

Classifying Altered States of Consciousness

[Comment on "Bringing Order to Disarray: A Consensus Taxonomy
of Non-Ordinary (Altered) States of Consciousness" by E. Cardeña et al.]

John F. Kihlstrom

University of California, Berkeley

Email: jfkihlstrom@berkeley.edu

URL: <https://www.ocf.berkeley.edu/~jfkihlstrom/>

©American Psychological Association, 2025. This paper is not the copy of record and may not exactly replicate the authoritative document published in the APA journal. The final article is available, upon publication, at: 10.1037/cns0000451

Abstract

Cardeña et al. (2025) offer an intuitive taxonomy of various altered states of consciousness (ASCs). Although natural science prefers taxonomies based on proper sets, alternative views of categorization may be more appropriate for mental constructs like states of consciousness. Classification of ASCs raises the question of which features (e.g., phenomenal awareness and voluntary control) best characterize ordinary, unaltered consciousness, and what role unconscious mental life plays in the scheme. An alternative basis for classification takes account of features besides subjective experience – namely, the procedure by which the altered state is induced, the behavioral expressions of subjective experience, and any psychophysiological correlates. Any taxonomic scheme depends crucially on the features being considered, as illustrated by the case of hypnosis, which appears to be misclassified on the basis of spontaneous imagery, instead of suggested alterations in subjective experience.

Classifying Altered States of Consciousness

[Comment on "Bringing Order to Disarray: A Consensus Taxonomy of Non-Ordinary (Altered) States of Consciousness" by E. Cardeña et al.]

In considering any scientific taxonomy, it is important to be clear about just what sort of classification scheme is on offer. Linnaeus's binomial system of biological classification (in his *Systema Naturae* of 1735), was based on the classical Aristotelian view of categories as proper sets whose features are singly necessary and jointly sufficient to define an object as a member of one category rather than another. But there are other views of the structure of concepts and categories (Mervis & Rosch, 1981; Murphy, 2002; Smith & Medin, 1981). In particular, the *probabilistic* or *prototype* view holds that the features in question are not defining, but rather characteristic: they tend to be present in category instances, but no feature is singly necessary, and no set of features is jointly sufficient, to define category membership.

Cardeña et al. seem to have embraced the classical view, as indicated by their reliance on "orthogonality" as one of their guiding principles (p. 5). At the same time, they admit that their taxonomy may have the fuzzy boundaries characteristic of the prototype view. Their scheme does seem to have some fuzziness about it, with unclear boundaries between categories. For example, hypnosis appears as an exemplar in three different superordinate categories, while spirit possession and psychedelic experiences each appear in two.

What is *Unaltered* Consciousness?

What is needed, before offering a taxonomy of *altered* states of consciousness, is a clear idea of what *unaltered* consciousness is like. Cardeña et al. make repeated reference to “ordinary” consciousness, but state only that “the notion of an ordinary waking state of consciousness needs to be problematized” (p. 3).

Problematization might begin by assuming that consciousness is about two things: *monitoring* ourselves and our environment, so that thoughts, feelings, and desires are accurately represented in phenomenal awareness; and *controlling* ourselves and our environment, so that we can voluntarily initiate and terminate behavioral and mental activities (Kihlstrom, 1984, p. 150). This yields a two-dimensional space of awareness and control within which different ASCs might be located.

An alternative taxonomic scheme, focusing solely on awareness, considers whether the ASC in question entails a dissociation between conscious and unconscious processing. The dissociation between explicit and implicit memory (Schacter, 1987) offered a new perspective on unconscious mental life, and has been extended to mental functions other than memory, including perception, learning, thinking, emotion, and motivation (Kihlstrom, 1987, 2012). This yields a second basis for the classification of ASCs: whether they entail a dissociation between conscious (explicit) and unconscious (implicit) processing; and whether the unconscious processing generates relatively low-level effects requiring only perception-based processing of the unconscious content; or whether it also extends to higher-level effects requiring the analysis of meaning.

What Kinds of Features?

Subjective experience is critical to the definition of any state of consciousness, altered or not, but it is not the only relevant feature. Expanding on a model initially offered by Stoyva and Kamiya (1968), Kihlstrom (1984) proposed that any ASC could be described in terms of four characteristic features: an induction procedure, changes in subjective experience, associated behavioral expressions, and correlated physiological indices (Figure 1). One or more of these elements might be missing for any particular instance; but the more of these features that are present, the more confident we can be that a subject is, in fact, in a particular ASC.

<<<<Place Figure 1 About Here>>>>

This expanded framework, conceived with hypnosis in mind, can be applied to other ASCs as well. For example, various forms of meditation begin with preparatory activities that may be construed as induction procedures, such as assuming the lotus position. Psychedelic states induced by the ingestion of psychoactive substances would seem to require no formal induction ritual, but certain preparatory activities may serve to modulate the experience, as in the famous Good Friday Experiment.

In their taxonomy, Cardeña et al. rightly give pride of place to changes in subjective experience. Still, under ordinary circumstances we should expect any change in subjective experience to be reflected in a corresponding change in objective behavior.-- to paraphrase the 1604 Anglican *Book of Common Prayer*, outward and objective signs of an inward and subjective experience. The suggestions on the standardized hypnotizability scales, for example, call for alterations in subjective

experience, but response to them is measured in terms of the subjects' publicly observable behavior.

To take another example, Deikman (1966) proposed that the common outcome of different meditative traditions was *de-automatization* -- a reorganization of cognitive structures which usually operate automatically, which affords new modes of experience for the meditator. He had no way to measure this effect behaviorally, but since cognitive psychology embraced the distinction between automatic and controlled processing, a number of studies suggest that meditation reduces interference on the Stroop test and related tasks, providing behavioral evidence of de-automatization (for an overview, see Kihlstrom, 2024).

Psychophysiological indices are nice when we have them, as we do in the case of sleep and dreaming. However helpful they might be in identifying the dream state, though, they are not necessary criteria for diagnosing any state of consciousness – not least because, like all psychophysiological measures, they have been validated against self-reports of subjective experience. Correlates should never substitute for criteria – even REMs (Malcolm, 1959). Changes in subjective experience itself, along with their behavioral consequences, remain critical. As stated in the treatise that gave the field its very name, "Psychophysiology... starts with the facts learned by introspection... " (Troland, 1929, p. 144).

Which Features?

Whether categories are structured as proper or fuzzy sets or some other way, the validity of any taxonomy depends critically on the features chosen to represent its

exemplars. Focusing on the wrong (or uncharacteristic) features can lead theorists to make category mistakes (Ryle, 1949), like classifying bats as birds because they can fly, or whales as fish because they live in water. In the first edition of the *Systema Naturae* (1735), Linnaeus created a superordinate class of *Quadrupedia*, encompassing all four-footed animals. Later he thought better of it, and the 10th edition (1758) featured a substitute class of *Mammalia*, more clearly separating humans and dogs from the frogs and turtles of *Amphibia*. If we attend to the wrong features, the classification cannot be right.

Hypnosis offers a case in point. Cardeña et al. classified hypnosis based on the occurrence of various types of imagery experienced while subjects are “deeply” hypnotized (p. 9). Unfortunately, imagery of the kinds described by Cardeña et al. are not characteristic features of hypnosis. Rather, the domain of hypnosis is better represented by response to suggestions for subjective experiences entailing alterations in perception, memory, and action – of the sort that are included in the standardized hypnotizability scales (Hilgard, 1965). In the classic case, these experiences are associated with a degree of subjective conviction bordering on delusion, and an experience of involuntariness bordering on compulsion (Hilgard, 1973a; Kihlstrom, 2008).

These suggested experiences, in turn, are often characterized by a division in consciousness such that some aspect of experience, thought, or action proceeds outside of conscious awareness, and apparently outside of conscious control (Hilgard, 1973b, 1977, 1992; Kihlstrom, 1992a, 2018). Hilgard illustrated this dissociation with the “hidden observer”, by which subjects experiencing hypnotic analgesia or deafness

are also able to report the actual levels of pain or auditory stimulation being applied to them. The hidden observer is a metaphor for the subconscious representation of what Sutcliffe (1960, p. 82) referred to as "the real state of affairs rather than... the state suggested" by the hypnotist.

This dissociation between internal mental representations of the actual and suggested state of affairs is also illustrated by trance logic, which Orne (1959) informally characterized as reflecting the "peaceful coexistence between illusion and reality". Trance logic reflects the co-conscious registration of the actual cognitive state of affairs -- permitting, for example, a college student regressed to age 6 to transcribe accurately, albeit in a childlike hand, a sentence like "I am conducting an experiment which will assess my psychological capacities." (Orne, 1951, p. 219).

Research employing more conventional experimental paradigms reveals the same sorts of dissociations. Chief among these is posthypnotic amnesia (PHA; for a comprehensive review, see Kihlstrom, 2020): hypnotizable subjects, given appropriate suggestions, often cannot consciously remember the events and experiences that transpired while they were hypnotized. The fact that PHA can be reversed by a pre-arranged cue shows that it reflects a disruption of retrieval: the targeted memories have been deeply encoded and remain available in storage, even if they are temporarily inaccessible. Despite their impairment in conscious recollection, amnesic subjects show semantic priming effects attributable to the critical, unrecalled memories (Kihlstrom, 1980). Along with savings in relearning and retroactive interference, spared priming reflects a dissociation between explicit (conscious) and implicit (unconscious) memory during posthypnotic amnesia.

Similar semantic priming effects have been observed in hypnotic blindness. For example, Bryant and McConkey (1989a) showed hypnotically blind subjects cards printed with pairs of words such as *WINDOW-PANE*. When they were later asked to spell orally presented homophones such as */peɪn/*, the subjects spelled them in line with the disambiguating context – in this case, as *PANE* rather than *PAIN*. Preserved semantic priming has also been observed in the auditory domain (Nash, Lynn, Stanley, & Carlson, 1987). Because these subjects had not consciously perceived the words previously presented to them, these priming effects count as dissociations between explicit and implicit perception (Kihlstrom, Barnhardt, & Tataryn, 1992).

Beyond conventional priming effects, the influence of unconsciously perceived stimuli can be observed in other sorts of experimental situations, as when visual cues influence choice in a problem-solving task (Bryant & McConkey, 1989b), or hypnotically deaf subjects display speech dysfluencies in the face of delayed auditory feedback (Spanos, Jones, & Malfara, 1982). Subjects experiencing hypnotic analgesia continue to show cardiovascular and other psychophysiological responses to the pain stimulus (Hilgard & Morgan, 1975; Hilgard et al., 1974). Posthypnotic suggestions are experienced as automatic, but they do not meet the consensual criteria for automaticity (Tobis & Kihlstrom, 2010); apparently, they are deliberately, if unconsciously, executed in response to relevant cues (Kihlstrom, 1992a).

Of particular interest are studies of perceptual couplings, in which two different percepts are inextricably linked (Epstein, 1982; Hochberg, 1974). An example is the familiar Ponzo illusion, in which the superimposition of two horizontal lines of equal length on a pattern of radiating lines generates the perception that one line is longer

than the other. Observers who see the converging lines *must* also see the two horizontal lines as differing in length: the two percepts are coupled. However, when hypnotic subjects receive a suggestion for selective blindness for the converging lines, they continue to see the two horizontal lines as differing in length (Miller, Hennessy, & Leibowitz, 1973). In these and similar cases, the actual stimulus state of affairs appears to be processed subconsciously, generating the conscious perception to which it is coupled.

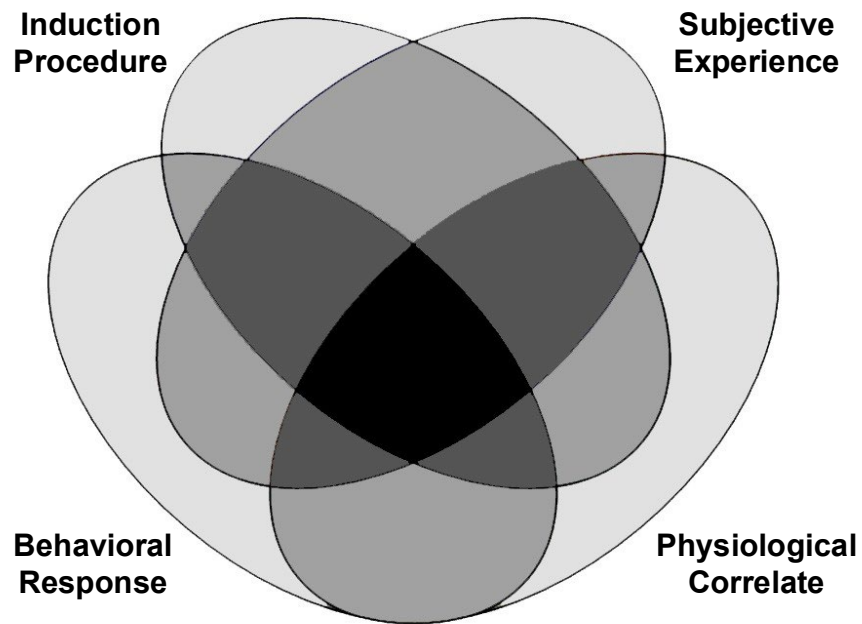
Considering the importance of suggestion, rather than imagery, along with the dissociative aspects of the resulting hypnotic experiences, would seem to place hypnosis in another category entirely – one based not on imagery, but rather on divisions in consciousness. Other than dissociative identity disorder, the dissociative and conversion disorders – whose amnesias, automatisms and paradoxical stigmata did so much to stimulate academic interest in unconscious mental life (Janet, 1907) – appear to find no place in the taxonomy offered by Cardena et al. Given the phenotypic similarities between the phenomena of hypnosis and the symptoms of what used to be called hysteria (Kihlstrom, 1979, 1992b, 2005), proper classification may require another superordinate category entirely to reflect alterations in the unity of consciousness.

Author Notes

The point of view represented in this paper is based on research supported in part by Grant #MH35856 from the National Institute of Mental Health. I thank two anonymous reviewers for their comments on an earlier version.

Figure Captions

Figure 1. Venn diagram showing the relations among four elements of an ASC, after Stoyva and Kamiya (1968, Figure 1), Kihlstrom (1984, Figure 1) and Venn (1881, p. 106).



References

- Bryant, R. A., & McConkey, K. M. (1989a). Hypnotic blindness, awareness, and attribution. *Journal of Abnormal Psychology*, 98(4), 443-447. doi: <http://dx.doi.org/10.1037/0021-843X.98.4.443>
- Bryant, R. A., & McConkey, K. M. (1989b). Hypnotic blindness: A behavioral and experiential analysis. *Journal of Abnormal Psychology*, 98, 71-77. doi: <https://doi.org/10.1037/0021-843X.98.1.71>
- Cardeña, E., Berkovich-Ohana, A., Valli, K., Barttfeld, P., Gómez-Marín, A., Greyson, B., . . . Yaden, D. (2025). Bringing Order to Disarray: A Consensus Taxonomy of Non-Ordinary (Altered) States of Consciousness. *Psychology of Consciousness: Theory, Research, and Practice*, in press. doi: <https://doi.org/10.1037/cns0000431>
- Deikman, A. J. (1966). De-automatization and the mystic experience. *Psychiatry*, 29(4), 324-338. doi: <https://doi.org/10.1080/00332747.1966.11023476>
- Epstein, W. (1982). Percept-percept couplings. *Perception*, 11(1), 75-83. doi: <https://doi.org/10.1068/p110075>
- Hilgard, E. R. (1965). *Hypnotic susceptibility*. New York: Harcourt, Brace, & World.
- Hilgard, E. R. (1973a). The domain of hypnosis, with some comments on alternative paradigms. *American Psychologist*, 28, 972-982. doi: <http://dx.doi.org/10.1016/j.beproc.2011.04.006>
- Hilgard, E. R. (1973b). A neodissociation interpretation of pain reduction in hypnosis. *Psychological Review*, 80(5), 396-411. doi: <http://dx.doi.org/10.1037/h0020073>
- Hilgard, E. R. (1977). *Divided consciousness: Multiple controls in human thought and action*. New York: Wiley-Interscience.
- Hilgard, E. R. (1992). Divided consciousness and dissociation. *Consciousness & Cognition*, 1(1), 16-31. doi: [https://doi.org/10.1016/1053-8100\(92\)90041-8](https://doi.org/10.1016/1053-8100(92)90041-8)
- Hilgard, E. R., & Morgan, A. H. (1975). Heart rate and blood pressure in the study of laboratory pain in man under normal conditions and as influenced by hypnosis. *Acta Neurobiologica Experimentalis*, 35(5-6), 741-759.
- Hilgard, E. R., Morgan, A. H., Lange, A. F., Lenox, J. R., Macdonald, H., Marshall, G. D., & Sachs, L. B. (1974). Heart rate changes in pain and hypnosis. *Psychophysiology*, 11(6), 692-702. doi: <https://doi.org/10.1111/j.1469-8986.1974.tb01138.x>
- Hochberg, J. (1974). Higher-order stimuli and interresponse coupling in the perception of the visual world. In R. B. MacLeod & H. L. Pick (Eds.), *Perception: Essays in honor of James J. Gibson* (pp. 17-39). Ithaca, N.Y.: Cornell University Press.
- Janet, P. (1907). *The major symptoms of hysteria*. New York: Macmillan.
- Kihlstrom, J. F. (1979). Hypnosis and psychopathology: Retrospect and prospect. *Journal of Abnormal Psychology*, 88(5), 459-473. doi: <http://dx.doi.org/10.1037/0021-843X.88.5.459>
- Kihlstrom, J. F. (1980). Posthypnotic amnesia for recently learned material: Interactions with "episodic" and "semantic" memory. *Cognitive Psychology*, 12(2), 227-251. doi: [http://dx.doi.org/10.1016/0010-0285\(80\)90010-9](http://dx.doi.org/10.1016/0010-0285(80)90010-9)

- Kihlstrom, J. F. (1984). Conscious, subconscious, unconscious: A cognitive perspective. In K. S. Bowers & D. Meichenbaum (Eds.), *The unconscious reconsidered* (pp. 149-211). New York: Wiley.
- Kihlstrom, J. F. (1987). The cognitive unconscious. *Science*, 237(4821), 1445-1452. doi: <http://dx.doi.org/10.1126/science.3629249>
- Kihlstrom, J. F. (1992a). Dissociation and dissociations: A comment on consciousness and cognition. *Consciousness & Cognition*, 1(1), 47-53. doi: [http://dx.doi.org/10.1016/1053-8100\(92\)90044-B](http://dx.doi.org/10.1016/1053-8100(92)90044-B)
- Kihlstrom, J. F. (1992b). Dissociative and conversion disorders. In D. J. Stein & J. Young (Eds.), *Cognitive science and clinical disorders* (pp. 247-270). San Diego: Academic Press.
- Kihlstrom, J. F. (2005). Dissociative disorders. *Annual Review of Clinical Psychology*, 1, 227-253. doi: <http://dx.doi.org/10.1146/annurev.clinpsy.1.102803.143925>
- Kihlstrom, J. F. (2008). The domain of hypnosis, revisited. In M. Nash & A. Barnier (Eds.), *Oxford handbook of hypnosis* (pp. 21-52). Oxford: Oxford University Press.
- Kihlstrom, J. F. (2012). Unconscious processes. In D. Reisberg (Ed.), *Oxford Handbook of Cognitive Psychology* (pp. 176-186). Oxford: Oxford University Press.
- Kihlstrom, J. F. (2018). Hypnosis as an altered state of consciousness. *Journal of Consciousness Studies*, 25(11-12), 53-72.
- Kihlstrom, J. F. (2020). Posthypnotic amnesia: Using hypnosis to induce forgetting. In D. Groome & M. Eysenck (Eds.), *Forgetting: Explaining memory failure*. Thousand Oaks, Ca.: SAGE.
- Kihlstrom, J. F. (2024). Meditation and Deautomatization. In T. Shackelford (Ed.), *Encyclopedia of Religious Psychology and Behavior*: Springer, Cham.
- Kihlstrom, J. F., Barnhardt, T. M., & Tataryn, D. J. (1992). Implicit perception. In R. F. Bornstein & T. S. Pittman (Eds.), *Perception without awareness: Cognitive, clinical, and social perspectives*. (pp. 17-54). New York, NY, USA: The Guilford Press.
- Malcolm, N. (1959). *Dreaming*. London: Routledge & Kegan Paul.
- Mervis, C. B., & Rosch, E. (1981). Categorization of natural objects. *Annual Review of Psychology*, 32, 89-115. doi: <http://dx.doi.org/10.1146/annurev.ps.32.020181.000513>
- Miller, R. J., Hennessy, R. T., & Leibowitz, H. W. (1973). The effect of hypnotic ablation of the background on the magnitude of the Ponzo perspective illusion. *International Journal of Clinical and Experimental Hypnosis*, 21(3), 180-191. doi: <https://doi.org/10.1080/00207147308409122>
- Murphy, G. L. (2002). *The big book of concepts*. Cambridge, Ma.: MIT Press.
- Nash, M. R., Lynn, S. J., Stanley, S., & Carlson, V. (1987). Subjectively complete hypnotic deafness and auditory priming. *International Journal of Clinical and Experimental Hypnosis*, 35(1), 32-40. doi: <https://doi.org/10.1080/00207148708416034>
- Orne, M. T. (1951). The mechanisms of hypnotic age regression: An experimental study. *Journal of Abnormal and Social Psychology*, 46(2), 213-225. doi: <https://doi.org/10.1037/h0059971>
- Orne, M. T. (1959). The nature of hypnosis: Artifact and essence. *Journal of Abnormal and Social Psychology*, 58(3), 277-299. doi: <http://dx.doi.org/10.1037/h0046128>

- Ryle, G. (1949). *The concept of mind*. London: Hutchinson.
- Schacter, D. L. (1987). Implicit memory: History and current status. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 13(3), 501-518. doi: <http://dx.doi.org/10.1037/0278-7393.13.3.501>
- Smith, E. E., & Medin, D. L. (1981). *Categories and concepts*. Cambridge, Ma.: MIT Press.
- Spanos, N. P., Jones, B., & Malfara, A. (1982). Hypnotic deafness: Now you hear it -- Now you still hear it. *Journal of Abnormal Psychology*, 91, 75-77. doi: <http://dx.doi.org/10.1037/0021-843X.91.1.75>
- Stoyva, J., & Kamiya, J. (1968). Electrophysiological studies of dreaming as the prototype of a new strategy in the study of consciousness. *Psychological Review*, 75, 192-205. doi: <http://dx.doi.org/10.1037/h0025669>
- Sutcliffe, J. P. (1960). "Credulous" and "skeptical" views of hypnotic phenomena: A review of certain evidence and methodology. *International Journal of Clinical and Experimental Hypnosis*, 8(2), 73-101. doi: <https://doi.org/10.1080/00207146008415837>
- Tobis, I. P., & Kihlstrom, J. F. (2010). Allocation of attentional resources in posthypnotic suggestion. *International Journal of Clinical & Experimental Hypnosis*, 58(4), 367-382. doi: <http://dx.doi.org/10.1080/00207144.2010.499330>
- Troland, L. T. (1929). *The principles of psychophysiology: A survey of modern scientific psychology* (Vol. 1: *The problems of psychology and perception*). New York: Van Nostrand.
- Venn, J. (1881). *Symbolic logic*. London: Macmillan.