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Immanence, Transcendence, and Cognition

Timothy L. Hubbard

Arizona State University and *Grand Canyon University*

Similarities of immanence and transcendence perspectives regarding the presence of the sacred or divine in the natural world to several domains and topics in contemporary science are discussed. Parallels of immanence and transcendence perspectives in psychology (computer metaphor, embodied cognition, transpersonal psychology, different types of information processing, creativity) are noted. Trends to transform the transcendent into the immanent (mathematics, mind–body dualism, reductionism, artificial intelligence, noetic science and the paranormal, God-of-the-Gaps, elimination of mind) in science are identified, and responses to such trends (increased participation by the observer, extension of social cognition to the natural world, use of a cybernetic alternative, 4E cognition, re-enchantment of the natural world) are discussed. It is suggested that transformation of the transcendent into the immanent left the natural world meaningless and devoid of mind, detached observation is not necessarily an optimal scientific strategy, and a balance between immanence and transcendence perspectives is needed.

Keywords: cognition, immanence, transcendence

An important component of the relationship of the sacred or divine to the natural world is whether the sacred or divine is believed to be present in the natural world or is located in a realm beyond the natural world; indeed, this is perhaps one of the more debated topics in religious and philosophical thought (e.g., see Kim, 1987; Leitane, 2013; Rölli, 2004). The former view suggests the sacred or divine is immanent in the natural world (i.e., in physical and biological environments not created by humans), whereas the latter view suggests the natural world must be transcended (i.e., left behind) in order to encounter the sacred or divine. Interestingly, differences between an immanence perspective and a transcendence perspective regarding the presence of the sacred or divine in the natural world parallel differences between perspectives regarding the presence of cognition (mind) in the body (brain). An analogy is drawn between

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how religion and philosophy address the relationship of the sacred and divine to the natural world and how contemporary science addresses the relationship of cognition to the body, and generalizations of the immanence perspective and the transcendence perspective that apply to different approaches to studying cognition are proposed. By considering how an immanence perspective and a transcendence perspective apply to findings and theories in psychology and in science more generally, it might be possible to gain insight into issues in psychology and in science more generally. Such insights have important implications for advancing scientific understanding, the conduct of science, and the treatment of the natural world.

Brief overviews of a range of domains and topics in psychology and in science more generally are presented. An important part of this consideration involves classification of different phenomena or processes within psychology and within science more generally as relatively more immanent or as relatively more transcendent, and the implications of such classifications are explored. Specific findings and theories in psychology can be consistent with either an immanence perspective or a transcendence perspective or can be consistent with both an immanence perspective and a transcendence perspective; even so, contemporary approaches in science more generally are more consistent with an immanence perspective than with a transcendence perspective. Indeed, the tendency in contemporary science has been to eliminate the transcendent or to reduce the transcendent to the immanent, but it is suggested that a more participatory form of science in which the transcendent is incorporated within the immanent rather than reduced to the immanent is needed. Indeed, just as science has attempted to eliminate or reduce the notion of the transcendent, science has similarly attempted to eliminate or reduce the notion of mind. Re-incorporating the transcendent into the natural world also re-incorporates mind into the natural world, and this is consistent with recent 4E approaches to cognition that demonstrate how cognition is embodied, embedded, extended, and enactive. Acknowledgment of the transcendent in the natural world moves beyond a purely objective or conceptual approach and also incorporates the subjective and experiential.

The consideration of immanence, transcendence, and cognition presented here is divided into five parts. Part I includes an overview of traditional notions of immanence and transcendence from religion and philosophy and suggests how generalizations of those notions might be applied to issues in psychology in particular and the sciences more generally. Part II suggests the distinction between immanence and transcendence is related to a range of domains and topics in psychology, and notes that some domains and topics seem more compatible with an immanence perspective, whereas other domains and topics seem more compatible with a transcendence perspective. Part III broadens the consideration beyond psychology to include other sciences and relationships among different sciences, and it is noted that Western science has generally tried to eliminate the

transcendent or transform the transcendent into the immanent. Attempts to eliminate the transcendent or to transform the transcendent into the immanent are especially relevant for psychology, as such attempts can potentially be generalized to also eliminate the notion of mind or to transform (reduce) mind to neural activity. Part IV considers responses to and consequences of the trends discussed in Part III and discusses how the notion of the transcendent might be reintroduced into Western science. One response involves a call for a more participatory and cybernetic approach, and this is consistent with a reintroduction of the transcendent into the natural world and has important implications for human interaction with and treatment of the natural world. Part V offers a summary and some conclusions.

Part I: From Religious Roots to Cognitive Characteristics

Differences between an immanence perspective and a transcendence perspective are considered, and these differences are summarized in Table 1. Historical differences between an immanence perspective and a transcendence perspective in religion and philosophy are discussed, and some ways in which those perspectives might be generalized and applied to the study of cognition and other scientific domains and topics are suggested.

Table 1
Immanence and Transcendence Perspectives

Immanence	Transcendence
the sacred or the divine is usually encountered in the natural world	the sacred or the divine is usually not encountered in the natural world
emphasis is on life in this world	emphasis is on life in another world (e.g., afterlife)
humans have power and responsibility to maintain the natural world	humans have little power or autonomy
human bodies are essential for and determine the nature of our experience	human bodies are obstacles to contact with the sacred or the divine
life is sacred, and spiritual qualities are inherent in many experiences	life is biological, and spiritual qualities are not inherent in many experiences
usually many gods or divinities	usually a single primary God or divinity
involves space and time	involves infinity and eternity
functional properties defined solely by physical components	functional properties not clearly influenced by or reducible to physical components
cognitive processes determined by properties of the body (embodied cognition)	existence of a soul, spirit, or mind independent of the body
consistent with neuropsychology and neuroscience	consistent with transpersonal psychology

Immanence Perspective

In an immanence perspective, consideration of the sacred and divine focuses on the natural world, and the sacred and divine are considered to dwell within the space and time of the natural world and not extend beyond the natural world (for overview, see Thamiry, 1910). The sacred and divine are believed to permeate the natural world and are potentially accessible to being known and experienced by humans in the natural world. The immanence perspective usually considers individuals as having relatively more power and responsibility regarding the natural world (e.g., active protection of and responsibility for the natural world, conducting ceremony to preserve the natural world). Human bodies are not viewed as obstacles to contact with the sacred or divine, nor are human bodies or the natural world considered to be illusory. Humans might not be perfect, but neither are they innately sinful or corrupted. Physical nature is viewed as rooted in the sacred or divine; the physical universe is not necessarily flawed but is instead a rich embodiment of the sacred or divine. Spiritual qualities or entities can be present in every aspect of experience, and life (and often salient nonliving aspects of the natural world) is viewed as sacred or divine. An immanence perspective is often associated with pre-monotheistic practices and nature-based religions (e.g., animism and pantheism, within which divinity occupies specific objects within the world and permeates the world) but can also be found in continental philosophy (e.g., Spinoza believed that there was not a transcendent principle involved in the production of life, thus making life immanent in the world, Zylstra, 2020).

An immanence perspective might be applied to the study of cognitive processes in at least two ways. The first way suggests that the nature of cognitive processes is determined by the body. The clearest example of this is embodied cognition, in which properties of the physical body determine properties of cognition (e.g., Lakoff and Johnson, 1999; Matheson and Barsalou, 2018). In this approach, the physical substrate in which cognitive processes occur is an important determinant of the characteristics and results of those processes. A second way is to suggest that experiences result from an explicit physical source within the body, and in most cases, this would be the brain. In this view, mind is an outcome of what the brain does. A change from a transcendence perspective in which a cause is external to the object of study to an immanence perspective in which the cause is inherent in the object of study has occurred in many areas in science (e.g., élan vital, phlogiston, and caloric were once posited as separate substances that caused other objects to be alive, burn, or be hot, respectively, but were eventually shown to not exist). Although biology, chemistry, and physics have moved from a transcendence perspective in which properties of the physical world are not causal to an immanence perspective in which properties of the physical world are causal, psychology has struggled to explain how cognitive experiences can result from neural activity (e.g., the "explanatory gap" between subjective and

objective, Levine, 2009; the "hard problem" in studies of consciousness, Chalmers, 1997; the problem of meaning, Flanagan, 2007).

Transcendence Perspective

In a transcendence perspective, consideration of the sacred or divine focuses on nonmaterial realms outside of sensory experience and involves the infinite and the eternal (for overview, see Turner, 1912). There is often an emphasis on a single or primary God (e.g., Yahweh, Allah), a presence of other lessor gods or divinities (e.g., angels, jinn), and at least one realm separate from the physical world (e.g., heaven, hell). A primary concern is the relationship of the individual human with that God or realm, and the form of this relationship can involve contemplation, faith, enlightenment, salvation, service, ritual, or other activities, with the end goal that the individual is in the company of or in unity with divinity. Practices can involve actions such as prayer, worship, devotion, meditation, withdrawal from the world, or asceticism. Although actions in the world can be important, the primary emphasis is on an existence other than that of this world (e.g., an afterlife). Transcendence perspectives suggest the material world is often separate from divinity, and because of this separation, the material world is viewed as imperfect, corrupt, sinful, or illusory. Consistent with this, transcendental approaches often lead to denigration or devaluation of the body, and the individual is viewed as having relatively little or no autonomous power. Transcendence perspectives often include themes of descent and ascent in which the sacred or divine initially descends into material form and later reverses direction and begins to ascend. In the descent, divine and material separate, and knowledge of the transcendent is lost, and in the ascent, divine and material are rejoined, and knowledge of the transcendent is regained. Such a view occurs in many cyclic philosophies (e.g., Hindu Yugas, Mayan Baktuns) and is part of the perennial philosophy (e.g., see Eliade, 1971; Huxley, 2009).

A transcendence perspective might be applied to cognitive processes in at least two ways. The first way suggests the nature of cognitive processes is not determined by the material properties of the physical body. An example of this occurs in functionalism, in which the type of physical substrate or medium in which cognitive processing occurs is not important; rather, it is the patterns of connections between units within that physical substrate or medium and between inputs and outputs (i.e., stimuli and responses) that are critical (Horowitz, 2015). As long as a physical substrate or medium can (re)produce the appropriate patterns of connections, cognitive processes would occur. Thus, if two different media (e.g., computers and brains) could exhibit the same patterns of connectivity between their constituent units (e.g., silicon gates and neurons, respectively) and between stimuli and responses, then the same cognitive processes (and resultant mental experiences) would occur in each. A second way is to posit that cognitive

processes can result from some nonphysical source, as has been done in some studies of parapsychological phenomenon (e.g., Kurtz, 1991, but see Radin, 2006, 2018). Both of these ways are challenged by contemporary studies of neuropsychology and neuroscience, which have reported high correlations between the functioning of the brain, subjective mental experience, and objective behavior (e.g., effects of brain damage or psychoactive drugs on experience and behavior). Indeed, contemporary cognitive neuroscience appears exclusively immanent in its orientation, with even transcendent experiences being attributed to neural mechanisms (e.g., the "god module," Persinger et al., 2010; Seybold, 2005).

Generalizing the Perspectives

Although some discussions of immanence and transcendence appear to consider these perspectives as dichotomous and mutually exclusive categories, it might be possible for a given stimulus, process, or phenomenon to involve both immanence and transcendence (cf. Jorgensen, 2010/2011). This might occur if immanence and transcendence anchored opposite ends of a single dimension (and a specific stimulus, process, or phenomenon might be located anywhere along that single dimension) or if immanence and transcendence were two separate (perhaps orthogonal) dimensions (and a specific stimulus, process, or phenomenon might be located anywhere along each dimension). Regardless, although many discussions of the relationship of the sacred or divine to the natural world emphasize either immanence or transcendence, the major monotheistic religions emphasize both immanence and transcendence.[1] In Jewish Kabbala, the divine presence (Shekinah) involves a light that fills (i.e., is immanent in) and surrounds (i.e., is transcendent of) the world. In Christianity, a transcendent Father becomes immanent in the Son. In Islam, Allah is within all things (i.e., is immanent) and beyond the world (i.e., is transcendent). Just as different aspects of monotheistic religions can be perceived as immanent in one instance or point in time and as transcendent in another instance or point in time, so too might a cognitive process or other scientific phenomenon be considered as immanent in one instance or point in time and transcendent in another instance or point in time (e.g., see the section on *God-of-the-Gaps* in Part III).

One way in which the immanence perspective and the transcendence perspective might be applied to scientific domains and topics involves whether the functioning or properties of a given stimulus, process, or phenomenon are determined solely by the properties of the physical components of that stimulus,

[1] At least one philosophical approach, panentheism, has been characterized as an attempt to balance the transcendentalism of theism and the immanence of pantheism, while avoiding the separation of the sacred from nature in the former and the identification of the sacred with nature in the latter (Asprem, 2014).

process, or phenomenon. An immanence perspective suggests the functioning and properties of a stimulus, process, or phenomenon are determined solely by the properties of the physical components of that stimulus, process, or phenomenon, whereas a transcendence perspective suggests the functioning and properties of a stimulus, process, or phenomenon are not determined solely by the properties of the physical components of that stimulus, process, or phenomenon. Some stimuli, processes, and phenomena might be either solely immanent or transcendent, but just as some religions exhibit both immanent and transcendent characteristics, a stimulus, process, or phenomenon in the natural world might exhibit both immanent and transcendent characteristics. An example of the presence of both immanent and transcendent characteristics is emergent properties, which are not reducible to properties of the physical components of the stimulus, process, or phenomenon (i.e., not fully immanent) but are dependent upon the presence of such components (i.e., not fully transcendent).[2] More broadly, the relative immanence and relative transcendence might differ in different stimuli, processes, or phenomena in different domains and topics in psychology and in other areas of science, and these possibilities are discussed in Parts II and III, respectively.

Part II: Parallels in Psychology

The immanence perspective and the transcendence perspective each have implications for a range of domains and topics in psychology, including the computer metaphor, embodied cognition, transpersonal psychology, information processing, and creativity. Some domains and topics appear more consistent with an immanence perspective, whereas other domains and topics appear more consistent with a transcendence perspective, and these differences are summarized in Table 2.

The Computer Metaphor

As noted earlier, a transcendence perspective is consistent with a view of cognitive processes as beyond, separate, or distinguishable from a specific physical medium (body or other hardware) in which those processes occur or are instantiated. In the early days of the cognitive revolution, the primary approach to developing theories and models of cognitive processing involved functionalism, which focused on patterns of connectivity between processing units and between stimuli and responses (Horowitz, 2015; Walker, 2013). The medium in which those patterns of connectivity were instantiated was thought to be irrelevant

[2] Consistent with this, emergent properties of a given phenomenon are not instantiated by the properties of the individual physical components (e.g., liquidity of water at room temperature is not present in its individual components of hydrogen and oxygen, temperature of a gas is not present in an individual molecule); however, physical components are necessary in the generation of that phenomenon.

(for critique, see Block, 1978). The brain was viewed as analogous to a digital serial computer; cognitive processes were just computer programs (e.g., Newell and Simon, 1956), and having a specific mental state was viewed as running the proper program. In humans, such programs were run by (and on) the hardware of the brain, but there is no reason why such programs could not be run by (and on) other hardware such as electrical circuits on a microchip. This view is consistent with similarities between neural synapses in a biological organism and silicon gates in a computer chip (e.g., McCulloch and Pitts, 1943) and was initially developed in symbol manipulation approaches (e.g., Newell, Shaw, and Simon, 1958) and later in neural network approaches (e.g., Rumelhart, McClelland, and the PDP Research Group, 1986) and general models of cognitive processing (e.g., ACT-R [Ritter, Tehranchi, and Oury, 2018], SOAR [Newell, 1990]). The computer metaphor allowed different approaches and models to incorporate different types of information or formats of representation to support different types of cognitive processing.

Table 2
Immanence and Transcendence Perspectives in Psychology

Relatively More Immanent	**Relatively More Transcendent**
computer metaphor	nonalgorithmic, noncomputable functions
properties of body influence cognition (embodied cognition)	self or identity expanded beyond the body (transpersonal psychology)
problem-solving using algorithms or brute force	problem-solving using heuristics or creative insight
sensory information	conceptual information
phenomena (appearance)	noumena (thing-in-itself)
exemplars	prototypes
future merging with artificial intelligence	future merging with spirit or divinity
ecological perception (affordances and invariants)	representational models of perception
bottom–up processing	possible aspects of top–down processing
imagery representation	propositional representation
$knowledge_{sp}$	$knowledge_{d}$
episodic memory	possible aspects of semantic memory
declarative memory	possible aspects of procedural memory
conscious and deliberative (explicit) cognitive processing	unconscious and automatic (implicit) cognitive processing
problem-solving during deliberation	problem-solving during incubation
convergent or logical thought	divergent or creative thought

Given the lack of concern with the nature of the physical substrate, the computer metaphor (and functionalism more generally) might be considered as more transcendent than immanent. In what was intended as a *reductio ad absurdum* of the computer metaphor but could be taken as consistent with a more transcendent perspective, Hubbard (1996a) argued that functionalist approaches were consistent with the idea of reincarnation. Specifically, given the ideas that mental states resulted from running the correct program, and that the same program or application can run on different computer drives, then downloading a program or application from one drive and uploading it onto a different drive was tantamount to reincarnation of those specific mental states in a new physical body. If the upload was into a newer or better operating system, that was tantamount to rebirth in a higher caste or perhaps transmigration into a different animal. Furthermore, given that the same computer drive can run different programs, the same body could contain multiple personalities or be "possessed" by different applications. Curiously, researchers and theorists who espoused the computer metaphor did not follow the analogy through to these logical conclusions. However, although there are important similarities between computers and brains (e.g., both involve a large number of interconnected individual structural units capable of binary on/off responses; see the section *Artificial Intelligence* in Part III), the nature and character of cognitive processes are not completely captured by a computer metaphor. The connections between elements that are emphasized in functionalist approaches are between physical elements, and computers are physical objects. Given this, the computer metaphor appears more immanent than transcendent.

Given technological developments that allow observation of intact functioning brains (e.g., PET, fMRI), the rise of cognitive neuroscience, and the realization of the influence and importance of the body on cognitive processes, a computer metaphor based on the digital serial computer has fallen out of favor. Additionally, the brain, unlike typical computers, is not a serial processing device, but engages in massively parallel processing, and problem-solving strategies employed by computers and by humans are often different (e.g., computers generally use a brute force approach in which the entire problem space is searched, whereas humans generally use a heuristic approach in which only a small subset of the problem space is searched; Gilhooly, 1989). Even within the computer metaphor, there are different approaches to modeling cognition (e.g., serial processing of symbols, learning rules to adjust connections between processing units, etc.). As noted earlier, a suggestion that the brain is like a computer does not capture important elements of experience (e.g., how patterns of neural connections and firing result in the subjective experience of qualia, see Chalmers, 1997, or of meaning, see Flanagan, 2007). Most critically, at least some aspects of cognition might be non-algorithmic and hence non-computable (Kauffman, 2008; Penrose, 1990), and it is not clear how a computer might instantiate a non-algorithmic or non-computable function. The realization that the brain is not completely

analogous to a computer is not surprising, as in the history of science the models of the mind usually reflect the technology of the time (Leary, 1990), and there is no reason to assume that current technology offers the best or final analogy.

Embodied Cognition

As noted earlier, an immanence perspective is consistent with an embodied approach toward cognition. Just as an immanence perspective places the sacred or divine within the natural world, thus making the natural world the substrate for the sacred or divine, embodied (or grounded) cognition places cognitive processes within the body, thus making the body the substrate (or ground) for cognition. More specifically, in embodied cognition, properties of the body and environment determine the types of cognition that can occur in that body (e.g., Barsalou, 2008; Matheson and Barsalou, 2018). Just as characteristics of the sacred or divine as manifested in the natural world are determined, shaped, or constrained by properties of the natural world, so too are characteristics of cognitive processing determined, shaped, or constrained by properties of the body and environment (e.g., human visual experience is limited by the tuning of photoreceptor sensitivities to the narrow range of wavelengths from the Sun that best penetrate Earth's atmosphere). Non-human animals with different types of bodies and sensory receptors have different sensory experiences than do humans (e.g., some fish can sense magnetic fields, dogs can hear higher frequencies, bats and dolphins perceive an organic form of radar, hummingbirds see into the ultraviolet), and the nature and quality of experiences are a function of the types of sensory receptors (for overviews of sensory capabilities of other species, see Call et al., 2017; Hughes, 2001). Indeed, it has been argued that humans cannot imagine what it would be like to have some of the sensory experiences that other animals have (e.g., Nagel, 1974, argued that humans cannot imagine the experience of being a bat that navigates by radar, although humans can have an abstract understanding of the operation of bat radar).[3]

The embodied cognition approach highlights another potential aspect of the distinction between immanence and transcendence: the same information or experience would potentially be available to any organism in a given environment, but the specific information that might be experienced by a given organism would be limited by that organism's physiology. Those sensory capabilities needed for survival in a given niche are selected for, and different species would face different selection pressures (e.g., birds of prey have high visual acuity, which aids in spotting prey; migrating birds are sensitive to polarization in light, which aids in long-distance navigation). An analogy might be made between the sensory

[3] For a suggestion that accessing second-order isomorphisms within the functional architecture of mental representation might facilitate such experiences, see Hubbard (2023).

receptors and the tuning of a radio. All the potential information (i.e., the total information being broadcast from all radio stations) is simultaneously available, but reception of any given radio station depends upon which frequency the radio is tuned to receive; different types of sensory receptors would correspond to different tunings of the radio. Just as a radio is an instrument for sampling different types of information from the environment (e.g., tuning to different frequencies to listen to different radio stations), the body is an instrument for sampling different types of information and is biased toward information that would aid the survival of that body (organism). Given the limitations of any measuring instrument (and that the senses are just measuring instruments), not all aspects of the environment can be measured (experienced) by a given instrument (sensory receptor). Human experience (phenomenology), as well as cognition based on that experience, is determined by properties of the body and the evolved sensitivity of the body to different types of information.

Humans use technology to aid investigation of what cannot be perceived with the unaided senses (e.g., microscopes to view the very small, telescopes to view the very distant, false color images to convert infrared or radio frequencies to visual pictures). However, such technological aids impose an extra layer of interpretation and abstraction between a stimulus and cognition of that stimulus (e.g., a false color image of radio frequencies is not the same as direct experience of those frequencies by a sensory receptor). Consistent with the limitations of our sensory systems, Berman (1981) suggests that rather than asking what is *X*, science should ask what is the human experience of *X*. Such a view is reminiscent of Kant's (1781/1998) distinction between the phenomenal and the noumenal and suggests that science should acknowledge the limitations of the phenomenal and not attempt to describe the natural world as it really is. Indeed, science already acknowledges that although our theories and models might provide progressively closer approximations to the natural world, it is unlikely that we will ever completely describe (or know) the natural world. In other words, we know our mental representations and models of the world (i.e., phenomena), but we cannot know the world-in-itself (i.e., noumena) or what Kant referred to as *das ding an sich* (i.e., the thing-in-itself). This parallels Gödel's incompleteness theorem, in that our description of the world will never be complete (for discussion of Gödel, see Smullyan, 1992). In this sense, there is a part of the natural world that will always remain unknown from within that world. Perhaps in order to fully know the natural world, we must transcend it (i.e., view it from a perspective outside of rather than from within the natural world).

Transpersonal Psychology

Transpersonal psychology is in many ways opposite to the embodied cognition approach. Just as the embodied cognition approach is consistent with an

immanence perspective, transpersonal psychology is consistent with a transcendence perspective. The transpersonal is usually defined as an experience in which the self or identity is expanded beyond (i.e., transcends) the individual to encompass wider aspects of humankind, psyche, or the cosmos (Walsh and Vaughan, 1993), and it is concerned with the study of humanity's highest potential and with recognition, understanding, and realization of unitive, spiritual, and transcendent states of consciousness (Lajoie and Shapiro, 1992). To the extent that transpersonal psychology explicitly moves beyond the body and addresses what are considered to be spiritual issues, it would exemplify a transcendence perspective, as any spiritual realities would presumably not necessarily be grounded in the physical body (or even in physical reality). Indeed, transpersonal psychology is more likely to consider perspectives and arguments from spiritual traditions that emphasize realization of or connection with a source outside of one's self and outside the limitations of physical or material reality, and in this way, transpersonal psychology exemplifies a transcendence perspective. As might be expected, there has been skepticism regarding transpersonal psychology within the scientific community, and the field's focus on what are considered to be spiritual issues has not been without criticism (e.g., Walach, 2013).

Transpersonal psychology initially appears consistent with a functionalist approach in which the emphasis is not on the properties of the material substrate in which mental experience is instantiated. However, transpersonal approaches are not fully consistent with functionalism, as the latter requires some material substrate in which the different patterns of connections and relationships can be established, whereas the former does not require any material substrate. Transpersonal psychology has been considered an extreme version of humanistic psychology (e.g., Valle, 1989), and in this regard, shares concerns regarding human development and clinical therapeutic practice. Indeed, therapists with a transpersonal perspective consider the possibility of a "spiritual crisis" (a diagnostic category added to the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders*; American Psychiatric Association, 1994). A different view of transpersonal approaches emerged in Kurzweil (2005), who suggested advances in technology will move humans beyond biology to merge with artificial intelligence. Even so, in the traditional view and in Kurzweil's view of transpersonal psychology, there is an emphasis on moving beyond the resources or capabilities of the human body, but in the traditional view this involves a spiritual realm, whereas in Kurzweil's view this involves merging with non-biological technology. In either case, moving beyond the body suggests a neural substrate is not necessary for cognition and mental states; however, even if human cognition is merged with or relocated to a technological device, that device would still serve as a physical substrate for cognitive processing, thus making cognition a more immanent process.

Information Processing

There have been several distinctions within psychology between different types of information processing, and several of these distinctions map, at least loosely, onto the distinction between immanence and transcendence. These distinctions are not mutually exclusive, and they include bottom–up processing vs. top–down processing, imagery vs. propositional representation, knowledge$_{sp}$ vs. knowledge$_{d}$, episodic memory vs. semantic memory, declarative memory vs. procedural memory, and implicit processing vs. explicit processing.[4]

Bottom–Up vs. Top–Down. An immanence perspective is more consistent with a bottom–up approach in which perception of the natural world is determined solely by sense data, whereas a transcendence perspective is more consistent with a top–down approach in which perception of the natural world is supplemented or modulated by abstract or conceptual knowledge (which might be derived from a transcendent source [e.g., revelation] or from abstraction of previous bottom–up information). Although in religious and philosophical approaches an immanence perspective preceded a transcendence perspective (e.g., animistic and pantheistic religions preceded major monotheistic religions), in the scientific study of psychology, a transcendence perspective preceded an immanence perspective (e.g., approaches based on a functionalist computer metaphor preceded approaches based on embodied cognition). Berman (1981) pointed out that by emphasizing cognitive processing as abstraction and conceptualization (i.e., top–down), the concrete and sensory elements (i.e., bottom–up) are minimized. Bottom–up processing might be suggested to provide a nonreducible form of mental representation involving a more direct experience of stimuli in the natural world, whereas top–down processing might be suggested to decrease the importance of individual exemplars and increase the importance of abstractions, concepts, or prototypes. Even so, different types of representation have different advantages (Hubbard, 2007), and humans might use different types of representation at different times, in different tasks, or for different purposes.

Related distinctions regarding differences between ecological approaches to perception and representational approaches to perception can be postulated. In ecological approaches (e.g., Gibson, 1979), all the information an organism needs

[4] The different types of information processing considered here involve binary distinctions, which allow for a relatively straightforward mapping of those distinctions onto the binary distinction of immanence and transcendence. However, not all distinctions regarding information processing are necessarily binary. Nevertheless, a trinary or higher number of components might reduce to a set of binary distinctions (e.g., episodic, semantic, and procedural memory might reduce to declarative memory [continuing both episodic memory and semantic memory] and procedural memory). Even so, the brief treatment here is sufficient to demonstrate the potential applicability of the distinction between an immanence perspective and a transcendence perspective to different types of information processing.

(in the form of affordances and invariants) is specified in the stimulus array (see also Witt and Riley, 2014), and so perception is a bottom–up process with no need for top–down representational strategies to disambiguate or supplement bottom–up information. Examples of this include optic flow patterns that indicate the velocity and direction of movement (if any) of the observer and changes in texture gradients with distance. However, the pattern of stimulation is often underspecified, and to the extent that information regarding a stimulus is underspecified by sensory input, there would be a need for top–down supplemental information as suggested by representational approaches. One example involves size–distance invariance, which highlights how the visual angle subsumed by a static stimulus does not provide unique information about the size or distance of that stimulus (e.g., a given visual angle might result from a small object that is relatively close or a large object that is relatively far away; Epstein, Park, and Casey, 1961).[5] Other examples include effects of size, shape, or color constancy (Walsh and Kulkowski, 1998). Alternatively, properties of the physical world could be incorporated into the functional architecture of mental representation, and examples of such incorporation include effects of invariant physical principles such as momentum and gravity on localization of physical objects (e.g., Hubbard, 2005, 2006, 2015, 2020).

Imagery vs. Propositions. Imagery is often considered to involve quasi-perceptual information (qualia), and propositions are often considered to involve symbols and more abstract information. Consistent with this, imagery is considered to depict, whereas propositions are considered to describe (Kosslyn, 1980). The extent to which images could be reduced to propositions has been extensively debated (cf. Kosslyn, 1981; Pylyshyn, 1981; see also Tye, 1991). One curious aspect of this debate is that individuals can have mental images of a stimulus whose components they previously perceived but cannot verbally describe (e.g., a random visual shape, an unidentifiable sound), and this suggests that mental images cannot be completely reduced to abstract descriptions. Experimental studies of imagery tend to focus on how imagery is used (e.g., as a mnemonic) or manipulated (e.g., in mental rotation) and not on the quasi-perceptual nature of the image that is being used or manipulated, and models of imagery tend to focus on syntax and to not address semantics (i.e., not address the "what it is like to be") of imagery (for discussion, see Hubbard, 1996b). It has been argued that data from behavioral studies (e.g., Anderson, 1978) or from brain imaging studies (e.g., Hubbard, 2010; Zatorre and Halpern, 2005) cannot distinguish between imagery or other formats of mental representation (see discussion of representational ambiguity in Hubbard, 2018). Even so, imagery seems to be more immanent (i.e., focused on specific concrete

[5] For example, the Moon and the Sun as seen from the surface of the Earth appear to be the same visual angle size (0.5 degree), and based on this, would appear to be the same physical size. However, the Moon is much smaller in diameter and much closer to the Earth, and the Sun is much larger in diameter and much farther from the Earth.

examples encountered in the world), whereas propositional representation seems to be more transcendent (i.e., capable of going beyond specific exemplars in the world to generate an abstract prototype, e.g., Posner and Keele, 1968).

Knowledge$_{sp}$ vs. Knowledge$_{d}$. Related to the differences between imagery and propositional representation is the distinction between knowledge$_{sp}$ and knowledge$_{d}$ (Raffman, 1993). Knowledge$_{sp}$ is sensory–perceptual, concrete, and experiential, whereas knowledge$_{d}$ is descriptive, abstract, and conceptual. Given that knowledge$_{sp}$ is based on experience of specific autobiographical instances in the world, it appears as though knowledge$_{sp}$ is more immanent. Given that knowledge$_{d}$ is based on abstractions and conceptual knowledge that apply broadly and would not be limited to specific autobiographical instances, it appears as though knowledge$_{d}$ is more transcendent. Even so, in developing knowledge$_{d}$, one generally has to go through a preceding stage of knowledge$_{sp}$ (e.g., knowledge$_{sp}$ of exemplars of a given type of stimulus, task, or experience are averaged across to develop knowledge$_{d}$ of a prototype of that type of stimulus, task, or experience), although an exception to this might involve knowledge$_{d}$ that is derived purely deductively. The idea that knowledge$_{sp}$ often precedes knowledge$_{d}$ is consistent with the possibility that immanence and transcendence might occur at different points in time in learning and in the knowledge representation process. The distinction between knowledge$_{sp}$ and knowledge$_{d}$ is also relevant to the role of exemplars in conceptual knowledge: a prototype might be conceived of as an abstraction that doesn't actually match any existent exemplar (e.g., Posner and Keele, 1968) and so bottom–up knowledge$_{sp}$ of a prototype would not exist. Consistent with this, the existence and role of abstract prototypes has been questioned (e.g., Hintzman, 1984).

Differences between knowledge$_{sp}$ and knowledge$_{d}$ are highlighted in three well-known philosophical scenarios (see also Hubbard, 1996b). The first involves Mary the Color Scientist (Jackson, 1982), who spent her entire life in a room in which all objects visually appear in shades of gray. Mary learns everything there is to know about color vision, optics, and ophthalmology, but she has never seen a colored object. One day Mary escapes from the gray room, and it could be asked if she learns anything new the first time she sees a colored object (e.g., a red rose). The distinction between knowledge$_{sp}$ and knowledge$_{d}$ suggests that she does (i.e., she acquires knowledge$_{sp}$ of red), but several philosophers have suggested she does not (for discussion, see Nida–Rümelin and O'Conaill, 2019). The second involves the notion of an inverted spectrum (Shoemaker, 1982). A person with normal color vision has a typical experience of "red" when presented with light having a wavelength of 680 nanometers. A second person might have a visual system that functions slightly differently, so that when they are presented with light having a wavelength of 680 nanometers, their subjective experience is similar to that which a person with normal color vision would have when seeing light having a wavelength of 550 nanometers (i.e., "green"). When both individuals are asked to name the color of a ripe apple (involving knowledge$_{d}$), they respond "red," even though

the subjective experiences (involving knowledge$_{sp}$) on which those answers are based are different. A completely inverted spectrum is an extreme case, but a similar argument can be made for any of the color weaknesses that exist in visual perception. The third involves the "what is it like to be a bat" problem mentioned earlier, as humans could possess knowledge$_{d}$ of bat radar but not possess knowledge$_{sp}$ of bat radar.

Episodic vs. Semantic. As noted earlier, knowledge$_{sp}$ is concrete and involves autobiographical information regarding the specific time and place in which stimuli (e.g., people, places, events) were encountered, and knowledge$_{d}$ involves a more general abstraction of information away from any specific time and place. This difference, between an autobiographical memory tied to a specific time and place and a general abstract memory that is not tied to a specific time and place, has been referred to as the difference between episodic memory and semantic memory, respectively (e.g., McCoon, Ratcliff, and Dell, 1986; Tulving, 1972, 1985). Because episodic memory is tied to a specific time and place within the physical environment (for review, see Tulving, 2002), it might be viewed as more immanent, whereas because semantic memory is abstracted from any specific time and place (for review, see Kumar, 2021), it might be viewed as more transcendent. However, there are debates over the extent to which episodic memory and semantic memory are actually separate systems (e.g., see retrieval-based models such as Jamieson, Avery, Johns, and Jones, 2018). Regardless, unless memory can be shown to continue to exist when outside of a physical storage or processing mechanism (e.g., outside of a neural network or computer drive), neither episodic memory nor semantic memory can be truly transcendent. Even so, claims of memories carried from life to life (e.g., people known in a past life, possession of certain objects during that life, circumstances of the death of that life; Stevenson, 2001), out-of-body experiences (Murray, 2009), and existence of psi (Radin, 1997), are consistent with a transcendent aspect of episodic memory or semantic memory.

Declarative vs. Procedural. The distinction between declarative memory and procedural memory (for review, see Gupta and Cohen, 2002) might also map onto the differences between immanence and transcendence. Episodic memory and semantic memory are forms of declarative memory, which involve autobiographical and abstract conceptual information, respectively. Procedural memory is often defined as knowledge of how to do some specific action, and that knowledge is not necessarily available to conscious awareness (i.e., it might be implicit). It is possible to have only one type of knowledge about a given activity (e.g., a person who has read treatises on dancing but cannot dance might have declarative knowledge but not procedural knowledge of dance, an acrobat who can execute a complex physical routine but can't explain how the routine was accomplished [e.g., how weight was shifted during a specific movement] would have procedural knowledge but not declarative knowledge) or both types of knowledge (e.g., a ski instructor who can

ski and also explain to others how to ski). As with knowledge$_{sp}$ and knowledge$_{d}$, declarative memory and procedural memory might occur at different points in time (e.g., while learning a new motor skill, there would be primarily declarative memory [from instruction] and little procedural memory, whereas after that motor skill is well-learned, there might be little declarative memory and primarily procedural memory). In procedural memory, execution of a well-learned skill occurs automatically and without requiring conscious attention or other cognitive resources. Such an automatic response would be more top–down (Shiffrin and Schneider, 1977), and thus potentially appear less immanent.

Implicit vs. Explicit. The idea of automatic and unconscious processing seems more consistent with a transcendence perspective. Many types of cognitive processing that are not typically available to consciousness are referred to as *implicit* (e.g., Banaji and Greenwald, 2013; Gawronski and Payne, 2010; Nisbett and Wilson, 1977), whereas other types of cognitive processing that are typically available to consciousness are referred to as *explicit* (e.g., Nosek, 2007). The distinction between implicit processing and explicit processing can be applied to perception, learning, and memory, and it can be loosely mapped onto the distinction between an immanence perspective and a transcendence perspective: implicit processing and a transcendence perspective involve a lack of awareness of the relationships between a stimulus and specific parts or aspects of the natural world, whereas explicit processing and an immanence perspective involve an awareness (or an assumption) of the relationships between a stimulus and specific parts or aspects of the natural world. The outputs of cognitive processes that are implicit or unconscious might appear as more transcendent, whereas the outputs of cognitive processes that are explicit or conscious might appear as more immanent. As noted earlier, well-learned skills often involve a progression from an initial explicit deliberative practice to a subsequent implicit automatic response. Even so, implicit (unconscious) learning can occur (for review, see Stadler and Frensch, 1998), and the appearance of such knowledge might appear to be transcendent (e.g., from revelation).

Creativity

One of the more challenging areas of investigation within psychology, and an area in which unconscious or implicit processing has been proposed to play an important part, is creativity. Some models of creativity posit a stage of incubation, in which conscious work on the problem-to-be-solved ceases, but unconscious work might continue (for review, see Ritter and Dijksterhuis, 2014). In many cases, and after some period of time has elapsed, a novel answer or solution spontaneously pops into conscious awareness (e.g., the "Eureka" moment of Archimedes). Why a period of incubation can be effective in creative problem-solving has been debated (e.g., possible mechanisms involve decay of an inappropriate

mental set, recovery from fatigue, unconscious thought being more divergent). Regardless, a sudden awareness of a novel answer or solution could be viewed by individuals as coming from outside of themselves (e.g., from a Muse, God, or other supernatural source) and so would appear as transcendent. More generally, divergent or creative thought might appear more transcendent, whereas convergent or logical thought might appear more immanent. Consistent with this, in the first half of the twentieth century, topics such as creativity were eschewed by logical positivism and behaviorist psychology, which claimed that any topic that could not be objectively defined or measured (i.e., was not strongly immanent) was not an appropriate topic for scientific investigation. At that time, experimental and methodological techniques for studying implicit and unconscious processes had not been developed, but such techniques have subsequently been developed and are now widely used.

Part III: Transforming the Transcendent

In addition to potential parallels of the distinction between immanence and transcendence to different domains and topics in psychology noted in Part II, there are several other domains and topics in science more generally that are potentially related to the distinction between immanence and transcendence, and these are summarized in Table 3. In only one case, mathematics, does the notion of the transcendent appear to be embraced, but in other cases, including mind–body dualism, reductionism across sciences, artificial intelligence, noetic science and the paranormal, the God-of-the-Gaps, and elimination of mind, there appear to be attempts to reductively transform the transcendent into the immanent.

Mathematics

Although numerosity is tied to concrete physical exemplars of quantity and so seems relatively immanent, other aspects of mathematics appear more transcendent. Elements of both transcendence and immanence can be seen in set theory, in which mathematical logic is used to describe various collections of objects. To the extent that set theory can apply regardless of object type, it is transcendent; to the extent that set theory addresses specific objects, it is immanent. In the writings of Plato, numbers are seen as existing outside of any specific exemplars of number, as perfect forms in a transcendent world of forms (Anglin and Lambek, 1995). Curiously, contemporary mathematics even contains a type of number referred to as "transcendental," and such numbers are not algebraic (i.e., they are not the root of a non-zero polynomial with a rational coefficient). The most well-known transcendental number is π, the ratio of a circle's circumference to its diameter. Interestingly, π is also an irrational number (i.e., it cannot be precisely expressed as a fraction

[although 22/7 is a common approximation]), and its decimal representation never ends or settles into a permanently repeating pattern. The full extent of π is unknowable, and this is consistent with a view that while in (or from the perspective of) the natural world we cannot know all of the stimuli in (or beyond) the natural world (cf. Gödel's incompleteness theorem). The potential transcendence of numbers is also seen in mathematical models of higher *N*-dimensional spaces which cannot exist within our four-dimensional spacetime reality, in the existence of transfinite numbers, and in aleph numbers.

Mind–Body Dualism

Perhaps the most obvious parallel of a distinction between immanence and transcendence to a scientific topic is the relationship of the mind (cognition) to the body (including the brain), and this historically has taken the form of mind–body

Table 3
Immanence and Transcendence Perspectives in Western Science

Relatively More Immanent	Relatively More Transcendent
numerosity	transcendental numbers, N-dimensional space, aleph numbers
Cartesian body extended in space	Cartesian mind not extended in space
mind is the same as brain	mind is distinct and separate from brain
identity theory, eliminative materialism	functionalism
medical model, effects of drugs and surgery	psychosomatic medicine, placebo effect
reductionism across sciences	irreducibility of psychology to physics
explanatory arrows all point downward (to physics)	explanatory arrows can point in different directions
consistent with neuropsychology and neuroscience	consistent with transpersonal psychology
usually focuses on an individual in isolation	usually considers the context in which an individual is embedded
artificially intelligent devices can be conscious	artificially intelligent devices cannot be conscious
consciousness and matter share the same properties	consciousness and matter have different properties
the paranormal and the supernatural	the normal and the natural
a limited God-of-the-Gaps	no limits on the sacred or divinity
mental illness results from chemical or neurotransmitter imbalance	mental illness results from spiritual crisis
elimination of mind as causal power	emphasis on mind as causal power

dualism. Although the relationship of cognitive processes to the brain is a key element of contemporary psychology, there is a long history of consideration of this relationship in addition to that provided by contemporary psychology and addressed earlier. Contemporary discussions of mind–body dualism are often traced back to Descartes (1641/1993), who noted numerous differences between mind and body, including that mind (thoughts [*res cogitans*]) was not extended in space, but that body (physical objects [*res extensa*]) was extended in space. Descartes claimed that mind and body were separate, although he allowed that the mind could influence the body through the pineal gland. Since Descartes' day, there have been other approaches to the relationship between mind and body (for reviews, see Churchland, 1988; Llinás and Churchland, 1996; Warner and Szubka, 1994) including identity theory (in which mind is just the functioning of the brain), token physicalism (in which mental states are linked with physical states, but not necessarily in a one-to-one relationship), functionalism (in which connections between inputs and outputs, rather than the nature of the physical substrate per se is emphasized), eliminative materialism (in which folk-psychological descriptions of mental states [e.g., joy, happiness, depression] are discarded in favor of descriptions of neural functioning), and epiphenomenalism (in which mental states are just by-products of neural activity and play no causal role in cognitive processing).

Within a mind–body dualism of the type described by Descartes, mind (cognition) is clearly transcendent, and body (brain) is clearly immanent. However, many contemporary scientific discussions of the relationship of mind and body suggest there is actually no dualism at all, and such views usually attempt to reduce mind (i.e., mental or cognitive processes) to body (i.e., biological, chemical, or other physical processes). An immanence perspective on mind–body dualism is consistent with identity theory, token physicalism, and epiphenomenalism, and this suggests that sources and characteristics of cognitive processing and mental experience are all in the physical world, and specifically, in the biological and chemical functioning of the brain. In the strongest view, eliminative materialism, even the existence of mental experience is denied (or considered illusory), and as something that does not exist could not be immanent or transcendent, only an immanent body remains. How one resolves the mind–body relationship is linked to whether cognitive processes are viewed as more immanent or as more transcendent, and contemporary approaches to resolving the relationship between mind and body usually involve an immanence perspective in which mind is reduced to a function of the body (e.g., use of the medical model in treatment of mental illness). However, such a strategy assumes the validity of a reduction across sciences that might or might not be justifiable. Even so, regardless of which (if any) of the proposed resolutions of mind–body dualism is ultimately correct, the reason why subjective mental experience (i.e., mind) occurs at all must still be addressed and cannot be simply dismissed or ignored.

Reductionism Across Sciences

The possibility of mind–body dualism is one answer to the question of the relationship between the mind and the body; however, such a question is usually answered in Western science by a reduction of the mind to the body. Reductionism involves one way of specifying the relationships between the different sciences, and in the most common version, different sciences are organized hierarchically. Physics is considered the base or foundation. Chemistry is built upon physics, biology is built upon chemistry, psychology is built upon biology, and so forth. The goal of reductionism is to explain the laws and findings of one science in terms of the laws and findings of a more basic science (e.g., biological laws in terms of chemical laws). In such an account, the explanatory arrows point downward toward physics (cf. Weinberg, 1994), and this is consistent with an immanence perspective but not consistent with a transcendence perspective. Reductionism is consistent with embodied cognition and suggests that properties of cognitive processes are determined by (biological, chemical, and physical) properties of the body and environment. Indeed, neuroscience and medicine are based on reductionism (e.g., brain imaging and study of brain-damaged patients to understand normative function, use of psychotropic drugs in combating mental illness) and are consistent with an immanence perspective. Alternatively, an approach to cognitive processing that is based on transpersonal psychology, and to a lesser extent functionalism, would not reduce properties of cognitive processing to biology and chemistry, and so would be more consistent with a transcendence perspective.

Although reductionism is the dominant view in the sciences today, arguments against reductionism have been made (e.g., Fodor, 1975; Gallagher, 2018; Putnam, 1973; van Gulick, 2001). Kauffman (1995, 2008) highlighted the importance of self-organization in establishing order and structure in the natural world, and he suggested that the existence of self-organization, emergent properties, and preadaptation in complex living systems demonstrated that biology is not reducible to physics. Kauffman's arguments can be extended to suggest that psychology is not reducible to physics or perhaps even reducible to biology. Additionally, Fodor (1974) suggested that bridge laws connecting different sciences might not be able to incorporate all possible variations of a given phenomenon (e.g., economic exchanges can involve paying with cash, credit card, or barter, but it is doubtful the same neural instantiation would underlie each type of behavior, and so the generalizability [and usefulness] of the economic principles regarding exchange would be lost by a reduction to biology; see also Nathan and Del Pinal, 2016). Although issues regarding reductionism have been debated primarily within philosophy, there is no in principle reason why the validity of reductionism might not ultimately be an empirical question, even if the methodological and/or technological ability to empirically investigate this issue is currently lacking.

Discussions of reductionism within psychology often focused on individuals in relative isolation, but an important caveat in evaluating the extent to which reductionism might be viable is a consideration of the context within which the individual is embedded (e.g., see the section *A Cybernetic Alternative* in Part IV).

Artificial Intelligence

With the development of science during the past few centuries, explanations for many different physical phenomena moved away from a transcendence perspective based on the supernatural and toward an immanence perspective based on observable and measurable properties of matter and the natural world. Such an increased focus on observable and measurable properties of matter occurred even in psychology and reached an apogee in the behaviorism of the first half of the twentieth century (although contemporary eliminative materialism and neuroculture are similarly extreme in their emphasis). Artificial intelligence has progressively moved toward a view that is abstracted away from immanence, with theorists such as Kurzweil (2005) appearing to embrace a view in which consciousness, phenomenology, algorithms, and matter all share the same set of properties. This abstraction initially seems more consistent with a transcendence perspective, and given the basis of the computer metaphor in functionalism, it is tempting to consider artificial intelligence as exhibiting a transcendence perspective. However, and as noted earlier, given that the software and hardware of any artificially intelligent device is created using physical materials, and that any artificially intelligent device would rely on that physical material, any artificial intelligence would not be fully transcendent (even if mental states or consciousness was an emergent property). Indeed, production of an artificially intelligent (or conscious) device could be viewed as evidence that intelligence (or consciousness) has a purely physical basis.

It is relevant that there are still debates regarding whether artificially-constructed devices can possess or exhibit consciousness (e.g., Chella, Cangelosi, Metta, and Bringsjord, 2019; Hildt, 2019). If consciousness is solely immanent, then the existence of consciousness in artificially-constructed devices might seem possible or even likely (as nothing beyond the appropriate hardware and software would be necessary), but if consciousness is at least partially transcendent, then it is not clear how such devices might acquire any necessary transcendent characteristic (i.e., the "missing ingredient" required for consciousness, Lamme, 2018). Indeed, the continued existence of such a debate suggests that at least some traces of a transcendence perspective remain; if there were widespread agreement that consciousness was solely immanent, there would not be a question about the possibility that such devices could be conscious. There are distinctions within artificial intelligence that are relevant to whether such devices might possess or exhibit consciousness or other mental states. One distinction involves the

physical architecture: Would a parallel processing architecture that utilizes different connection strengths between processing units and is more similar to the architecture of the brain be more likely to experience mental states than would a simple serial processor that applies various rules and sequential algorithms? A second distinction involves the goal of artificial intelligence: Would a program based on verbal protocols from humans and intended to replicate patterns of human performance (including errors) be more likely to experience human-like mental states than would an expert system that is not based on verbal protocols from humans?

Noetic Science and the Paranormal

Noetic science is a relatively new discipline, and it attempts a rapprochement between scientific and spiritual/parapsychological approaches (e.g., Radin, 1997, 2006, 2018). There are a number of topics in noetic science that can initially be viewed as suggesting the existence of a transcendent aspect of cognitive processes and mental experience. Indeed, Barušs and Mossbridge (2017) titled their book on noetic science *Transcendent Mind: Rethinking the Science of Consciousness*. Topics they discussed included many previously considered to be paranormal or supernatural, including telepathy, clairvoyance (remote viewing), precognition (presentiment), and psychokinesis (effects of thought on physical objects). Such a parallel between the transcendental and the paranormal is understandable, as the transcendent (by definition) is not in or of the natural world, and the existence of paranormal abilities initially appears inconsistent with the dominant materialist paradigm of traditional Western science (for discussion, see Tart, 2009). Consistent with this, Kurtz (1991) in his critique of religion suggested humans have a tendency toward magical thinking, which he claimed undermined critical judgment and allowed irrational belief in the transcendental and in the paranormal to occur. Another possibility more consistent with noetic science is that the so-called "paranormal" is actually of this world (i.e., immanent, see Radin's, 2013, notion of "supernormal") and thus unrelated to the transcendent. In essence, noetic science attempts to make what was considered the paranormal or the supernatural into the normal or the natural. Interestingly, in seeking to transform the transcendent into the immanent, noetic approaches parallel the goal of psychoanalysis in seeking to transform the unconscious (implicit) into the conscious (explicit).

The God-of-the-Gaps

As Western science has generally adopted an immanence perspective, any remaining unexplained phenomena have sometimes been attributed to a God-of-the-Gaps. In this view, only that which is not currently scientifically understood might be attributed to a deity or other non-physical cause (for

review, see Larmer, 2002). Of course, as the range of scientific understanding increases, the range of phenomena that might be attributed to a God-of-the-Gaps decreases, until ultimately all of the gaps in scientific understanding would be closed and there would be no need for such a God. Before many natural phenomena such as lightning and earthquakes were (at least partially) scientifically understood, explanations of those phenomena often involved appeal to the gods or other supernatural forces, and such forces could be perceived as not of this world (and thus were transcendent). However, today natural phenomena such as lightning and earthquakes are explained in terms of electrical discharges and plate tectonics, respectively (and thus are immanent). Similarly, many types of mental illness are no longer attributed to supernatural (transcendent) forces such as possession by spirits or demons, but are understood as having physical causes related to neurotransmitter and other chemical imbalances. What is not scientifically understood today might be scientifically understood tomorrow, and as scientific understanding increases, the gaps in our understanding decrease, and so the amount of the universe left for a divine or transcendent explanation decreases (e.g., we no longer need to appeal to the gods or the supernatural in explanations of lightning, earthquakes, or mental illness).

Elimination of Mind

The diminishing role of the transcendent can be clearly seen in the response attributed to the eighteenth century scientist Pierre-Simon Laplace to a question regarding why there was no place for God in his theory of solar system dynamics: "I have no need of that hypothesis" (see Ball, 1960; Barbour, 1998). One ultimate goal of science is to eliminate the transcendent and explain all phenomena in terms of purely physical (immanent) mechanisms. Indeed, not only has Western science progressively eliminated the sacred or divine (i.e., transcendent) from worldly phenomena, but Western science has also progressively eliminated mind from worldly phenomena (Berman, 1981). As noted earlier, a recent approach to mind–body dualism is eliminative materialism, which has as a goal the characterization of experience solely in terms of neural activity and the elimination of folk-psychological terms (cf. neuroculture, Mora, 2015). Reductionism across the sciences, in which psychology is reduced to biology, which is reduced to chemistry, which is reduced to physics, has no need for the presence of mind as a causal mechanism (i.e., "no need of that hypothesis"); even so, and as noted earlier, reductionism across the sciences is not universally agreed upon, and there are compelling arguments that reduction might not be possible (e.g., Fodor, 1974; Kauffman, 2008). However, even if there were agreement that mind is not causal, the phenomenology of mental experience would still need to be accounted for and should not just be dismissed. One response to the elimination of the transcendent and the elimination of mind has been a call for increased participation

(rather than neutral observation) of the observer in the scientific process, and this is considered in Part IV.

Part IV: A Call for Participation

Part III discussed how contemporary Western science has attempted to transform the transcendent into the immanent and that transformation of the transcendent has often been accompanied by elimination of the (notion of) mind. Such attempts to transform the transcendent have isolated the observer from the phenomena being studied. Indeed, such isolation is a standard part of Western scientific practice, but it results in the observer being cut-off from the sacred and the transcendent, resulting in a loss of myth and meaning (cf. Campbell, 1988). This has led to a call for increased participation of the observer with the natural world and for decreased detachment and separation of the observer from the natural world (Berman, 1981). Such a view suggests an approach to cognition and to science more generally that involves participation rather than conceptualization, and differences between participation and conceptualization are summarized in Table 4. Additional responses and consequences including an extension of social cognition into the natural world, a cybernetic alternative to reductionism, consistency with a 4E approach to cognition, and a re-enchantment and re-animation of the natural world are discussed.

Participation vs. Conceptualization

In Western science, investigators generally do not participate as such in the reality they study; instead, they aim to be neutral observers of that reality, and it is assumed that scientific observations should be independent of the observer. Science has historically been considered as relatively objective and as placing a (figurative, if not literal) wall between the scientific observer and the phenomenon being observed, and placing such a wall is tantamount to focusing on abstract conceptual knowledge and ignoring experiential knowledge (cf. Mary the Color Scientist, who before escaping the gray room acquired all possible knowledge$_d$ of color vision but no knowledge$_{sp}$). However, an immanence perspective that places the objects of study outside of and separate from the observer is incomplete. Bateson (1972, p. 461) noted, "the individual mind is immanent but not only in the body. It is immanent also in the pathways and messages outside the body; and there is a larger Mind of which the individual mind is only a subsystem. This larger mind is comparable to God… but it is still immanent in the total interconnected social system and planetary ecology." Although in this view the transcendent has been made immanent, this does not involve reduction of the transcendent to the immanent as is typical in Western science, but rather involves incorporation of the transcendent within the immanent. Importantly, not only the

Table 4
Immanence and Transcendence Perspectives in Western Science

Participation	Conceptualization
experimental outcomes are influenced by the observer	experimental outcomes are not influenced by the observer
subjective, first-person, knowledge$_{sp}$	objective, third-person, knowledge$_{d}$
cognitive system extended beyond the physical body	cognitive system limited to within the physical body
semantics	syntax
purpose	lawfulness
participant consciousness	nonparticipant consciousness
the observer is integral part of the world; detached and neural observation is not possible	the observer is not a part of the world; detached and neutral observation is a goal
social cognition, biases, and attributions extended to non-human elements of the natural world	non-human elements of the natural world are treated as nonsocial and nonsentient objects
consistent with a cybernetic approach	consistent with a reductive approach
perception–action, action-specific perception, perceptual cycle	isolation of different cognitive processes
feedback loops, message pathways, homeostasis; cognition stretched across mind, body, activity, and setting	cognitive process limited to neural network within the body
meaning is "out in the world" as well as "in the head"	meaning is only "in the head"

transcendent, but also the mind, was emphasized in Bateson's view. Although contributions of the observer to the observation are recognized in some descriptions of quantum physics, many sciences still stress that the observer must be separated from the phenomena being observed.

A nonreductive incorporation of the transcendent into the immanent might be viewed as prioritizing concrete experience over abstract concepts, but immanence and transcendence perspectives are complementary, and both are necessary. Differences between participation and conceptualization are analogous to differences between semantics and syntax, with participation involving the meaning and purpose of a stimulus and conceptualization involving abstract rules for manipulation or expression of that meaning and purpose (cf. Monod's, 1972, proposal that purpose is a principle of the transcendent and lawfulness is a principle of the immanent). Relatedly, and as noted earlier, humans can store or retrieve information by using imagery or by using propositional representation, but Western science has

emphasized abstract rules, conceptualization, and syntax. Surprisingly, even theories of mental imagery focus more on the manipulation (syntax) of images (e.g., mental rotation) than on the subjective content (qualia) of imagery (Hubbard, 1996b). A call for participation also evokes the idea that researchers influence the results of an experiment simply by the act of observation (e.g., Baclawski, 2018; Buks et al., 1998; Schäfer, 2013) and that truly neutral and detached observation is not possible. Participation could potentially re-instate the meaning and purpose that has been stripped away from the natural world by the isolation of the observer (cf. Brown, 2020). Importantly, there might be types of processing or knowledge that cannot be reduced to objective conceptualization and so can only be known through participation (e.g., claims that the transcendent [mystical] is ineffable and must be experienced to be known; Braud, 2002; James, 1902/1982; Kundi, 2013).

Extending Social Cognition

The idea of "participation" implies the existence of a social element in the relationship of humans to non-human elements of the natural world, and so it might be useful to consider potential social aspects of such participation. Hubbard (2012) presented several examples of such participation in shamanic cognition that showed how concepts from cognitive and social psychology could be applied to describe or explain interactions of humans with non-human elements of the natural world. One example involves the intentional stance, in which observers attempting to predict or understand the behavior of some other entity might, in the absence of physical knowledge or design knowledge about that entity, treat that entity as possessing mental states, desires, and beliefs, and then use such attributions as tools to predict or understand the behavior of that entity.[6] A second example involves extending biases of social attribution (e.g., fundamental attribution error, in-group/out-group differences, correspondence bias, locus of control) to apply to non-human elements of the natural world (e.g., increasing the membership in the in-group to include nonhuman animals). More generally, cognition relevant to understanding and predicting behaviors of and interactions with other humans provides a metaphor or analogy for understanding and predicting behaviors of and interactions with non-human elements of the natural world. Such an extension of social cognition to non-human elements of the natural world is consistent with the notion that at least some of the explanatory arrows in bridge laws connecting the sciences could point upward rather than downward.

If humans are active participants in and not just neutral observers of the physical world, then qualities and characteristics of that participation, and how

[6] The opposite of the intentional stance occurs in totemism, in which properties or characteristics of a totem animal can be used to predict or understand the behavior of a person who has that totem.

participation and non-participation might differ, are important. Consistent with this, Berman (1981) proposed a distinction between "participant consciousness" and "nonparticipant consciousness"; in the former, the observer is an integral part of the natural world, whereas in the latter, the observer is detached or separate from the natural world. Participant consciousness involves a merger or identification with one's surroundings, but this is viewed as inconsistent with standard scientific methods and practices that require a neutral observer who is distanced (separated) from those surroundings (i.e., who is in nonparticipant consciousness). Participant consciousness seems similar to some views of the Copenhagen interpretation in quantum physics (e.g., Schäfer, 2013) and to some Native American approaches to science (e.g., Cajete, 2000; Peat, 1994, 2005) that involve participation and social interaction of the observer with the stimulus or phenomenon being observed, and the embrace of both subjective participation (transcendence) and objective science (immanence) in participant consciousness is consistent with noetic science. Berman presents a strong argument for participant consciousness, and he suggests a science that attended to such relationships — rather than to separate and discrete entities — would be more holistic and involve a type of animism (involving mind, meaning, and purpose) without anthropomorphism. Furthermore, he suggests such an approach is necessary to counteract the accelerated level of destruction of the natural world that has occurred under nonparticipant consciousness.[7]

A Cybernetic Alternative

The majority of research on human cognitive processing involves reductive approaches in which a process, behavior, or structure is studied in isolation; however, Bateson (1972) and others have argued for an externalization of mind, in which cognitive processing makes explicit use of the environment. Such an externalization is reminiscent of cybernetics, which is defined as the scientific study of control and communication in animals (including humans) and machines (Wiener, 1948). Cybernetics often focuses on how feedback influences behavior of an object, person, or other stimulus (for review, see Francois, 1999), and provision of feedback that could influence subsequent behavior of the observer in a cybernetic system is more consistent with participation than with detached or

[7] If the natural world is devoid of meaning, then there are no clear or compelling arguments against predatory and exploitative relationships to the flora, fauna, and other resources in the natural world. In other words, if humans view themselves as separate and disconnected from the natural world, then there is no imperative to behave morally or ethically toward (or to be concerned with the well-being of) any entities in the natural world. Alternatively, if humans view themselves as part of and connected to the natural world, then there would likely be less predatory and exploitative treatment of Earth's natural environment (see also Brown, 2020; Tarnas, 1996).

neutral observation.[8] A typical example of a cybernetic system is a steam engine: such an engine requires a specific level of pressure to operate optimally; if the pressure within the engine is too high, the governor opens a value to release pressure, and if the pressure is too low, the valve remains closed. Another example is the thermostat: if the temperature is too hot, mechanisms for cooling are turned on, but if the temperature is too cold, mechanisms for heating are turned on. Such examples are negative feedback loops in which a state or condition is held at a stable (optimal) level; importantly, the governor and thermostat are not isolated observers, but participate in maintaining the stability of the systems within which they are embedded. However, theorizing in psychology is often abstract and not grounded in the natural world (e.g., Barsalou, 2008) or in embodiment (e.g., Gibbs, 2005), and that obscures the externalization of mind and the cybernetic nature of cognition.

A cybernetic approach is consistent with suggestions of some cognitive theorists that neural networks place meaning "out in the world" as well as "inside the head" (e.g., Clark and Chalmers, 1998; Hardy, 1998; Hubbard, 2002). By considering meaning to be both out in the world and inside the head, functional connections such as feedback loops between the person and elements of the external natural world are made explicit. This is consistent with views from the perception–action approach (e.g., Hommel, 2019) and action-specific perception (e.g., Witt, 2018), both of which suggest that consequences of an anticipated action contribute to qualities of the current perception. This is also consistent with suggestions that cognition is mediated by artifacts and that what we call "mind" includes the environmental context within which cognition is embedded (cf. Cole, 1996; Ellis, 2018; Jordan, 2013, 2020). Consistent with this, Bateson (1972, p. 459) proposed the following thought experiment: "Suppose I am a blind man, and I use a stick. I go tap, tap, tap.… Is my mental system bounded at the handle of the stick? Is it bounded by my skin? Does it start halfway up the stick? Does it start at the tip of the stick?" Bateson argues that such questions are nonsensical unless not just the man, but also the stick, purpose of the tapping, and environment are taken into account; he concluded message pathways exist outside the skin and must be included as part of the cognitive system. Relatedly, Hutchins (1995) described how the execution of a cognitive task could be viewed as a single cognitive activity distributed across multiple individuals. Thus, in a cybernetic system, physical stimuli distinct from the body can effectively function as parts of the body (and of the cognitive system).

These ideas suggest an outward shift and even a potential dissolution of any functional boundaries between neural structures and the external environment.

[8] The term "cybernetic" in colloquial popular culture has a somewhat different meaning, and is often used to refer to robotic or cyborg systems (e.g., Gibson, 2017) rather than to the use of feedback per se. Such colloquial usage should not be confused with the technical usage here.

The definition of "cognition" would be broadened to include mind, body, activity, and setting (Lave, 1993), and this is consistent with the idea that a person's neural network may be part of a larger functional network extending beyond that person's body. Such a broadening is consistent with the ecological view of perception (e.g., Gibson, 1979) and the shamanic view that the universe is saturated with meaning (Eliade, 1964), because such views place important aspects of meaning out in the natural world (Taylor, 2007). Consistent with this, Jordan (2013, 2020) argued that organisms embody the phylogenetic, cultural, social, and developmental contexts from which they emerged and in which they are sustained, and Neisser (1976) proposed a perceptual cycle in which exploration of the world influenced cognitive representations of the world which in turn then influenced subsequent exploration of the world. Relatedly, homeostatic mechanisms of humans and other organisms are examples of cybernetic systems, and a cybernetic view suggests that sustaining many biological and growth processes should be framed as maintaining a constant optimal level rather than framed as a continual growth and expansion. Such a homeostatic view underscores the nature of participation, as feedback from the environment changes the organism, which in turn will influence future feedback from the environment. If the observer is too isolated, any potential feedback is not effective, and the system can more easily move away from a stable and sustainable (optimal) level and potentially be damaged or damage the larger environment in which that system is embedded.

4E Cognition

The call for a cybernetic approach is consistent with recent proposals for a 4E approach to cognition (for review, see Newen, de Bruin, and Gallagher, 2018), which emphasizes that cognition is embodied (i.e., cannot be described solely in terms of abstract representations but must involve the entire body), embedded (i.e., cannot be described as an isolated system separate from the ecological niche), extended (i.e., often offloaded onto other beings or technological devices to serve functions difficult or impossible for individuals to perform using only their own mental processes), and enactive (i.e., reflects meaningful relationships between the individual and the environment). The importance of embodiment for cognition has already been discussed, and a concern for how that body is embedded in, extended into, and enactive with the surrounding environment is consistent with participation in the environment, extension of social cognition to nonhuman elements of the environment, and a cybernetic approach involving message pathways outside the human body (i.e., an externalization of mind). The 4E approach to cognition appears consistent with the call for increased participation and a cybernetic approach; indeed, the embedded and enactive elements of the 4E approach to cognition seem especially critical, as those elements suggest the formation of meaningful relationships between the individual and elements of the environment,

and such meaningful relationships could lead to an incorporation of the transcendent within the immanent and a resultant "re-enchantment" and "re-animation" of the natural world (e.g., Abram, 1997, 2010; Berman, 1981; Main, 2022).

Re-enchantment and Re-animation

The notion of an active participation that involves inclusion of the natural world beyond the body within the cognitive system offers a way to potentially bridge between immanence and transcendence (and between embodied cognition and transpersonal psychology). Such connections (in the form of feedback loops or other message pathways) would incorporate influences of the body and influences of the natural world. Such feedback loops or message pathways would place (or allow) meaning and purpose back into the natural world, and this would be consistent with Berman's (1981) call for a re-enchantment of the world and Peat's (1994, p. 307) call for a "reanimation of biology, the notion of observation, and a reconsideration of reductive and mechanistic approaches." Although focused on the immanent, such a re-animation might potentially involve transcendent elements or a transcendence perspective. Relatedly, Kauffman (2008) suggested the role of creativity and self-organization in the natural world should be considered as sacred, but such an approach does not necessarily involve participation (e.g., feedback loops, message pathways) and is focused in the immanent. Attempts to reductively transform the transcendent into the immanent (i.e., to de-enchant or de-animate the natural world) risk severing humanity from meaningful cognitive connections to the natural world. A re-enchantment and re-animation of the natural world can reestablish such connections, and this would offer a homeostatic corrective to the activities of societies that are damaging or driving to extinction the fauna and flora of the natural world, as presumably one would be less likely to exploit or damage that with whom one has a meaningful (and social) relationship.

Part V: Final Thoughts

Traditional views in religion and philosophy suggest an immanence perspective places the sacred or divine within the natural world and a transcendence perspective places the sacred or divine beyond the natural world. Parallels to this distinction can be seen in psychology and in Western science in general, as how religion and philosophy address the relationship of the sacred or divine to the natural world is similar to how science addresses the relationship of cognition to the body. However, in Western culture science has supplanted religion and philosophy as the main tool for understanding and making sense of the world, and as science generally does not endorse the notion of the transcendent, it is not surprising that in Western culture the immanent has been emphasized at

the expense of the transcendent. An immanence perspective involves functions and processes of any stimulus, process, or phenomenon that are determined by properties of the physical components of that stimulus, process, or phenomenon, whereas a transcendence perspective involves functions and processes of any stimulus, process, or phenomenon that are not clearly determined by properties of the physical components of that stimulus, process, or phenomenon. Such a view of transcendence does not require that functions or processes be unrelated to the natural world, but only requires that any connections not be known. Indeed, as shown by attempts to transform the transcendent into the immanent, some stimuli, processes, and phenomena could initially be viewed from a transcendence perspective (e.g., mental illness as caused by possession by spirits), but later be viewed from an immanence perspective (e.g., mental illness as caused by neurotransmitter imbalance).

Some topics in psychology appear to be relatively more immanent and other topics in psychology appear to be relatively more transcendent. Elements of the computer metaphor can be viewed as relatively more immanent (e.g., if the storage of information and the running of programs that create mental states requires a physical substrate) or as relatively more transcendent (e.g., if based on a functionalism that allows cognitive processes to be instantiated in different substrates such as silicon gates on a computer chip or neural networks in a biological brain). An embodied cognition approach in which cognitive processing is influenced by properties of the body is relatively more immanent, whereas a transpersonal psychology which emphasizes spiritual issues or a merging of biological and artificial intelligence is relatively more transcendent. Some types of information or cognitive processing such as bottom–up processing, imagery, knowledge$_{sp}$, episodic memory, and declarative memory that involve concrete and sensory information (linked to a specific time and place in the natural world) appear relatively more immanent, whereas other types of information or cognitive processing such as top–down processing, propositional representation, knowledge$_{d}$, semantic memory, and procedural memory that involve abstract and conceptual information (not linked to a specific time and place in the natural world) appear relatively more transcendent. The distinction between immanence and transcendence is also relevant to the difference between explicit (conscious) and implicit (unconscious or automatic) processing, with the former appearing more immanent and the latter appearing more transcendent.

The distinction between immanence and transcendence is also relevant to other sciences and to aspects of science more generally. The materialist basis (and bias) of Western science is strongly immanent; in fact, much of the history of Western science has involved attempts to reductively transform the transcendent into the immanent, with the ever-shrinking domain of scientifically unexplained phenomena (including phenomena that might initially appear transcendent) sometimes attributed to a God-of-the-Gaps. Transcendent notions in the early

history of many scientific disciplines (e.g., élan vital, phlogiston, caloric) have been replaced with immanent physical mechanisms (e.g., caloric replaced by mean molecular motion). Perhaps the most obvious application of the distinction between an immanence perspective and a transcendence perspective is the relationship between mind and body (with most Western scientists favoring reduction of mind to body) and reductionism across the sciences (in which the phenomena and laws of a given science are explained in terms of a more basic science). However, there are compelling arguments against reductionism, and to the extent that reductionism cannot account for at least some aspects of cognitive (e.g., qualia, meaning), biological (e.g., preadaptation, self-organization), or physical (e.g., emergent properties) phenomena, the transcendent cannot be reductively transformed into or reduced to the immanent. Rather than reducing the transcendent to the immanent, it might be necessary to expand the view of the natural world to include the transcendent (cf., noetic science, which uses experimental and statistical methods to examine apparent parapsychological [transcendental] phenomena).

Attempts to reductively transform or eliminate the transcendent often result in the observer being cut-off or isolated from the phenomenon being studied. Indeed, Western science has emphasized such separation (and the experimental control that often requires such separation) as an integral part of the scientific method. However, some theorists proposed the idea of an externalized and extended mind in which an individual mind is not limited to a single biological body, but actually incorporates information processing and storage from outside that body. In this view, the transcendent is potentially united with the immanent, not by reduction of the transcendent into the immanent, but rather by incorporation or expansion of the transcendent into the immanent. Such an incorporation or expansion is consistent with the attribution of mental states and social cognition regarding behavior of humans toward non-human elements of the natural world. Furthermore, extending such attributions allows for the possibility of feedback, which is consistent with a more cybernetic view of cognition. Indeed, other elements of human biology (e.g., maintenance of homeostasis) involve just such cybernetic-type feedback loops. One consequence of a cybernetic perspective is that functional boundaries between the neural systems of the body and the external world are shifted outward or weakened; meaning is out in the world as well as in the head, and message pathways outside the skin are part of the cognitive system. Such an externalized or extended mind can potentially incorporate both traditional immanent elements as well as possible transcendent elements. This suggests that observers cannot be truly detached or neutral and that they necessarily participate in the reality they observe.

As science has sought to remove the transcendent from human experience of the natural world, reductive approaches have rendered much of the natural world empty of meaning and devoid of mind. However, proposals regarding embedded,

extended, and enactive aspects of mind suggest that we participate in the natural world and that the natural world is saturated with meaning and purpose. While not denying the tremendous material progress of the past few centuries, it is important to remember that such progress has come at the price of a denial of the sacred and divine and the elimination of the transcendent. As discussed here, many elements of psychology, as well as science more generally, are potentially consistent with a transcendence perspective. Rather than a triumph of reduction to the immanent, perhaps a better goal (especially given how the success of Western science and technology is damaging the natural world) would be a balance between the immanent and the transcendent that is more akin to the balance of yin and yang in some Eastern philosophies. Such a balance might involve an incorporation of the transcendent into the immanent by a re-enchantment and re-animation of the natural world. The immanent and the transcendent could provide different perspectives and different ways of knowing; much of our scientific knowledge has come from isolated observation and conceptualization, and perhaps we should also seek complementary knowledge from active participation and interaction. The transcendent has long been downplayed or denied in Western science, and reductive transformation of the transcendent into the immanent does not appear to offer an optimal strategy for understanding the mind or for maintaining the stability and sustainability of the natural world. Perhaps we eliminate or ignore the transcendent at our peril.

References

Abram, D. (1997). *The spell of the sensuous*. New York: Vintage Books.

Abram, D. (2010). *Becoming animal: An earthly cosmology*. New York: Pantheon Books.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (fourth edition). Washington, DC: American Psychiatric Association.

Anderson, J. R. (1978). Arguments concerning representations for mental imagery. *Psychological Review, 85*(4), 249–277. doi:10.1037/0033-295X.85.4.249

Anglin W.S., and Lambek J. (1995). *The heritage of Thales. Undergraduate texts in mathematics (Readings in Mathematics)*. New York: Springer. doi:10.1007/978-1-4612-0803-7_14

Asprem, E. (2014). *The problem of disenchantment: Scientific naturalism and esoteric discourse*. Leiden, Netherlands: Brill.

Baclawski, K. (2018). The Observer Effect. *2018 IEEE Conference on Cognitive and Computational Aspects of Situation Management (CogSIMA) (pp. 83-89)*. Boston, Massachusetts, doi:10.1109/COGSIMA.2018.8423983.

Ball, W. W. R. (1960). *A short history of mathematics*. New York: Dover Publications. (originally published in 1908).

Banaji, M. R., and Greenwald, A. G. (2016). *Blindspot: Hidden biases of good people*. New York: Bantam Books.

Barbour, I. (1998). *Religion and science: Historical and contemporary issues*. New York: SMC Press.

Barsalou, L. W. (2008). Grounded cognition. *Annual Review of Psychology, 59,* 617–645. doi:10.1146/annurev.psych.59.103006.093639

Barušs, I., and Mossbridge, J. (2017). *Transcendent mind: Rethinking the science of consciousness*. Washington, DC: American Psychological Association.

Bateson, G. (1972). *Steps to an ecology of mind*. San Francisco: Chandler Publishing.

Berman, M. (1981). *The reenchantment of the world*. Ithaca, New York: Cornell University Press.
Block, N. (1978). Troubles with functionalism. In C. W. Savage (Ed.), *Perception and cognition: Issues in the foundations of psychology. Minnesota studies in the philosophy of science* (pp. 261–325). Minneapolis: University of Minnesota Press.
Braud, W. G. (2002). Thoughts on the ineffability of the mystical experience. *International Journal for the Psychology of Religion, 12*(3), 141–160.
Brown, R. (2020). *Groundwork for a transpersonal psychanalysis: Spirituality, relationship, and participation*. New York: Routledge.
Buks, E., Schuster, R., Heiblum, M., Mahalu, D., and Umansky, V. (1998). Dephasing in electron interference by a 'which path' detector. *Nature*, *391*(6670), 871-874. doi:10.1038/36057
Cajete, G. (2000). *Native science: Natural laws of interdependence*. Santa Fe, New Mexico: Clear Light Publishers.
Call, J., Burghardt, G. M., Pepperberg, I. M., Snowdon, C. T., and Zentall, T. (Eds.). (2017). *APA handbook of comparative psychology: Perception, learning, and cognition*. Washington, DC: American Psychological Association. doi:10.1037/0000012-000
Campbell, J. (with B. Moyers). (1988). *The power of myth*. New York: Doubleday.
Chalmers, D. J. (1997). *The conscious mind: In search of a fundamental theory*. New York: Oxford University Press.
Chella, A., Cangelosi, A., Metta, G., and Bringsjord, S. (Eds.). (2019). *Consciousness in humanoid robots*. Lausanne: Frontiers Media. doi: 10.3389/978-2-88945-866-0
Churchland, P. M. (1988). *Matter and consciousness: A contemporary introduction to the philosophy of mind*. Cambridge, Massachusetts: MT Press.
Clark, A., and Chalmers, D. J. (1998). The extended mind. *Analysis*, *58*(1), 7–19.
Cole, M. (1996). *Cultural psychology*. Cambridge, Massachusetts: Belknap Press/Harvard University Press.
Descartes, R. (1993). *Mediations on first philosophy* [D. A. Cress, Trans.]. Indianapolis: Hackett Publishing Company. (Originally published in 1641)
Eliade, M. (1964). *Shamanism: Archaic techniques of ecstasy* [W. R. Trask, Trans.]. Princeton, New Jersey: Princeton University Press/Bollingen Series LXXVI.
Eliade, M. (1971). *The myth of the eternal return: Or, cosmos and history* [W. R. Trask, Trans.]. Princeton, New Jersey: Princeton University Press/Bollingen Series XLVI.
Ellis, R. (2018). *Bodies and other objects*. New York: Cambridge University Press.
Epstein, W., Park, J., and Casey, A. (1961). The current status of the size–distance hypotheses. *Psychological Bulletin, 58*(6), 491–514. doi:10.1037/h0042260
Flanagan, O. (2007). *The really hard problem: Meaning in a material world*. Cambridge, Massachusetts: MIT Press.
Fodor, J. A. (1974). Special sciences (or: The disunity of science as a working hypothesis). *Synthese*, *28*, 97–115.
Fodor, J. A. (1975). *The language of thought*. Cambridge, Massachusetts: Harvard University Press.
Francois, C. (1999). Systemics and cybernetics in a historical perspective. *Systems Research and Behavioral Science*, *16*, 203–219. doi:10.1002/(SICI)1099-1743(199905/06)16:3<203::AID-SRES210>3.0.CO;2-1
Gallagher, S. (2018). Rethinking nature: Phenomenology and a non-reductionist cognitive science. *Australasian Philosophical Review*, *2*(2), 125–137. doi:10.1080/24740500.2018.1552074
Gawronski, B., and Payne, B. K. (Eds.). (2010). *Implicit social cognition: Measurement, theory, and applications*. New York: Guilford Press.
Gibbs, R. W., Jr. (2005). *Embodiment and cognitive science*. New York: Cambridge University Press.
Gibson, J. J. (1979). *The ecological approach to visual perception*. Boston: Houghton Mifflin
Gibson, R. (2017). More than merely human: How science fiction pop-culture influences our desires for the cybernetic. *Sexuality & Culture*, *21*, 224–246. doi:10.1007/s12119-016-9391-9
Gilhooly, K. J. (Ed.). (1989). *Human and machine problem solving*. New York: Plenum Press.
Gupta, P., and Cohen, N. J. (2002). Theoretical and computational analysis of skill learning, repetition priming, and procedural memory. *Psychological Review, 109*(2), 401–448. doi:10.1037/0033-295X.109.2.401
Hardy, C. (1998). *Networks of meaning*. Westport, Connecticut: Praeger Publishers
Hildt, E. (2019). Artificial intelligence: Does consciousness matter? *Fronters in Psychology*, *10,* 1535. doi: 10.3389/fpsyg.2019.01535

Hintzman, D. L. (1984). MINERVA 2: A simulation model of human memory. *Behavior Research Methods, Instruments & Computers, 16*(2), 96–101. doi:10.3758/BF03202365
Hommel, B. (2019). Theory of event coding (TEC) V2.0: Representing and controlling perception and action. *Attention, Perception, & Psychophysics, 81*, 2139–2154. doi:10.3758/s13414-019-01779-4
Horowitz, A. (2015). Functionalism, the computer model of the mind, and casual connections. *Analysis and Metaphysics*, *14*, 59–67.
Hubbard, T. L. (1996a). Consciousness and cognition beyond the body: Functionalist cognitive science and the possibility of out-of-body experiences and reincarnation. *Journal of the American Society for Psychical Research, 90,* 202–220.
Hubbard, T. L. (1996b). The importance of a consideration of qualia to imagery and cognition. *Consciousness and Cognition, 5,* 327–358. doi:10.1006/ccog.1996.0021
Hubbard, T. L. (2002). Some correspondences and similarities of shamanism and cognitive science: Interconnectedness, extension of meaning, and attribution of mental states. *Anthropology of Consciousness, 13,* 26–45. doi:10.1525/ac.2002.13.2.26
Hubbard, T. L. (2005). Representational momentum and related displacements in spatial memory: A review of the findings. *Psychonomic Bulletin & Review, 12,* 822–851. doi:10.3758/BF03196775
Hubbard, T. L. (2006). Bridging the gap: Possible roles and contributions of representational momentum. *Psicologica, 27,* 1–34.
Hubbard, T. L. (2007). What is mental representation? And how does it relate to consciousness? *Journal of Consciousness Studies, 14,* 37–61.
Hubbard, T. L. (2010). Auditory imagery: Empirical findings. *Psychological Bulletin*, *136*, 302–329. doi:10.1037/a0018436
Hubbard, T. L. (2012). Causal representation and shamanic experience. *Journal of Consciousness Studies*, *19*, 202–228.
Hubbard, T. L. (2015). The varieties of momentum-like experience. *Psychological Bulletin*, *141*, 1081–1119. doi:10.1037/bul0000016
Hubbard, T. L. (2018). Some methodological and conceptual considerations in studies of auditory imagery. *Auditory Perception & Cognition*, *1*, 6–41. doi:10.1080/25742442.2018.1499001
Hubbard, T. L. (2020). Representational gravity: Empirical findings and theoretical implications. *Psychonomic Bulletin & Review*, *27*(1), 36–55. doi:10.3758/s13423-019-01660-3
Hubbard, T. L. (2023). Shamanic shape-shifting and second-order isomorphism. *Mind and Matter*, *21,* 9–44.
Hughes, H. C. (2001). *Sensory exotica: A world beyond human experience*. Cambridge, Massachusetts: MIT Press.
Hutchins, E. (1995). *Cognition in the wild*. Cambridge, Massachusetts: MIT Press.
Huxley, A. (2009). *The perennial philosophy*. New York: HarperCollins. (Originally published in 1945)
Jackson, F. (1982). Epiphenomenal qualia. *The Philosophical Quarterly,* 32(127), 127–136. doi:10.2307/2960077
James, W. (1982). *The varieties of religious experience: A study of human nature*. New York: Penguin Books. (Originally published in 1902)
Jamieson, R. K., Avery, J. E., Johns. B. T., and Jones, M. N. (2018). An instance theory of semantic memory. *Computational Brain and Behavior*, *1*, 119–136. doi:10.1007/s42113-018-0008-2
Jordan, J. S. (2013). The wild ways of conscious will: What we do, how we do it, and why it has meaning. *Frontiers in Psychology, 4,* Article 574. doi:10.3389/fpsyg.2013.00574
Jordan, J. S. (2020). Wild stories. *Journal of Consciousness Studies*, *27*(3–4), 128–151.
Jorgensen, D. (2010/2011) The experience of immanent transcendence. In S. A. Christoffersen, M. W. Jürgensen, and N. H. Petersen (Eds.), *Transfiguration: Nordic journal of religion and the arts* (pp. 33–50). Chicago: University of Chicago Press.
Kant, I. (1998). *Critique of pure reason* [P. Guyer and A. Wood, Trans.]. New York: Cambridge University Press. (Originally published in 1781).
Kauffman, S. (1995). *At home in the universe: The search for laws of complexity*. New York: Oxford University Press.
Kauffman, S. A. (2008). *Reinventing the sacred: A new view of science, reason, and religion*. New York: Perseus Books.
Kim, C. (1987). Transcendence and immanence. *Journal of the American Academy of Religion, 55*(3), 537–552. doi:10.1093/jaarel/LV.3.537

Kosslyn, S. M. (1980). *Image and mind*. Cambridge, Massachusetts: Harvard University Press.
Kosslyn, S. M. (1981). The medium and the message in mental imagery: A theory. *Psychological Review, 88*(1), 46–66. doi:10.1037/0033-295X.88.1.46
Kumar, A. A. (2021). Semantic memory: A review of methods, models, and current challenges. *Psychonomic Bulletin & Review*, *28*, 40–80. doi:10.3758/s13423-020-01792-x
Kundi, S. (2013). Characteristics of mystical experiences and the impact of meditation. *International Journal of Social Science*, *2*, 141–146. doi:10.5958/j.2321-5771.2.2.007
Kurtz, P. (1991). *The transcendental temptation: A critique of religion and the paranormal*. New York: Prometheus Books.
Kurzweil, R. (2005). *The singularity is near: When humans transcend biology*. New York: Penguin Books.
Lajoie, D. H., and Shapiro, S. I. (1992). Definitions of transpersonal psychology: The first twenty-three years. *Journal of Transpersonal Psychology*, *24*(1), 79–98.
Lakoff, G., and Johnson, M. (1999). *Philosophy in the flesh: The embodied mind and its challenge to Western thought*. New York: Basic Books.
Lamme, V. A. F. (2018). Challenges for theories of consciousness: Seeing or knowing, the missing ingredient and how to deal with panpsychism. *Philosophical Transactions of the Royal Society B* 373, 20170344. doi:10.1098/rstb.2017.0344
Larmer, R. (2002). Is there anything wrong with "God of the Gaps" reasoning? *International Journal for Philosophy of Religion*, *52*(3), 129–142.
Lave, J. (1993). The practice of learning. In S. Chaiklin and J. Lave (Eds.), *Understanding practice: Perspectives on activity and context* (pp. 3–32). New York: Cambridge University Press.
Leary, D. (1990). *Metaphors in the history of psychology*. New York: Cambridge University Press.
Leitane I. (2013) Transcendence and immanence. In A. L. C. Runehov and L. Oviedo (Eds.), *Encyclopedia of sciences and religions*. Dordrecht: Springer. doi:10.1007/978-1-4020-8265-8_856
Levine. J. (2009). Materialism and qualia: The explanatory gap. In A. Beckermann, B. P. McLaughlin, and S. Walter (Eds.), *The Oxford handbook of philosophy of mind*. New York: Oxford University Press.
Llinás, R. R., and Churchland, P. S. (1996). *The mind–brain continuum*. Cambridge, Massachusetts: MIT Press.
Main, R. (2022). *Breaking the spell of disenchantment: Mystery, meaning, and metaphysics in the work of C. G. Jung*. Asheville, North Carolina: Chiron Publications.
Matheson, H. E., and Barsalou, L. W. (2018). Embodiment and grounding in cognitive neuroscience. In J. Wixted (Ed.), *Stevens' handbook of experimental psychology and neuroscience*, Volume 3 (fourth edition, pp. 357–384). New York: Wiley.
McCoon, G., Ratcliff, R., and Dell, G. S. (1986). A critical evaluation of the semantic–episodic distinction. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *12*, 295–306. doi:10.1037/0278-7393.12.2.295
McCulloch, W.S., and Pitts, W. (1943). A logical calculus of the ideas immanent in nervous activity. *Bulletin of Mathematical Biophysics*, *5*,115–133. doi:10.1007/BF02478259
Monod, J. (1972). *Chance and necessity*. London: Collins.
Mora, F. (2015). Neuroculture: A new cultural revolution? In J. P. Huston, M. Nadel, F. Mora, L. F. Agnati, and C. J. Cela–Conde (Eds.), *Art, aesthetics, and the brain* (pp. 3–18). New York: Oxford University Press.
Murray, C. D. (Ed.). (2009). *Psychological scientific perspectives on out of body and near death experiences*. Hauppauge, New York: Nova Science Publishers.
Nagel, T. (1974). What is it like to be a bat? *Philosophical Review*, *LXXXIII,* 4, 435–450.
Nathan, M., and Del Pinal. G. (2016). Mapping the mind: Bridge laws and the psycho–neural interface. *Synthese*, *93*(2), 637–657. doi:10.1007/s11229-015-0769-2
Neisser, U. (1976) *Cognition and reality: Principles and implications of cognitive psychology*. San Francisco: Freeman.
Newell, A. (1990). *Unified theories of cognition*. Cambridge, Massachusetts: Harvard University Press.
Newell, A., Shaw, J. C., and Simon, H. A. (1958). Elements of a theory of human problem solving. *Psychological Review, 65*(3), 151–166. doi:10.1037/h0048495
Newell, A., and Simon, H. (1956). The logic theory machine: A complex information processing system. *IRE Transactions on Information Theory*, *2*(3), 61–79. doi:10.1109/TIT.1956.1056797.
Newen, A., de Bruin, L., and Gallagher, S. (2018). (Eds.). *The Oxford handbook of 4E cognition*. New York: Oxford University Press.

Nida–Rümelin, M., and O'Conaill, D. (2019). Qualia: The knowledge argument. In E. N. Zalta (Ed.), *The Stanford encyclopedia of philosophy* (Winter edition). Retrieved January 20, 2023 from https://plato.stanford.edu/archives/win2019/entries/qualia-knowledge/

Nisbett, R. E., and Wilson, T. D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review, 84*(3), 231–259. doi:10.1037/0033-295X.84.3.231

Nosek, B. A. (2007). Implicit–explicit relations. *Current Directions in Psychological Science, 16*(2), 65–69. doi:10.1111/j.1467-8721.2007.00477.x

Peat, F. D. (1994). *Lighting the seventh fire: The spiritual ways, healing, and science of the Native American*. New York: Birch Lane Press.

Peat, F. D. (2005). *Blackfoot physics: A journey into the Native American universe*. Boston, Massachusetts: Weiserbooks.

Penrose, R. (1990). *The emperor's new mind: Concerning computers, minds, and the laws of physics*. New York: Oxford University Press.

Persinger, M. A., Saroka, K. S., Koren, S. A., and St-Pierre, L. S. (2010). The electromagnetic induction of mystical and altered states within the laboratory. *Journal of Consciousness Exploration & Research*, *1*(7), 808–830.

Posner, M. I., and Keele, S. W. (1968). On the genesis of abstract ideas. *Journal of Experimental Psychology, 77*(3, Pt.1), 353–363. doi:10.1037/h0025953

Putnam, H. (1973). Reductionism and the nature of psychology. *Cognition, 2*(1), 131–146. doi:10.1016/0010-0277(72)90033-9

Pylyshyn, Z. W. (1981). The imagery debate: Analogue media versus tacit knowledge. *Psychological Review, 88*(1), 16-45. doi:10.1037/0033-295X.88.1.16

Radin, D. (1997). *The conscious universe: The scientific truth of psychic phenomena*. New York: Harper–Collins Publishers.

Radin, D. (2006). *Entangled minds: Extrasensory experiences in a quantum reality*. New York: Pocket Books, Inc.

Radin, D. (2013). *Supernormal: Science, yoga, and the evidence for extraordinary psychic abilities*. New York: Random House/Deepak Chopra Books.

Radin, D. (2018). *Real magic: Ancient wisdom, modern science, and a guide to the secret power of the universe*. New York: Harmony Books.

Raffman, D. (1993). *Language, music, and mind*. Cambridge, Massachusetts: MIT Press.

Ritter, F. E., Tehranchi, F., and Oury, J. D. (2018). ACT-R: A cognitive architecture for modeling cognition. *WIREs Cognitive Science,* 10e1488. doi:10.1002/wcs.1488

Ritter, S. M., and Dijksterhuis, A. (2014). Creativity—The unconscious foundations of the incubation period. *Frontiers in Human Neuroscience, 8,* Article 215. doi:10.3389/fnhum.2014.00215

Rölli, M. (2004). Immanence and transcendence. *Bulletin de la Société Américaine de Philosophie de Langue Française*, *14*, 50–74. doi: 10.5195/jffp.2004.460

Rumelhart, D.E., McClelland, J. L., and PDP Research Group. (Eds.). (1986). *Parallel distributed processing. Explorations in the microstructure of cognition: Foundations* (Volume 1). Cambridge, Massachusetts: MIT Press.

Schäfer, L. (2013). *Infinite potential: What quantum physics reveals about how we should live*. New York: Random House/Deepak Chopra Books.

Seybold, K. S. (2005). God and the brain: Neuroscience looks at religion. *Journal of Psychology and Christianity, 24*(2), 122–129.

Shiffrin, R. M., and Schneider, W. (1977). Controlled and automatic human information processing: II. Perceptual learning, automatic attending and a general theory. *Psychological Review, 84*(2), 127–190. doi:10.1037/0033-295X.84.2.127

Shoemaker, S. (1982). The inverted spectrum. *Journal of Philosophy*, *79*(7), 357–381. doi:10.2307/2026213

Smullyan, R.M. (1992). *Gödel's incompleteness theorems*. New York: Oxford University Press.

Stadler, M. A., and Frensch, P. A. (Eds.). (1998). *Handbook of implicit learning*. Thousand Oaks, California: Sage.

Stevenson, I. (2001). *Children who remember previous lives: A question of reincarnation* (revised edition). Jefferson, North Carolina: McFarland & Company, Publishers.

Tarnas, R. (1996). *The passion of the Western mind: Understanding the ideas that have shaped our world view*. London: Pimlico.

Tart, C. T. (2009). *The end of materialism: How evidence of the paranormal is bringing science and spirit together*. Oakland, California: New Harbinger Publications.
Taylor, C. (2007). *A secular age*. Cambridge, Massachusetts: Harvard University Press.
Thamiry, E. (1910). Immanence. In *The Catholic encyclopedia*. New York: Robert Appleton Company. Retrieved December 4, 2022 from New Advent: http://www.newadvent.org/cathen/07682a.htm
Tulving, E. (1972). Episodic and semantic memory. In E. Tulving and W. Donaldson (Eds.), *Organization of memory*. New York: Academic Press.
Tulving, E. (1985). *Elements of episodic memory* (revised edition). New York: Oxford University Press.
Tulving, E. (2002). Episodic memory: From mind to brain. *Annual Review of Psychology, 53*(1), 1–25. doi:10.1146/annurev.psych.53.100901.135114
Turner, W. (1912). Transcendentalism. In *The Catholic encyclopedia*. New York: Robert Appleton Company. Retrieved December 4, 2022 from New Advent: http://www.newadvent.org/cathen/15017a.htm
Tye, M. (1991). *The imagery debate*. Cambridge, Massachusetts: MIT Press/Bradford Books.
Valle, R. S. (1989) The emergence of transpersonal psychology. In R. S. Valle and S. Halling (Eds.), *Existential–Phenomenological perspectives in psychology* (pp. 257–268). Boston, Massachusetts: Springer. doi:10.1007/978-1-4615-6989-3_16
van Gulick, R. (2001). Reduction, emergence, and other recent options on the mind/body problem: A philosophic overview. *Journal of Consciousness Studies*, *8*(9-10), 1–34.
Walach, H. (2013). Criticism of transpersonal psychology and beyond — the future of transpersonal psychology. In H. L. Friedman and G. Hartelius (Eds.), *The Wiley–Blackwell handbook of transpersonal psychology* (pp. 62–87). New York: Wiley.
Walker, Y. (2013). Machine functionalism: Brains as computing machines. *Res Cogitans*, *4*(1), Article 5. doi:10.7710/2155-4838.1073
Walsh, R. and Vaughan, F. (1993). On transpersonal definitions. *Journal of Transpersonal Psychology*, *25*(2), 125–182.
Walsh, V., and Kulkowski, J. (Eds.). (1998). *Perceptual constancy: Why things look as they do*. New York: Cambridge University Press.
Warner, R., and Szubka, T. (Eds.). (1994). *The mind–body problem: A guide to the current debate*. Cambridge, Massachusetts: Blackwell.
Weinberg, S. (1994). *Dreams of a final theory: The scientist's search for the ultimate laws of nature*. New York: Random House.
Wiener, N. (1948). *Cybernetics or control and communication in the animal and the machine*. Paris: Hermann.
Witt, J. K. (2018). Spatial biases from action. In T. L. Hubbard (Ed.), *Spatial biases in perception and cognition* (pp. 307–323). New York: Cambridge University Press.
Witt, J. K., and Riley, M. A. (2014). Discovering your inner Gibson: Reconciling action-specific and ecological approaches to perception–action. *Psychonomic Bulletin & Review, 21*(6), 1353–1370. doi:10.3758/s13423-014-0623-4
Zatorre, R. J., and Halpern, A. R. (2005). Mental concerts: Musical imagery and the auditory cortex. *Neuron*, *47*(1), 9–12. doi: 10.1016/j.neuron.2005.06.013
Zylstra, S. (2020). Spinoza on action and immanent causation. *Archiv für Geschichte der Philsophie*, *102*(1), 29–55.