empirical approach*. New York, NY: Guilford Press.
- Hood, R. W., Jr., & Morris, R. J. (1983). Toward a theory of death transcendence. *Journal for the Scientific Study of Religion*, 22, 353–365. <http://dx.doi.org/10.2307/1385773>
- Hood, R. W., Jr., Morris, R. J., & Watson, P. J. (1990). Quasi-experimental elicitation of the differential report of religious experience among intrinsic and indiscriminately pro-religious types. *Journal for the Scientific Study of Religion*, 29, 164–172. <http://dx.doi.org/10.2307/1387425>
- Hood, R. W., Jr., & Williamson, W. P. (2000). An empirical test of the unity thesis: The structure of mystical descriptors in various faith samples. *Journal of Psychology and Christianity*, 19, 232–244.
- Hunter, E. C. M., Sierra, M., & David, A. S. (2004). The epidemiology of depersonalisation and derealization: A systematic review. *Social Psychiatry and Psychiatric Epidemiology*, 39, 9–18. <http://dx.doi.org/10.1007/s00127-004-0701-4>
- James, W. (1985). *The varieties of religious experience* (Vol. 13). Cambridge, MA: Harvard University Press. (Original work published 1902)
- Kass, J. D., Friedman, R., Leserman, J., Zuttermeister, P. C., & Benson, H. (1991). Health outcomes and a new index of spiritual experience. *Journal*

- for the *Scientific Study of Religion*, 30, 203–211. <http://dx.doi.org/10.2307/1387214>
- Koenig, H., King, D., & Carson, V. B. (2012). *Handbook of religion and health*. New York, NY: Oxford University Press.
- Lukoff, D., Lu, F., & Turner, R. (1992). Toward a more culturally sensitive *DSM-IV*. Psychoreligious and psychospiritual problems. *Journal of Nervous and Mental Disease*, 180, 673–682. <http://dx.doi.org/10.1097/00005053-199211000-00001>
- MacLean, K. A., Leoutsakos, J. M. S., Johnson, M. W., & Griffiths, R. R. (2012). Factor analysis of the Mystical Experience Questionnaire: A study of experiences occasioned by the hallucinogen psilocybin. *Journal for the Scientific Study of Religion*, 51, 721–737. <http://dx.doi.org/10.1111/j.1468-5906.2012.01685.x>
- Newberg, A., Alavi, A., Baime, M., Pourdehnad, M., Santanna, J., & d'Aquili, E. (2001). The measurement of regional cerebral blood flow during the complex cognitive task of meditation: A preliminary SPECT study. *Psychiatry Research: Neuroimaging*, 106, 113–122. [http://dx.doi.org/10.1016/S0925-4927\(01\)00074-9](http://dx.doi.org/10.1016/S0925-4927(01)00074-9)
- Pennebaker, J. W., Francis, M. E., & Booth, R. J. (2001). *Linguistic inquiry and word count: LIWC2001*. Mahway, NJ: Erlbaum.
- Russell, B. (1917). *Mysticism and logic and other essays*. London, UK: G. Allen & Unwin. <http://dx.doi.org/10.5962/bhl.title.19117>
- Schwartz, H. A., Eichstaedt, J. C., Kern, M. L., Dziurzynski, L., Ramones, S. M., Agrawal, M., . . . Ungar, L. H. (2013). Personality, gender, and age in the language of social media: The open-vocabulary approach. *PLoS ONE*, 8, e73791. <http://dx.doi.org/10.1371/journal.pone.0073791>
- Seligman, M. E. P. (2015). Introduction: How are we called into the future? In D. B. Yaden, T. D. McCall, & J. H. Ellens (Eds.), *Being called: Scientific, secular, and sacred perspectives* (pp. xvii–xxvi). Santa Barbara, CA: Praeger.
- Seligman, M. E. P., & Csikszentmihalyi, M. (2000). *Positive psychology: An introduction* (Vol. 55, p. 5). Washington, DC: American Psychological Association.
- Sethi, S., & Seligman, M. E. (1993). Optimism and fundamentalism. *Psychological Science*, 4, 256–259. <http://dx.doi.org/10.1111/j.1467-9280.1993.tb00271.x>
- Simeon, D., & Abugel, J. (2006). *Feeling unreal: Depersonalization disorder and the loss of the self*. New York, NY: Oxford University Press.
- Simeon, D., Guralnik, O., Hazlett, E. A., Spiegel-Cohen, J., Hollander, E., & Buchsbaum, M. S. (2000). Feeling unreal: A PET study of depersonalization disorder. *The American Journal of Psychiatry*, 157, 1782–1788. <http://dx.doi.org/10.1176/appi.ajp.157.11.1782>
- Simeon, D., Kozin, D. S., Segal, K., Lerch, B., Dujour, R., & Giesbrecht, T. (2008). De-constructing depersonalization: Further evidence for symptom clusters. *Psychiatry Research*, 157, 303–306. <http://dx.doi.org/10.1016/j.psychres.2007.07.007>
- Stace, W. T. (1960). *Mysticism and philosophy*. Philadelphia, PA: Lippincott.
- Yaden, D. B., Anderson, D. E., Mattar, M. G., & Newberg, A. B. (2015). Psychoactive stimulation and psychoactive substances: Conceptual and ethical considerations. In J. H. Ellens & T. B. Roberts (Eds.), *The psychedelic policy quagmire: Health, law, freedom, and society* (pp. 219–236). Santa Barbara, CA: Praeger.
- Yaden, D. B., Eichstaedt, J. C., Schwartz, H. A., Kern, M. L., Le Nguyen, K. D., Wintering, N. A., . . . Newberg, A. B. (2015). *The language of ineffability: Linguistic analysis of mystical experiences*. Retrieved from <http://proxy.library.upenn.edu:2100/10.1037/rel0000043>
- Yaden, D. B., Iwry, J., & Newberg, A. B. (2016). Neurochemistry and religion: Surveying the field. In J. Kripal, A. DeConick, & T. Pinn (Eds.), *Macmillan interdisciplinary handbooks on religion: The brain, cognition, and culture* (pp. 277–299). London, England: Macmillan.
- Yaden, D. B., Iwry, J., Slack, K. J., Eichstaedt, J. C., Zhao, Y., Vaillant, G. E., & Newberg, A. B. (2016). The overview effect: Awe and self-transcendent experience in space flight. *Psychology of Consciousness: Theory, Research, and Practice*, 3, 1–11. <http://dx.doi.org/10.1037/cns0000086>
- Yaden, D. B., Le Nguyen, K. D., Kern, M. L., Belser, A. B., Eichstaedt, J. C., Iwry, J., . . . Newberg, A. B. (2016). Of Roots and Fruits: A Comparison of Psychedelic and Nonpsychedelic Mystical Experiences. *Journal of Humanistic Psychology*. Advance online publication. <http://dx.doi.org/10.1177/0022167816674625>
- Yaden, D. B., McCall, T. D., & Ellens, J. H. (Eds.). (2015). *Being called: Scientific, secular, and sacred perspectives*. Santa Barbara, CA: Praeger.
- Yaden, D. B., & Newberg, A. B. (2014). New means for perennial ends: Self-transcendent experiences and noninvasive brain stimulation. In J. H. Ellens (Ed.), *Seeking the sacred with psychoactive substances: Chemical paths to spirituality and to God. Vol. 2: Insights, arguments, and controversies* (pp. a303–a325). Westport, CT: Praeger.

Received February 22, 2016

Revision received July 9, 2016

Accepted July 12, 2016 ■