Cross-Cultural Contributions to Psychology and Neuroscience: Self, Mind, and Mindfulness in Buddhism

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INTRODUCTION

Psychology and neuroscience can benefit from inter-disciplinary insights and cross-cultural concepts. While this statement should be uncontroversial, some in the humanities and the sciences remain unconvinced. In contrast, we suggest that this kind of exchange is already occurring in some quarters of academia and that both the sciences and the humanities could benefit from further constructive collaboration. In this article, we focus on the potential for productive exchanges between psychology, neuroscience, and religious studies—particularly regarding the concepts of self, mind, and mindfulness in Buddhism.

To take one particularly salient contemporary example, in recent years Buddhist traditions have substantially impacted areas of neuroscience and psychological research. This is largely due to the observed changes in behavioral markers of attention and associated structural and functional changes in the brain due to meditation practices,[1] as well as the kinds of mental states they can sometimes elicit—such as self-transcendent experiences (STEs).[2] Inter-disciplinary conceptual analysis of these practices and mental states in their original cultural contexts can be useful as they can provide relevant knowledge derived from a long history of epistemological and cultural discourse about the subjectivity involved in these practices and mental states. Insights from studying these culturally-rooted perspectives have the potential to provide novel distinctions between concepts in contemporary psychological theory. A more deliberate and inter-disciplinary approach to topics such as these across the sciences and the humanities holds the promise of providing more understanding than either method by itself.[3]

Concepts typically vary in their definition or connotations across cultures. In some cases, these differences can illuminate previously unnoticed distinctions within the set of elements included in that concept.[4] Alternately, a concept can sometimes elegantly capture a com-

1. David R. Vago and David A. Silbersweig, "Self-Awareness, Self-Regulation, and Self-Transcendence (S-ART): A Framework for Understanding the Neurobiological Mechanisms of Mindfulness," *Frontiers in Human Neuroscience* 6 (2012).

2. David Bryce Yaden, Jonathan Haidt, Ralph W. Hood, Jr., David R. Vago, and Andrew B. Newberg, "The Varieties of Self-Transcendent Experience," *Review of General Psychology* 21, no. 2 (2017): 143–160.

3. James O. Pawelski, "Defining the 'Positive' in Positive Psychology: Part I, A Descriptive Analysis," *Journal of Positive Psychology* 11, no. 4 (2016): 339–356; James O. Pawelski and D. J. Moores, eds., *The Eudaimonic Turn: Well-Being in Literary Studies* (London: Fairleigh Dickinson University Press, 2012); James O. Pawelski and Louis Tay, "Better Together: The Sciences and the Humanities in the Quest for Human Flourishing," in *Handbook of Positive Psychology*, ed. Shane J. Lopez, Lisa Edwards, and Susana C. Marques (NY: Oxford University Press, 2016); Louis Tay, James O. Pawelski, and Melissa G. Keith, "The Role of the Arts and Humanities in Human Flourishing: A Conceptual Model," *Journal of Positive Psychology* (2017).

4. R. E. Nisbett, K. Peng, I. Choi, and A. Norenzayan, "Culture and Systems of Thought: Holistic versus Analytic Cognition," *Psychological Review* 108, no. 2

plex set of ideas with a single term. For example, the word "awakening" (or "enlightenment") is quite difficult to express in English (or any) language, proving to be contextually relevant in Buddhist contexts, but falling short of achieving precision in contemporary psychology or cognitive neuroscience.[5] Furthermore, the majority of current research on meditation practices has been divorced from the soteriological context from which the practices originate.[6] This unfortunate lapse in translation fails to recognize the profound shift across ethical, perceptual, emotional, and cognitive domains described in the traditional Buddhist contexts from which mindfulness meditation practices are common.

Other concepts from Buddhism as well as those from other religious, philosophical, and cultural traditions will undoubtedly continue to influence psychology and neuroscience. Yet the interdisciplinary discussions that can contextualize these concepts in constructive and illuminating ways need to take place. Such discussions could be welcomed as a rich source of cross-cultural and interdisciplinary dialogue and, perhaps, provide the basis for conceptual or methodological advances.

This article represents a call for more cross-cultural and interdisciplinary discussions of this kind. To that end, we focus on a particular distinction that we believe has potential to provide such an advance in the understanding of a particular kind of subjective experience, namely the distinction between "self" and "mind." While colloquially these two terms have been treated as close to identical in English, they are seen as much more distinct in many Buddhist traditions. There are several concepts that refer to different aspects of the self and mind across schools of Buddhism; *attā* (Skt. *ātman*) is a term from Buddhist and Vedanta schools of Hinduism often used to connote something close to one's true self or "soul" that is the core of one's personal identity.[7] However, Buddhist orthodoxy casts the self as illusory, referring instead to "no-self," which is referred to with the Pāli term *anattā* (Skt.

(2001): 291.

5. Andrew B. Newberg and Mark Robert Waldman, *How Enlightenment Changes Your Brain: The New Science of Transformation* (NY: Avery, 2016).

6. Jon Kabat-Zinn, "Mindfulness-Based Interventions in Context: Past, Present, and Future," *Clinical Psychology: Science and Practice* 10, no. 2 (2003): 144–156.

7. Patrick Olivelle, *The Early Upanisads* (New York: Oxford University Press, 1998).

anātman). On the other hand, the Sanskrit/Pāli word *citta* is used to connote the process of awareness in which an object is merely perceived, or made conscious.[8] This distinction can be illustrated by a metaphor: *citta* is like the (relatively) unchanging background of the sky whereas the illusion of ātman is like the insubstantial and constantly changing clouds that move through the background sky (though it should be noted that *citta*, too, is constructed and impermanent). This conceptual distinction, inspired from terms used in Buddhist traditions, may help to disambiguate aspects of the phenomenology of self-transcendent experiences and other states encountered during meditation while providing hypotheses for future investigations of their underlying neurobiology and subjective qualities.

MINDFULNESS IN PSYCHOLOGY AND NEUROSCIENCE

The practice of mindfulness meditation provides a contemporary illustration of how cross-cultural concepts, in this case specifically from Buddhism, influence modern psychology and neuroscience. In addition to research on alterations to physiology and attention, mindfulness meditation interventions are widespread and increasing in popularity in healthcare and therapeutic environments.[9] The Mindfulness-Based Stress Reduction (MBSR) program[10] is an example of a specific type of mindfulness-based interventions (MBI). MBIs can have both a health as well as spiritual impact on an individual. The results from scientific research demonstrating how MBIs produce psychological effects by reducing symptoms of depression, anxiety, and stress, would surprise

8. Bhikkhu Bodhi, *A Comprehensive Manual of Abhidhamma: The Philosophical Psychology of Buddhism*, 3rd ed. (Onalaska, WA: Buddhist Publication Society, 1999).

9. Kirk Warren Brown and Richard M. Ryan, "The Benefits of Being Present: Mindfulness and Its Role in Psychological Well-Being," *Journal of Personality and Social Psychology* 84, no. 4 (2003): 822–848; Alberto Chiesa and Alessandro Serretti, "Mindfulness-Based Stress Reduction for Stress Management in Healthy People: A Review and Meta-Analysis," *Journal of Alternative and Complementary Medicine* 15, no. 5 (2009): 593–600; Vago and Silbersweig, "Self-Awareness, Self-Regulation, and Self-Transcendence (S-ART)."

10. R. J. Davidson, J. Kabat-Zinn, J. Schumacher, M. Rosenkranz, D. Muller, and S. F. Santorelli, "Alterations in Brain and Immune Function Produced by Mindfulness Meditation," *Psychosomatic Medicine* 65, no. 4 (2003): 564–570.

few Buddhists.[11] Further, MBIs have also been shown to enhance prosocial behaviors like altruism and compassion.[12]

MBIs have led to the study of mindfulness as a particular mental state.[13] Mindfulness, as a mental state, is often defined as open and nonjudgmental awareness.[14] Mindfulness practices often, but not always, result in the mental state of mindfulness. The concepts of mindfulness in general as well as distinctions between mindfulness as a practice and mindfulness as a mental state are all derived from Buddhism.

Traditionally, in Buddhist contexts, ordained monks and nuns predominantly practiced mindfulness meditation. Mindfulness was often understood as one aspect of a larger set of teachings and beliefs tracing back to early Indian Buddhist scripture. One of the earliest mentions of mindfulness can be traced to the *Satipaṭṭhāna Sutta*, in the context of maintaining awareness of the breath and the body.[15] In his book, *Mindful America*, Jeff Wilson calls attention to the opening paragraph in this sutta, which describes mindfulness as "the direct path for the purification of beings, for the surmounting of sorrow and lamentation, for the disappearance of pain and grief, for the attainment of the true way, for the realization of Nirvana."[16] Throughout the sutta, mindfulness is commonly referred to as a heightened awareness of the body, states of mind, and sensations.[17]

However, the practice of mindfulness as described by the *Satipaṭṭhāna-sutta* did not gain popularity with laypeople until the beginning of the eighteenth century in Burma. A resurgence of *vipassanā* movements led by Burmese monks Ledi Sayadaw and Mahāsi Sayadaw

11. David McMahan, *The Making of Buddhist Modernism* (New York: Oxford University Press, 2008).
12. Paul Condon, Gaëlle Desbordes, Willa B. Miller, and David DeSteno, "Meditation Increases Compassionate Responses to Suffering," *Psychological Science* 24, no. 10 (2013): 2125–2127.
13. Vago and Silbersweig, "Self-Awareness, Self-Regulation, and Self-Transcendence (S-ART)."
14. Jon Kabat-Zinn, *Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness* (New York: Delacorte, 1994).
15. Anālayo, *Satipatthana: The Direct Path to Awakening* (Birmingham, UK: Windhorse, 2003).
16. Jeff Wilson, *Mindful America: The Mutual Transformation of Buddhist Meditation and American Culture* (NY: Oxford University Press, 2014), 21.
17. Anālayo, *Satipatthana.*

brought mindfulness to the attention of the community. Through their leadership, *vipassanā* began to lose its exclusivity to monks and nuns and was soon practiced by both monks and laypeople alike.[18]

In attempts to integrate historical and contemporary Buddhist descriptions of mindfulness, scientific models have emerged to describe the cognitive processes and underlying neurobiology of MBIs.[19] For example, Vago and Silbersweig describe mindfulness as a systematic form of mental training that improves self-awareness, self-regulation, and self-transcendence (S-ART).[20] The S-ART framework proposes a number of cognitive mechanisms that support the mindfulness-based practices, including attention and emotion regulation, extinction and reconsolidation of maladaptive attentional biases, embodied cognition through perceptual inference, and prosocial and altruistically motivated behavior. These authors proposed that as a result of mindfulness practice, a fundamental shift may become apparent in the practitioner—that the distinction between self and other may begin to dissolve—thus transcending self-focused motivations and achieving insight into the nature of one's mind and its habits. This type of insight has been described in the context of the Buddhist spiritual path as "awakening," an experience of fruition also associated with the description of enlightenment.[21]

18. Stephen Batchelor, *Confession of a Buddhist Atheist* (New York: Random House Digital, Inc., 2011); Erik Braun, *Birth of Insight: Meditation, Modern Buddhism, and the Burmese Monk Ledi Sayadaw* (Chicago: University of Chicago Press, 2013).

19. Vago and Silbersweig, "Self-Awareness, Self-Regulation, and Self-Transcendence (S-ART)"; Antoine Lutz, Amishi P. Jha, John D. Dunne, and Clifford D. Saron, "Investigating the Phenomenological Matrix of Mindfulness-Related Practices from a Neurocognitive Perspective," *American Psychologist* 70, no. 7 (2015): 632–658.

20. Vago and Silbersweig, "Self-Awareness, Self-Regulation, and Self-Transcendence (S-ART)."

21. Jake H. Davis and David R. Vago, "Can Enlightenment Be Traced to Specific Neural Correlates, Cognition, or Behavior? No, and (a Qualified) Yes," *Frontiers in Psychology* 4 (2013): 87; D. R. Vago, "Mapping Modalities of Self-Awareness in Mindfulness Practice: A Potential Mechanism for Clarifying Habits of Mind," *Annals of the New York Academy of Sciences* 1307 (2014): 28–42; Newberg and Waldman, *How Enlightenment Changes Your Brain.*

THE SELF/MIND DISTINCTION IN BUDDHISM

Crucial to many scientific models of mindfulness is the possibility of experiencing the lens of self-related processing as well as shifting into a perspective in which one's self is felt to be diminished or absent.[22] Here, we focus on the distinction made between these concepts from historical Buddhist traditions. It is our hope that psychology and neuroscience could benefit from an examination of the topics of self and mind from the perspectives of some historical and contemporary Buddhist frameworks. While both self and mind may be overlapping constructs, there is a rich taxonomy from Buddhist literature disambiguating the two.

The notions of "self" and "mind" have deep roots in many early Buddhist canons, which can also be related to different brain structures and processes. The term "self" takes the name ātman in Sanskrit and *attā* in Pāli. Commonly, *citta* can be found translated as "mind" in both Sanskrit and Pāli, and although *manas* (Pāli) can also be found translated as "mind," there is a distinction made between the two. Whereas *citta* is the mind as a holistic sense of awareness, *manas* is a third-order reflection of the mind: it is the ability of the *citta* to reflect on itself, being sensitive to one's own sensitivities.

The term *attā* can be traced back to the Indian *Upaniṣads* and various texts and commentaries.[23] Crucially, this self or *attā* is, in Buddhist traditions (and in contradistinction to other Indic religions), considered illusory; instead, Buddhism asserts the reality of no-self, or *anattā.* The illusory self contains all manner of self-referential thoughts and identifications, all of which would also be considered part of the illusory construct of *attā* contrasted with the reality of *anattā.* The term *citta* is commonly found in the *Abhidhamma*, among other numerous Buddhist commentaries. *Citta* can be roughly characterized as the theater of awareness in which all percepts take place—something closer to consciousness.

These terms, it should be emphasized, have been through many translations since they were first encountered by various early

22. Vago and Silbersweig, "Self-Awareness, Self-Regulation, and Self-Transcendence (S-ART)"; Yaden et al., "The Varieties of Self-Transcendent Experience."

23. *Dictionary of Buddhist Doctrinal and Technical Terms,* comp. Binayendra Nath Chaudhury (Kolkata: The Asiatic Society, 2005), s.v. "Attā."

scholars of Buddhism. We mention these other uses of these terms to resist overly simplistic characterizations. Much of our understanding of these terms comes from early interpretations by Rhys Davis and the Pali Text Society.[24] In order to accurately encompass the meaning of *attā*, or self, traditional Buddhist texts have associated the term with a multitude of synonyms and antonyms. In Pāli, the word for "self" (*satta*) is synonymous with the term for "being." This term for "being" is used in the *Rūparūpavibhāga* to present the idea of self; however, in this text, self is often also referred to as "individual" or "person."[25] Scholars often distinguish between the use and translation of the term *attā* in early and later Buddhist scripture. The term *attā* in early scriptures, such as the *Nikāyas*, are commonly represented as the empirical or existential self.[26] In this context, *attā* may be used to mean "oneself," "himself," or "myself" in a practical sense.

When discussing *attā,* Buddhist scripture presents the idea that the person is made of five aggregates or "building blocks of existence." The five aggregates or *khandhas* in Pāli consist of the physical body (*rūpa*), sensation (*vedanā*), sensory perception (*saññā*), habitual tendencies (*saṃkhāra*), and consciousness (*viññāṇa*).[27] According to many Buddhist traditions, these five aggregates are in a constant state of flux at every moment of existence. In this way, the empirical self exists as a changing flow of mental and physical states.[28] In later Buddhist scriptures, *attā* is often mentioned in conjunction with the denial of self, or the notion of no-self (*anattā).* However, the "self" referred to here is distinct from the existential or empirical self found in earlier scriptures—it refers to the notion of the metaphysical self, or the idea of an eternal, unchanging self.[29]

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24. Joaquin Pérez-Remón, Self and Non-Self in Early Buddhism (New York: Mouton, 1980).
25. Rafiqul Huda Chaudhury, "Female Labour Force Status and Fertility Behaviour in Bangladesh: Search for Policy Interventions," B*angladesh Development Studies* 11, no. 3 (1983): 59–102.
26. Peter Harvey, *The Selfless Mind: Personality, Consciousness, and Nirvana in Early Buddhism* (Richmond: Curzon, 1995); Pérez-Remón 1980.
27. Collett Cox, "Abhidharma," in *Encyclopedia of Buddhism,* ed. Robert Buswell, Jr. (New York: Macmillan, 2004): 1–7.
28. Harvey, *Selfless Mind.*
29. Ibid.

In Buddhist scripture there is a clear distinction between how "self" (*attā*) and "mind" (*citta*) are presented. In the *Abhidhamma*, *citta* is often referred to as a stream of consciousness consisting of a variety of mental qualities, seven of which are universal to every *citta*: sensory contact, feeling or sensation, perception of conception, volition, concentration, vitality, and attention.[30] In both Pāli and Sanskrit texts, *citta* is often translated as "mind" or "mind-set." Peter Harvey offers many definitions of *citta* including "that which has been acted on by the activity of willing or directed thought."[31] Cognition and feeling are described as mental qualities (*cetasikā)* that are dependent upon *citta* and are therefore an activity of *citta*.[32] The term *citta* encompasses the mind as a whole, including but not identical with self, thoughts, and emotional states of the mind such as malevolence, envy, treachery, etc.

The *Abhidhamma* describes *citta* not only as a stream of consciousness, but also in the context of awareness or the six sense-discernments: eye-discernment, ear-discernment, nose-discernment, tongue-discernment, body-discernment, and *manas*-discernment all fall under the term *citta*.[33] *Manas* can be translated as "mind-organ" and is responsible for the awareness or reflection of one's own mind. *Manas* is the ability to detect the state of *citta*. In this way, the processes of the mind in Buddhist scriptures closely reflects the idea of consciousness.

Where *attā* or the empirical self can be understood as the illusion of a consistency in the fluctuations of the five aggregates, *citta* is more thoroughly defined as "a fluctuating and ever-changing focus for the coordinating of mental states ... it is the 'empirical functioning *selves*' of a person, for there are many competing mind-sets."[34] The distinction between self (*attā*) and mind (*citta*) in historical Buddhist tradition is made clear in Buddhist scripture. In the discussion of the self, traditional Buddhist texts describe *attā* to be the illusory notion attached to the constant flux of the five aggregates. This is distinct from the description for *citta*, which explores the concepts surrounding thought, emotion, and consciousness.

30. Robert Buswell, Jr. and Donald Lopez, Jr.,"Citta," in *The Princeton Dictionary of Buddhism* (Princeton: Princeton University Press, 2013), 381. .
31. Harvey, *Selfless Mind*, 111.
32. Ibid.
33. Ibid., 138.
34. Ibid., 114.

THE SELF/MIND DISTINCTION IN PSYCHOLOGY AND NEUROSCIENCE

The distinction between the "self" (*attā*) and the "mind" (*citta*) have recently become a topic of interest in psychology and neuroscience in the context of Self-Transcendent Experiences (STEs), or transient feelings of increased self-diminishment and enhanced connectedness.[35] During these experiences, individuals often report that their "sense of self" temporarily fades away yet they remain conscious (i.e., they do not "black out"). How can modern psychology and neuroscience make sense of this subjective state? Can Buddhist taxonomies provide valuable insight? We think so.

Many people report a lessening or fading of the self during mindfulness and other STEs.[36] It should be noted that this subjective report of the sense of self fading has no direct correspondence to a particular psychological construct, as psychologists have developed dozens of definitions of the self.[37] There are also a number of self-relevant processes that have been postulated in the extant psychological literature, including self-esteem, self-efficacy, self-awareness, self-concept, and many other similar formulations.[38] Processes related to self-relevant narratives and memories seem crucial to what most psychologists mean when they refer to the self.[39] Agency, or the feeling that one is the cause of their own actions, is also typically assumed to be a core component of the self.[40] In an excellent review of how the topic of self has been treated in contemporary psychological research, Gillihan and Farah describe how the self has often been assumed to be a holistic and unified perception and essential entity—but that emerging research from neuroscience challenges these assumptions, bringing a

35. Yaden et al., "The Varieties of Self-Transcendent Experience."
36. Ibid.
37. R. F. Baumeister, ed., *The Self in Social Psychology* (Philadelphia: Taylor & Francis, 1999).
38. R. F. Baumeister, "The Self," *Advanced Social Psychology: The State of the Science* (2010): 139–175.
39. Jerome Seymour Bruner, "The 'Remembered Self,'" in *The Remembering Self: Construction and Accuracy in the Self-Narrative*, ed. U. Neisser and R. Fivush (Cambridge, UK: Cambridge University Press, 1994).
40. S. J. Blakemore and C. Frith, "Self-Awareness and Action," *Current Opinion in Neorobiology* 13, no. 2 (2003): 219–224.

substantial proportion of the field more in line with Buddhist views about the essentially illusory nature of the self.[41]

Neuroscientists typically discuss the self in terms of brain processes that support personal beliefs and behaviors.[42] For example, the frontal lobes provide the basis for executive functions such as planning behaviors, maintaining a schedule, and regulating our emotional responses.[43] The limbic system that is at the heart of emotional responses also is involved in memory, which is necessary to establish the history of the self for the individual. Finally, there is evidence that the parietal lobes help take sensory information from the body and the external world in order to establish a spatial representation of the self.[44] Ultimately, all of these neurobiological structures are integrated into the holistic functioning of the brain, which contributes to the mental representation of the self.[45]

The five aggregates can also find a home in cognitive neuroscience.[46] The physical body has its own physiology and interacts with the brain via the autonomic nervous system that regulates almost all body functions such as respiration and heart rate. The body also has a physical sensory system, which helps the brain determine where the body is and how it feels (e.g., pain perception). Sensory perceptions are processed in stages by primary, secondary, and tertiary brain structures, which help to integrate smell, taste, sight, and sound into a coherent rendition of the world around us. Habitual tendencies are more basic responses to the world, which include our hypothalamus, thalamus,

41. S. J. Gillihan and M. J. Farah, "Is Self Special? A Critical Review of Evidence from Experimental Psychology and Cognitive Neuroscience," *Psychological Bulletin* 131, no. 1 (2005): 76–97.

42. Andrew B. Newberg, Abass Alavi, Michael J. Baime, Michael Pourdehnad, Jill Santanna, "The Measurement of Regional Cerebral Blood Flow during the Complex Cognitive Task of Meditation: A Preliminary SPECT Study," *Psychiatry Research: Neuroimaging* 106, no. 2 (2001): 113–122.

43. A. B. Newberg and J. Iversen, "The Neural Basis of the Complex Mental Task of Meditation: Neurotransmitter and Neurochemical Considerations," *Medical Hypotheses* 61, no. 2 (2003): 282–291.

44. Cosimo Urgesi, Salvatore M. Aglioti, Miran Skrap, and Franco Fabbro, "The Spiritual Brain: Selective Cortical Lesions Modulate Human Self-Transcendence," *Neuron* 65, no. 3 (2010): 309–319.

45. Gillihan and Farah, "Is Self Special?"

46. Newberg and Waldman, *How Enlightenment Changes Your Brain.*

and primary motor areas, which all help us respond to the world in very basic ways.

"Mind," then, also drawing on the Buddhist framework, is closer to something like awareness, which usually includes the self, but can be experienced without the self in certain mental states. Here "mind" refers to something close to the capacity for experience without thought.[47] Neurologically, mind-relevant processes might be mediated by basic sensory processing areas and the thalamus. Research has suggested that the thalamus is the initial relay for visual and auditory input, but appears to be particularly affected during anesthesia and sleep states, for example. As for the nature of consciousness itself, neuroscience has little to say—brushing up against the so-called "hard problem of consciousness."[48] In broad strokes, this philosophical argument calls correlating functional processes to brain processes (e.g., the arm moving correlates with activity in the motor strip, feeling anger correlates with activity in the amygdala) the "easy problem of consciousness"—and while various accounts have been given,[49] the nature of qualia, or the "what it feels like," is deemed "the hard problem of consciousness," and is still very much an unsolved philosophical and scientific question.

There is a long history in psychology on the topic of the self/mind distinction. William James wrote the *Varieties of Religious Experience* (1902), which includes many descriptions of mental states in which the normal sense of self seems altered or disappears. The distinction between self and mind can help to decode William James's statement, "by self surrender there is the identification with the infinite."[50] Other

47. David Bryce Yaden, Jonathan Iwry, and Andrew B. Newberg, "Neuroscience and Religion: Surveying the Field," in *Religion: Mental Religion,* ed. Jeffrey Kripal and Niki Kasumi Clements, MacMillan Interdisciplinary Handbooks on Religion: The Brain, Cognition, and Culture (Farmington Hills, MI: Macmillan Reference USA, 2016).

48. David Chalmers, "Facing Up to the Problem of Consciousness," *Journal of Consciousness Studies* 2, no. 3 (1995): 200–219.

49. Daniel Dennett, *From Bacteria to Bach and Back* (New York: W. W. Norton & Company, 2017); Douglas Hofstadter, *I Am a Strange Loop* (New York: Basic Books, 2013); John Searle, *Mind: A Brief Introduction* (NY: Oxford University Press, 2004).

50. William James, *Varieties of Religious Experience* (orig. pub. 1902; Cambridge, MA: Harvard University Press, 1985), 390.

psychologists are investigating mental states in which the sense of self temporarily falls away yet the mind remains.[51] The emotion of awe,[52] for example, often seems to shrink the self.[53] Awe is triggered through a perception of vastness, like when witnessing the splendor of nature, a great human achievement, a big idea, or moving in rhythmic synchrony with a group.[54] A number of other religious, spiritual, or mystical experiences (RSMEs) can also involve the transient loss of one's sense of self.[55]

The distinction between self and mind could be useful for neurological research. For example, in STEs the self may fade away in some cases, leaving one with awareness of awareness itself. Neuroscientist Andrew Newberg describes the "unitary continuum" as the theory that this fading of self happens on a spectrum: "The arc of this continuum links the most profound experiences of the mystics with the smaller transcendent moments most of us experience every day, and shows that, in neurological terms, the two are different essentially

51. David Bryce Yaden, Theo D. McCall, and J. Harold Ellens, eds., *Being Called: Scientific, Secular, and Sacred Perspectives* (Santa Barbara, CA: Praeger, 2015).
52. Dacher Keltner and Jonathan Haidt, "Approaching Awe, a Moral, Spiritual, and Aesthetic Emotion," *Cognition and Emotion* 17, no. 2 (2003): 297–314.
53. Paul K. Piff, Pia Dietze, Matthew Feinberg, Daniel M. Stancato, and Dacher Keltner, "Awe, the Small Self, and Prosocial Behavior," J*ournal of Personality and Social Psychology* 108, no. 6 (2015): 883–899.
54. Jonathan Haidt, T*he Righteous Mind: Why Good People Are Divided by Politics and Religion* (New York: Pantheon, 2012), 200; David B. Yaden, Jonathan Iwry, Kelley J. Slack, Johannes C. Eiechstaedt, Yukun Zhao, George E. Vaillant, and Andrew B. Newberg, "The Overview Effect: Awe and Self-Transcendent Experience in Space Flight," *Psychology of Consciousness: Theory, Research, and Practice* 3, no. 1 (2016): 1–11.
55. Yaden, McCall, and Ellens, eds., *Being Called.*; David B. Yaden, Khoa D. Le Nguyen, Margaret L. Kern, Alexander B. Belser, Johannes C. Eichstaedt, Jonathan Iwry, Mary E. Smith, Nancy A. Wintering, Ralph W. Hood, and Andrew B. Newberg, "Of Roots and Fruits: A Comparison of Psychedelic and Nonpsychedelic Mystical Experiences," *Journal of Humanistic Psychology* 57, no. 4 (2016): 338–353; David B. Yaden, Khoa D. Le Nguyen, Margaret L. Kern, Nancy A. Wintering, Johannes C. Eichstaedt, H. Andrew Schwartz, Anneke E. K. Buffone, Laura K. Smith, Mark R. Waldman, Ralph W. Hood, Jr., and Andrew B. Newberg, "The Noetic Quality: A Multi-Method Exploratory Study," *Psychology of Consciousness: Theory, Research, and Practice* 4, no. 1 (2017): 54–62.

by degree."[56] In one study, Tibetan meditators put themselves into peak states of unity or self-transcendence in a neuroimaging scanner. The brain scans revealed that a region in the parietal lobe was less active than usual.[57] Normally, this brain region keeps track of one's self-boundaries, which separate individuals from their environments. Newberg and d'Aquili write, "In simple terms, it must draw a sharp distinction between the individual and everything else, to sort out the you from the infinite not-you that makes up the rest of the universe."[58] As this brain region becomes less active, the self fades into a larger sense of connection with one's surroundings. While this neurological model is only one among others, the distinction between the self and the mind provide important conceptual tools with which to investigate these mental states.

VALUE OF CROSS-CULTURAL CONCEPTS IN SCIENCE

Cross-cultural insights, including those from Buddhist traditions like those reviewed above, can help to reveal the assumptions implicit in scientific investigations that hinge on concepts influenced by cultural influences, or, perhaps better—cultural axioms. Cultural axioms are those things that are simply "taken-for-granted" by the members of a certain group (society, religion, ethnicity, etc.). They are not universal nor prescriptive values or traits, but they are axiomatic modes of articulation that characterize the motivation of members of a particular group. They are heuristic categories that we should not assume all participants of a group necessarily would use to describe their own values, but ones with which most would certainly agree. They are not foreign concepts, but demotic modifiers. They help give shape and significance to what many people in that group cherish and honor. Each member of a particular group not only expresses but also employs these axioms to explain themselves to themselves and move smoothly through society. In some cases, identifying these cultural axioms may undermine empirical projects that postulate universality of various psychological, sociological, or even neurological concepts. In other words, scientists

56. Newberg et al., "The Measurement of Regional Cerebral Blood Flow."
57. Ibid.
58. Andrew B. Newberg and Eugene G. d'Aquili, "The Neuropsychology of Religious and Spiritual Experience," *Journal of Consciousness Studies* 7, nos. 11–12 (2000): 11–12.

are well-advised not to ignore cultural axioms. Indeed, cross-cultural differences in concepts described by religious studies scholars can be treated as opportunities to explore new distinctions and syntheses that were hitherto passed over in silence.[59]

Scientific insights can also inform humanistic scholarship. Humanities scholars could profitably examine concepts, operationalized as constructs, in order to make clear nuances in meaning that may or may not be shared across cultures.[60] In our particular example, insights from neuroscience about the structure and function of the brain and the relationship between human cognitive and operational environments is extremely helpful to Buddhists who might see their own tradition's particular insights into the relation between the senses, mind, identity-formation, and action as limited to their own cultural context. In short, scientists can help scholars in the humanities identify shared traits, tendencies, and truths, and humanists can help scientists pay attention to human difference, fragility, and cultural complexity.

CONCLUSION

The result of the cross-cultural exchange with Buddhism described above is giving rise to innovations in religious studies, psychology, and neuroscience. Each field shares a desire to understand the self and mind in both culturally specific and scientifically universal ways. Buddhism has had an extraordinary impact on contemporary neuroscience, mainly through mindfulness. In this article, we have discussed another useful contribution, the distinction between self and mind—roughly, *attā* and *citta*—that we believe psychologists and neuroscientists should

59. Justin McDaniel, "The Art of Reading and Teaching *Dhammapadas*: Reform, Texts, Contexts in Thai Buddhist History," *Journal of the International Association of Buddhist Studies* 28, no. 2 (2008): 299–337; Justin McDaniel, *The Lovelorn Ghost and the Magical Monk: Practicing Buddhism in Modern Thailand* (NY: Columbia University Press, 2011); Justin McDaniel, "Buddhists in Modern Southeast Asia," *Religion Compass* 4, no. 11 (2010): 657–668; Justin McDaniel, *Gathering Leaves and Lifting Words: Histories of Buddhist Monastic Education in Laos and Thailand* (Seattle: University of Washington Press, 2012).

60. Pawelski and Tay, "Better Together"; Tay, Pawelski, and Keith, "The Role of the Arts and Humanities in Human Flourishing"; David Yaden, Jonathan Iwry, Emily Esfahani Smith, and James O. Pawelski, "Secularism and the Science of Well-Being," in *The Oxford Handbook of Secularism*, ed. Phil Zuckerman and John Shook (NY: Oxford University Press, 2016), 554–570.

take seriously in order to better understand the subjectivity of certain mental states of interest, such as mindfulness and STEs. Additionally, we made the more general claim that both science and scholarship can benefit from inter-disciplinary and cross-cultural analysis to reveal implicit assumptions. We are optimistic about the constructive outcomes of such dialogues.