The role of hypnosis and meditation in consciousness research

An interview with Zoltan Dienes

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Abstract

In this interview, Zoltan Dienes (Brighton, UK), specialist in consciousness studies, answers questions related to hypnosis and meditation: Why are hypnosis and mindfulness interesting topics for the study of consciousness? Is the notion of altered state of consciousness a useful notion in the context of hypnosis and mindfulness? What do we know about the neurocognitive mechanisms sustaining the action of hypnosis and mindfulness? There is a long tradition of using hypnosis clinically, particularly as an analgesic method; might mindfulness and hypnosis work in the same way? Building on his empirical and theoretical research on hypnosis and meditation, Zoltan Dienes gives us his answers. Hypnosis and meditation are postulated to engage metacognitive processes, though in opposite ways.

keywords: *consciousness*, *hypnosis*, *meditation*, *metacognition*.

Why are hypnosis and mindfulness interesting topics for the study of consciousness?

Hypnotic response involves distortions in consciousness: hallucinations, delusions, and altered experiences of agency. Thus, the fundamental facts to be explained in hypnosis involve the nature of conscious experience. It may be these different experiences rely on a single distortion in conscious experience: That of non-volition. In fact, Weitzenhoffer (1978) defined the "classic suggestion effect" as the experience of a response being non-volitional. For example, if we take a suggested motor response, like the arm rising in the air by itself, in several prominent theories of hypnosis (like those of either Hilgard or Spanos) the person does intend for the arm to rise; but the experience is that they did not intend it. So, in these accounts, hypnotic response involves an illusion of involuntariness; in fact, in these accounts it is precisely that illusion that makes a response hypnotic. The illusion presents a unique window into the nature of experienced volition for consciousness researchers. This illusion may give rise not only to feelings of involuntariness during

motor responses but also to the other distortions of consciousness just mentioned, namely, hallucinations and delusions. For example, consider a suggestion that one will see an elephant. If one intends to imagine the elephant, but is unaware of that intention, the imagination may be experienced as a perception: A hallucination. Or consider a suggestion that one has the opposite sex to one's actual sex. If one intends to engage in pretence, but is unaware of that intention, the pretence may be experienced as a belief: A delusion. That in any case, is my take on hypnotic response (e.g. Dienes & Perner, 2007). This view of hypnosis is naturally related to a key approach to understanding consciousness: Higher order theories, like that of Rosenthal (2005). According to higher order theories, a mental state being conscious requires one be aware of that mental state—by a higher order state.

If the essence of hypnotic response is intending while forming the higher order thought that one is not intending, then hypnosis is naturally linked to one of the major approaches to understanding consciousness: The illusion of involuntariness comes about by inaccurate higher order thoughts. Even if one didn't subscribe to higher order theory as an account of a mental state being conscious, one would surely subscribe to the view that having higher order thoughts is an interesting form of consciousness. So I think hypnosis should play a more prominent role in consciousness science than it currently does!

> "I think hypnosis should play a more prominent role in consciousness science than it currently does!"

Just as hypnosis may essentially be a meta-cognitive phenomenon, so is mindfulness. Mindfulness is a matter of having certain sorts of higher order states. One Pali sutta compares mindfulness to a surgeon's probe that is used to explore tissue so that the surgeon knows how to use the knife. A probe is used to show things as they are so that one can act appropriately. Thus, one aspect of mindfulness is accurate awareness of mental states. In this way, there is a tension between being mindful and hypnotic responding, because my view of hypnotic response is that it is a response in which one is (strategically) not mindful of the corresponding intention, as I discussed above. Thus, mindfulness also intrinsically relates to a major theory of consciousness, namely higher order theory.

> "Just as hypnosis may essentially be a meta-cognitive phenomenon, so is mindfulness."

Buddhist mindfulness also involves as its first foundation training awareness of one's body, including proprioception and interoception. Why was this regarded as a practice conducive to flourishing? Part of the answer to possible beneficial effects may relate to current theories in consciousness science, especially those using the predictive processing framework, placing importance on interoceptive awareness in, for example, constituting emotion (Seth and Critchley, 2016). But how this works has yet to be spelled out. One phenomenon provides an interesting challenge to predictive processing theories (to be discussed below): Attention to action in a deliberate way may decrease the sense it is volitional (a point Martin & Pacherie, 2019, use as a predictive processing theory of hypnosis), but attention to breath (as in many types of meditation) increases the sense of voluntary control. We return to this issue below.

Do you think that the notion of *altered state of consciousness* is a useful notion in the context of hypnosis and mindfulness?

It is a useful concept in both cases simply because it is part of phenomena claimed to exist; and thus, the nature of any putative altered state is something we need to settle one way or the other. An altered state of consciousness means there is some systematic change in how consciousness as a whole functions. For example, being in one emotion rather than another involves altering the state of consciousness, because there are systematic changes in how attention works, in motivation, and so on. The altered state often involves facilitating or inhibiting specific cognitive actions; maybe for example, being happy facilitates broad attentional focus, use of stereotypes and so on. So interesting altered states have causal properties.

> "The nature of any putative altered state in hypnosis or meditation is something we need to settle one way or the other."

Now, historically there have been two phenomena claimed to define hypnosis: First, there is the claim that there are hypnotic responses, namely suggested alterations in conscious experience, as I discussed above. This claim I take to be solid. Second, there is the claim that hypnosis is an altered state of consciousness that facilitates such hypnotic response. There is still debate about this. Highly hypnotisable people do experience broad phenomenological changes when "hypnotized" (Pekala & Kumar, 2007). One explanation is that these experiences are suggested effects; in other words, this phenomenon is just a specific case of the first phenomenon, namely hypnotic response. If the experience of an altered state is just another hypnotic response, then the altered state would have no causal role in facilitating response to

further suggestions. In fact, hypnotic inductions do increase the rate of hypnotic response. But on average by a tiny amount. They also increase the expectation of successfully responding. And maybe that is all there is to it: Increase expectations or motivation slightly and you increase response a bit, without the need to postulate a special causal altered state (Braffman & Kirsch, 1999). I personally side with this way of looking at the role of altered states in hypnosis because it is simplest. The one case I know of where an induction massively increased hypnotic response is the suggested delusional belief that one's reflection in the mirror is a stranger; Connors et al. (2012) found a response rate of 70% after an induction and 22% without. This may be a causal effect of induction reducing critical thinking; or it may be due to expectations.

Meditation has of course also been claimed to be an altered state. Historically, in the experimental academic literature, these claims have related to the sort of meditation that aims to promote deep absorption in a simple mental state, so the normal complexity of mental life falls away. While such concentration involves mindfulness, mindfulness does not necessitate such concentration. Indeed, the aim of much mindfulness meditation is to maintain a requisite level of richness in order to be aware of what is actually going on in one's mental life, and to do so to an extent that mindfulness generalizes to everyday life. The Buddhist claim is that one would then be in a globally different state (see Boyle, 2015, for interviews with meditation teachers about their experiences along these lines). Further, the Buddhist claim is that when one is fully mindful of one's mental states there is an awareness that no "I" exists beyond the mental states themselves and their causal flow. If one felt this experientially, it would be an altered state of consciousness (Berkovich-Ohana et al., 2013). My own research says little about this; but whatever altered state is involved with mindfulness, it would be, for the reasons discussed above, a rather different one from that involved with hypnosis.

While I think hypnosis and mindfulness are constitutively different, that is not to say phenomena that come under the heading of each in practice are really different. That is, I think it is an open question how much of the altered states described as arising in meditation may actually be suggested phenomena experienced hypnotically—so are not involving mindfulness fully, but rather hypnosis (Dienes et al., 2016). For example, in absorption meditation one goes through a set of prescribed stages of experience, an increasing depth of an altered state, as for example bodily pleasures arise and fade. I plan to investigate how much this could be suggested.

Do we have an idea of the neurocognitive mechanisms sustaining the action of hypnosis and mindfulness?

First we need a theory at the cognitive level of each phenomenon, then we can start to relate the theoretical processes to the neural basis. One starting point is the higher order theory of consciousness. Higher order states are types of meta-cognitive states, and one theoretical claim is that hypnosis and mindfulness are both essentially meta-cognitive, as discussed above. Then the neural basis of metacognition should be involved in both hypnosis and mindfulness, and there is some evidence for this. For example, the dorsolateral prefrontal cortex has been shown relevant to having accurate higher order thoughts, and Dienes and Hutton (2013) showed rTMS disrupting the left dorsolateral prefrontal cortex (DLPFC) increased hypnotic response (by assumption, because it was harder to have accurate higher order thoughts). (Coltheart et al., 2018, in a preregistered replication found the effect, albeit only on the right hand side: This could still be consistent with a metacognitive story because the lateralization of metacognition is not settled.) While the metacognitive explanation predicts involvement of specifically metacogntively-relevant areas of the prefrontal cortex in hypnotic versus non-hypnotic response, the overall fMRI literature is rather noisy and inconsistent; in a meta-analysis Landry et al. (2017) found only a visual area came out in a hypnotic versus non-hypnotic contrast over fMRI studies (presumably because hypnotic responding often involves imagery). McGeown (2016) in reviewing functional connectivity studies finds that while hypnosis may (or may not) be involved with reduced activation of the DLPFC, meditation was more consistently associated with increased activation. While the results are intriguing, as McGeown discusses, the DLPFC is involved in a broad executive network and determining what psychological role it actually played in these comparisons (or in the rTMS studies) is far from straight forward. By contrast, reading tea leaves is very easy to do.

> “The neural basis of metacognition should be involved in both hypnosis and mindfulness.”

An approach to getting a handle on neurocognitive mechanisms involved with hypnosis and meditation is to start with a general theory of neural mechanisms. Predictive processing is an up-and-coming account of how cognition may be implemented in the brain (e.g. Clark, 2016). Let me characterize the predictive processing framework by a series of apparent paradoxes, such as, ‘perception is controlled hallucination’ (said by Max Clowes of Sussex[1]) and similarly ‘thinking is controlled delusion’ (though that control can be fairly bad, witness reviewer 2 of

[1] Thanks to Ron Chrisley for pointing this out to me, and that it was said by Max back in 1971.

your last paper). It should thus be possible by changing control parameters to create hallucinations and delusions. These aphorisms make perception appear active, the next two portray action as perceptive, and thus seemingly passive: 'action is well predicted proprioception', and 'voluntary action is poorly perceived movement.' That is, voluntary actions are accompanied by sensory attenuation. Thus, the involuntary experience of hypnotic movements may be due to simply paying close attention to proprioceptive signals, reducing attenuation (a theory developed by Jean-Remy Martin & Elisabeth Pacherie 2019). Training in accurate proprioception, such as is done in traditional mindfulness meditation (e.g. mindful walking), may recalibrate the expected level of sensory attenuation for voluntary action, and thus reduce hypnotic response. This account gives a contrasting perspective from the metacogntiive theory for why meditators are low in hypnotisability: According to the meta-cognitive theory, meditators have particularly accurate higher order thoughts of intending, and thus find it difficult to be unaware of intentions; according to Martin et al.'s predictive processing account, meditators have more accurate expectations of strength of proprioceptive signals under conditions of slow attentional movement, and so know attenuation is less under those conditions. We are in the process of testing these accounts, both of which postulate a tension between mindfulness and hypnotic response.

Hypnosis is a well-established method as a psychotherapeutic and analgesic method, does mindfulness have similar clinical benefits? Do they work the same way in this case?

Both hypnosis and mindfulness can be used to deal with pain. Both are psychological therapies, involving regulation of attention and attitudes. But that doesn't mean they affect pain processing by the same underlying mechanisms. With a hypnotic analgesia suggestion, a counterfactual is considered: For example, the arm is like a block of wood and so doesn't feel the pain inflicted on it. Conversely, in mindfulness, one holds the pain in awareness, trying to see it as it is: One sees the body state as it is, the unpleasant feeling as it is, the overall state of the mind as it is, and puts it all in context. Despite the different approach at the psychological level, in outcome both hypnosis and mindfulness can lead to important reductions in both sensory and affective pain (e.g. Zeidan & Grant, 2016). The similar outcome may be produced by common or different mechanisms. A possible common mechanism is expectation.

> "Both hypnosis and mindfulness can be used to deal with pain. Both are psychological therapies, involving regulation of attention and attitudes. But that doesn't mean they

> affect pain processing by the same underlying mechanisms. ”

As postulated by Irving Kirsch, maybe hypnotic response is directly produced by a response expectancy, just as placebo analgesia is directly produced by the expectation of pain relief. Expectations are rarely if ever shown to be equivalent between mindfulness and active control interventions; maybe expectation is at work here too. This explanation of the effectiveness of hypnosis and mindfulness in reducing pain is so simple it should be given considerable prior plausibility. There is a striking and curious fact to consider, however: When placebo analgesia is based on verbal suggestion (without prior conditioning to a particular class of active analgesics), blocking opioid pathways with Naloxone substantially reduces (and perhaps completely removes) placebo analgesia. On the other hand, Naloxone leaves hypnotic analgesia substantially in place (perhaps doesn't touch it at all). So the underlying mechanism for hypnotic analgesia appears not to be opioid based, quite unlike placebo analgesia. The evidence for mindfulness is not yet clear, but is consistent with an expectation-component based on opioids—and something else. According to a metacognitive theory of hypnosis, hypnotic analgesia may involve strategies such as may be used in cognitive behavioural therapy, CBT (distraction, re-interpretation) but without being aware of engaging in strategies. Mindfulness involves the opposite strategies. Proper work disentangling the different pain pathways, the opioid and others, by differentially blocking them in the case of placebo, hypnosis, mindfulness and CBT is needed. Gyorgy Moga in my lab has started doing just that. So we will hopefully find out the extent to which hypnosis and mindfulness have the same or different psychophysiological mechanisms.

References

Berkovich-Ohana, A., Dor-Ziderman,Y., Glicksohn, J., & Goldstein, A. (2013). Alterations in the sense of time, space, and body in the mindfulness-trained brain: a neurophenomenologically-guided MEG study. *Frontiers in Psychology, 4*: 912. doi: 10.3389/fpsyg.2013.00912

Boyle, R. P. (2015). *Realized awakened consciousness: Interviews with Buddhist teachers*. Columbia University Press.

Braffman W and Kirsch I (1999). Imaginative suggestibility and hypnotizability: an empirical analysis. *Journal of Personality and Social Psychology, 77*, 578–87.

Clark, A. (2016). *Surfing Uncertainty: Prediction, Action, and the Embodied Mind.* Oxford University Press.

Coltheart, M., Cox, R., Sowman, P., Morgan, H., Barnier, A., Langdon, R., ... & Polito, V. (2018). Belief, delusion, hypnosis, and the right dorsolateral prefrontal cortex: A transcranial magnetic stimulation study. *Cortex*, *101*, 234-248.

Connors, M. H., Barnier, A. J.,Coltheart, C., Rochelle, E., Cox, R. E., & Langdon, R. (2012). Mirrored-self misidentification in the hypnosis laboratory: Recreating the delusion from its component factors. *Cognitive Neuropsychiatry, 17*:2, 151-176.

Dienes, Z, & Hutton, S. (2013). Understanding hypnosis metacognitively: rTMS applied to left DLPFC increases hypnotic suggestibility. *Cortex, 49*, 386-392

Dienes, Z., Lush, P., Semmens-Wheeler, R., Parkinson, J., Scott, R. B., & Naish, P. (2016). Hypnosis as self-deception; Meditation as self-insight. In A. Raz and M. Lifshitz (Eds), *Hypnosis and Meditation: Toward an integrative science of conscious planes*. Oxford University Press, pp 107-128.

Dienes, Z., & Perner, J. (2007). The cold control theory of hypnosis. In G. Jamieson (Ed.), *Hypnosis and conscious states: The cognitive neuroscience perspective*. Oxford University Press, pp 293-314.

Landry, M., Lifshitz, M. & Raz, A. (2017). Brain correlates of hypnosis: A systematic review and meta-analytic exploration. *Neuroscience & Biobehavioral Reviews, 81*, Part A, 75-98.

Martin, J. R., & Pacherie, E. (2019). Alterations of agency in hypnosis: A new predictive coding model. Psychological review, 126(1), 133.

McGeown, W. J. (2016). Hypnosis, hypnotic suggestibility, and meditation: an integrative review of the associated brain regions and networks. In A. Raz and M. Lifshitz (Eds), *Hypnosis and Meditation: Toward an integrative science of conscious planes*. Oxford University Press, pp 343-367.

Pekala, R. J., & Kumar, V. K. (2007). An empirical-phenomenological approach to quantifying consciousness and states of consciousness: With particular reference to understanding the nature of hypnosis. In G. Jamieson (Ed.). *Towards a cognitive-neuroscience of hypnosis and conscious states: A resource for researchers, students, and clinicians*. London: Oxford University Press, pp. 167-194.

Weitzenhoffer, A.M. (1978). Hypnotism and altered states of consciousness. In A. Sugarman & R.E. Tarter (Eds.), *Expanding dimensions of consciousness*. New York: Springer.

Zeidan, F., & Grant, J. A. (2016). Meditative and hypnotic analgesia: Different directions, same road? . In A. Raz and M. Lifshitz (Eds), *Hypnosis and Meditation: Toward an integrative science of conscious planes*. Oxford University Press, pp 397-413. ▫