

Chapter 7

Hypnosis as self-deception; meditation as self-insight

Zoltan Dienes, Peter Lush, Rebecca Semmens-Wheeler, Jim Parkinson, Ryan Scott, and Peter Naish

Abstract

Although meditation and hypnosis appear to be similar, both in skills demanded (e.g., imaginative involvement) and in their use as therapies, this chapter argues that the two are essentially different. Whereas mindfulness meditation aims to develop accurate meta-awareness, the hypnotic experience results from a lack of awareness of intentions; hypnosis is effectively a form of self-deception. The claim is supported by reviewing evidence that (a) meditators are not very hypnotizable; (b) highly hypnotizable people become aware of their intentions especially late while meditators have awareness especially early; and (c) meditators show particularly strong intentional binding but highly hypnotizable people do not. We suggest that one path to high hypnotizability is hypofrontality.

Introduction

A theme among many theories of hypnosis is that hypnotic response is a form of strategic self-deception about what mental state one is in (e.g., Dienes & Perner, 2007; Hilgard, 1977; Spanos, 1986). By contrast, a theme for many meditation practices, Buddhist as well as some non-Buddhist, is that they involve and cultivate mindfulness; and mindfulness, where it succeeds, involves being aware of the mental states one is in. Thus, by this argument, hypnotic response implies a lack of mindfulness, at least for those particular mental states about which one is strategically deceived. This chapter will consider the argument, its strengths and weaknesses, and present new empirical evidence for a tension between hypnotic response and mindfulness.

The chapter relies on a distinction between first-order and second-order mental states (e.g., Carruthers, 2000; Proust, 2012; Rosenthal, 2005). A mental state is, in part, individuated by its content; thus, the thought that “clouds pass through the sky” is different from the thought that “I will make it to the valley tonight, Zeus be willing” because the contents are different. If the content of a mental state refers only to the world (e.g., “clouds pass through the sky”), the mental state is a first-order state. If the content refers to a first-order mental state that one is in (e.g., the thought that “I see that clouds pass through the sky”), it is a second-order state, a type of metacognitive state. We will now apply this distinction first to hypnosis and then to mindfulness in order to relate the two.

AQ1 The nature of hypnosis

Hypnotic response appears to involve what would normally be clearly intentional motor or cognitive actions in the service of the subject, such as lifting an arm, imagining an elephant, or acting like a child (White, 1941)—but where the experience is that of the action being involuntary, or the imagination being perceptual, or the pretense being belief (see Oakley & Halligan, 2013 for an overview). One theoretical response is to argue that the resemblance of these motor and cognitive actions to intentional actions is illusory; the action is not intentional in the first place. For example, response expectancy theory (Kirsch, 1985) asserts that the expectation that an experience or response will happen is the sufficient psychological cause of the response or experience (cf. also Naish, 1986). Intentions are not needed as causes, only expectations. Similarly, Woody and Sadler (2008) postulate a breakdown in executive functioning during hypnotic response so that actions occur relatively automatically.

The correct theory of hypnotic response is not settled (see Nash & Barnier, 2008 for a theoretical review). Thus, another class of theories has explained the compelling subjective experiences metacognitively. That is, the subject does intend to act, imagine, or pretend, but they are not aware of that intention (e.g., Hilgard, 1977; Kihlstrom, 1997; Kirsch & Lynn, 1998a; Lynn, Rhue, & Weekes, 1990; Spanos, 1986). In other words, the first-order state of intending may be entirely normal; what makes the experience distinctively hypnotic is that the person forms an inaccurate higher-order thought (HOT) to the effect that they are not intending, despite sustained reflection on the volitional nature of the action. Dienes (2012) describes the common component of the latter type of theories as “cold control” in that the theories involve executive control without accurate higher-order thoughts (control without accurate HOTs). Cold control theory is simple in that it asserts that the unique aspect of an action that makes it hypnotic is purely metacognitive, a strategic lack of awareness. While further tests are needed (e.g., Dienes & Semmens-Wheeler, 2012), we take as evidence for cold control, the findings that expectations often fail to fully predict hypnotic response (e.g., Benham, Woody, Wilson, & Nash, 2006; Semmens-Wheeler, Dienes, & Duka, 2013) and that hypnotic response can involve executive tasks, such as overcoming prepotent responses (e.g., Lifshitz, Bonn, Fischer, Kashem, & Raz, 2013; Raz, Kirsch, Pollard, & Nitkin Kaner, 2006; Spanos, Radtke, & Dubreuil, 1982; Wyzenbeek & Bryant, 2012) (see Dienes, 2012, for further evidence for cold control).

Here, we see what predictions follow from cold control theory. That is, we will take a hypnotic response to be a strategic self-deception; specifically, the intentional performing of a motor or cognitive action while actively maintaining the higher-order thought that the action is not intentional. Thus, not all responses in a hypnotic context (clinical or academic) are hypnotic responses; not all hypnotherapy involves hypnotic response; and not all suggestion or influence is hypnotic (Tasso & Perez, 2008). To be hypnotic, the subject must create an altered experience of volition or reality in accord with the requirements of the situation by strategic self-deception (Dienes, 2012). Such an approach defines a psychological mechanism that may operate even when the context is not considered hypnotic (e.g., during spirit possession; Dienes & Perner, 2007), and whether or not any formal induction is used (cf. Kirsch et al., 2011).

The nature of mindfulness

Now, we consider the relevance of the first-order/second-order distinction to mindfulness. Gotama, the historical founder of the Buddhist tradition, developed a means of cultivating mindfulness about 2500 years ago, defining it by painting a picture in metaphors and contexts in the Pali Suttas, not by giving necessary and sufficient conditions. For our purposes, the picture is

quite clear enough, and as relevant to the Buddhist tradition as to the secular use of mindfulness (Kabat-Zinn, 2013; Peacock, 2014). In one metaphor, mindfulness was personified by Gotama as a gatekeeper, guarding the sense doors of a house, letting in only wholesome mental reactions (Analayo, 2003, pp. 53–57). That is, in this metaphor, mindfulness considers mental states with respect to their mental state properties (i.e., mindfulness as a second-order mental state). This impression is reinforced by the later Milanda Panha in which mindfulness is likened to the King's advisor reminding the King of what is beneficial—so that the meditator knows what mental qualities to pursue and what can be let go (Gethin, 2013).

Mindfulness is also defined by the practices said to cultivate it and, most specifically, by the four foundations of mindfulness (Analayo, 2003). While the first foundation involves awareness of one's own and others' bodies in, at least part, their physical form (i.e., first-order mindfulness), the remaining foundations concern, exclusively, awareness of mental states (second-order mindfulness). The fourth foundation also includes, specifically, awareness of volitions. In sum, mindfulness involves cultivating accurate awareness of mental states (cf. Hargus, Crane, Barnhofer, & Williams, 2010; Teasdale et al., 2002). Keng, Smoski, and Robins (2011) in effect draw on a first/second order distinction in arguing that

... in early Buddhist teachings, mindfulness refers rather specifically to an introspective awareness with regard to one's physical and psychological processes and experiences. This is in contrast to certain Western conceptualizations of mindfulness, which view mindfulness as a form of awareness that encompasses all forms of objects ... in Buddhist teachings, mindfulness more fundamentally has to do with observing one's perception of and reactions toward sensory objects than focusing on features of the ... objects themselves (p. 1042).

Here, we bring up some differences between mindfulness and hypnosis concerning the specific sort of awareness that the second-order state involves. The nature of the awareness involved in mindfulness is also revealed by metaphor: according to the Suttas, being mindful is like a cowherd able to sit under a tree and watch his cows from a distance; another metaphor involves watching from a tower (Analayo, 2003, pp. 53–57). These metaphors indicate how the aim is not to get so close to mental states as to be sucked into the content, while at the same time still remaining aware of them. To do this, mindfulness involves considering mental states as vehicles or carriers of content (e.g., noticing how mental states arise and pass) (Aronson, 2004). Thus, mindfulness requires being neither so distanced from a mental state that it is dissociated (unwatched, unconscious) nor so close that one is engrossed in it without awareness of its vehicle properties (the content automatically taken for real); hypnosis may involve either of these extremes (Kihlstrom, 2007; Wilson & Barber, 1982). Another metaphor for mindfulness describes carrying a bowl brimming with oil, where one drop must not be spilt, despite the commotion of a crowd watching a beautiful girl singing and dancing and a man with a sword ready to cut off one's head if a single drop is spilt (Analayo, 2003, p. 122). That is, mindfulness is performed with steadiness and equanimity (cf. Olendzki, 2013); hence the description sometimes given of "non-judgmental." Other attitudes compatible with mindfulness are joy and compassion (Olendzki, 2013). By contrast, the attitude one takes to any worldly or mental state in hypnosis is whatever is suggested, including anger (Houghton, Calvert, Jackson, Cooper, & Whorwell, 2002), anxiety (France, 2013), and aversion (e.g., Raji, Numminen, Närvänen, Hiltunen, & Hari, 2009; Rainville et al., 1999)¹.

¹ Anger, aversion, and anxiety may be the objects of mindfulness; however, these objects would not be regarded with anger, aversion, or anxiety, if they were being regarded mindfully.

In summary, while meditation and hypnosis have invited at least cursory comparison over the decades (e.g., Davidson & Goleman, 1977; Grant & Rainville, 2005), and their similarities and differences in many respects remain intriguing (e.g., Dumont, Martin, Broer, 2012; Liftshitz, Campbell, & Raz, 2012; Lynn, Malaktaris, Maxwell, Mellinger, & van der Kloet, 2012), here we focus on what we conjecture to be key to each: hypnotic response is centrally a (strategic) failure of metacognition while meditation, as a practice of mindfulness, is centrally an enhancement of metacognition (see Semmens-Wheeler & Dienes, 2012). We will discuss implications of this position that we have begun to explore: a tension between mindfulness and hypnotic response; relations between the time when one becomes aware of intentions, on the one hand, and both hypnotizability and experience with meditation, on the other; and the effect of manipulations (such as alcohol) that make a person more mindless on hypnotic response.

Mindfulness and hypnotic response in tension: correlational studies

We will first describe studies looking at correlations between mindfulness and hypnotic response to argue for a tension between the two; then at how responses that look hypnotic do occur in the Buddhist literature, to raise doubts about that tension; then a new study phrasing hypnotic suggestions in a Buddhist way to more severely test the claimed low hypnotisability of meditators. Finally, we comment on how we could establish a causal relation between mindfulness and hypnotic response by going beyond correlational studies.

Hypnotic response in mindful people

Semmens-Wheeler (2013) looked at two methods of assessing a negative relation between mindfulness and hypnotic response. The first method was with established questionnaires assessing the degree of mindfulness in everyday life (see Baer, 2013, for a review of measuring mindfulness by questionnaires; and Grossman & Van Dam, 2013, for criticisms). The second method used experienced meditators who had cultivated mindfulness. Semmens-Wheeler found that people high on a standard measure of hypnotizability (as assessed by Waterloo Stanford Group Scale of Hypnotic Susceptibility (WSGS:C), Bowers, 1993) differed on questionnaire measures of mindfulness (Brown & Ryan's Mindful Attention Awareness Scale (MAAS), 2003, and Baer, Smith, & Allen's Kentucky Inventory of Mindfulness Skills (KIMS), 2004)². That is, on average, the more hypnotizable a person, the less self-ratedly mindful they were in everyday life.

Semmens-Wheeler (2013) compared scores of 12 expert meditators on the WSGS:C with scores of over 500 screened participants in the University of Sussex database; the meditators passed on average 3 out of 12 suggestions, and were less susceptible than the average of all subjects in the database combined (5.5 suggestions). On average, the meditators would be classified as "lows."

² Lows had a mean score of 1.9 and highs of 9.8 on the WSGS:C. Lows scored 3.52 and highs 3.28 on the MAAS $t(47) = 2.22, p = 0.031$; and lows scored 3.13 and highs 2.97 on the KIMS, $t(50) = 1.84, p = 0.07$. The means for the mindfulness scales are expressed in terms of the average rating per item. The MAAS is on a 1–6 scale and the KIMS on a 1–5 scale with end points in both cases being "always" and "never." Consistent with our results, Black and Green (2014) recently found a negative correlation between Frewen et al.'s (2008, 2011) Meditation Breath Attention Scores (MBAS) and the Harvard Group Scale of Hypnotic Susceptibility (HGSHS:A), $r = -0.29, p < 0.05$. On the other hand, Black and Green did not find any significant correlations between HGSHS:A and the Five Factor Mindfulness Questionnaire (FFMQ, overall or with any of the five factor scores), overall $r = 0.03$ ($N = 77$).

(See Semmens-Wheeler & Dienes, 2012, for a review of previous work on meditation and hypnosis.) However, the tendency for meditators to be less hypnotizable than non-meditators may simply result from poor attitudes or low expectations on the part of meditators about hypnosis, perhaps reflecting attitudes derived from their religious traditions. On the other hand, attitudes towards hypnosis, as measured by the Attitudes Toward Hypnosis Scale (Spanos, Brett, Menary, & Cross, 1987), were similar between meditators and non-meditators, and the difference between meditators and non-meditators in hypnotic response remained as large after controlling for this measure of attitudes. Moreover, meditators and non-meditators were similar in their expectancy to respond hypnotically, and the differences in hypnotic response between meditators and non-meditators remained after controlling for expectancy. We wished to test these alternative explanations of the low hypnotizability of meditators more thoroughly. In particular, does indicating degree of agreement to the 14 questions of the Spanos et al. (1987) questionnaire sensitively measure all relevant attitudes to hypnosis by which meditators may differ from non-meditators? We tried another approach.

Hypnotic response in Buddhist literature

The context defined explicitly as hypnosis in our culture is just one context in which the same psychological mechanisms underlying hypnotic response operate (cf. Cardeña, van Duijl, Weiner, & Terhune, 2009). Hypnotic response occurs when a person strategically alters their sense of volition or reality; for example, by having intentional actions experienced as involuntary or imagination experienced as perception (Dienes & Perner, 2007). While Buddhism requires mindfulness in all meditation, some practices in Buddhist traditions seem hypnotic. For example, many of the Mahayana scriptures appear to have been derived from visions taken as actual communications from Buddha (Williams, 2009). Further, selected Tibetan monks may at times be taken over by spirits (e.g., Pehar Gyalpo), where the monk acts as an oracle, speaking not by his own volition, according to his own phenomenology (Ellingson, 1998)³.

Consider also the visualizations practiced in tantric Buddhism (e.g., Chapter 3; Williams & Tribe, 2000; Yeshe, 1998). In one set of exercises, an inner body is imagined with energy channels, having prescribed colors, channels, Sanskrit markings, and energy flows. The language used in formulating instructions in these exercises often presents these processes and structures as objective, as something perceived rather than imagined, especially as the exercises progress. For example, "... see the navel and secret chakras. Then look up and see the throat, crown, and brow chakras" (Yeshe, 1998, p. 109); "meditate in this way until you are completely familiar with your channels and chakras. Eventually you will know exactly where everything is, just as you know where everything is in your purse" (Yeshe, 1998, p. 110). The Dalai Lama, referring to the channels, commented "And if you actually direct your mind, your awareness to these points, you find there really is a special kind of response, suggesting that there is something there, that this is not simply fiction" (Hayward & Varela, 1992, p. 79). Similar comments can be made about deity tantra, where one imagines one is a deity, and the process of imagination becomes more convincing with time: "when visualizing him or herself as the deity . . . the practitioner, when seen through the eyes of awakened perception, *is* the deity" (Williams & Tribe, 2000, p. 225); "Do not merely pretend to be the deity. Have the inner conviction that you are the deity" (Yeshe, 1998, p. 79).

³ Not all monks are accomplished meditators (Dreyfus, 2003; Gombrich, 2006) and we are not clear if the State Oracle of Tibet who channels Pehar is an experienced meditator or not. Nonetheless, the succeeding examples are of apparent hypnotic responses combined with meditation.

Being convinced one is a deity resembles, for example, the hypnotic suggestion to be another person (e.g., of a different gender; Burn, Barnier, & McConkey, 2001). Of course, the interpretation of these practices depends on whether or not the energy channels are imagination, and whether or not people really become deities.

Tantra is not alone in presenting experiences that appear hypnotic, even if tantra especially emphasizes exercises rich in imaginative involvement (Kozhevnikov, Louchakova, Josipovic, & Motes, 2009). A rather different Buddhist tradition from tantra is the Theravada one (Gombrich, 2006; for a discussion of the contrast with tantra, see e.g., Gombrich, 1996, Chapter V). In describing the experiences of concentration meditation in a Theravada tradition, Snyder and Rasmussen (2009) say “Next, direct the wisdom eye to the bones of your own skeleton . . . look for colour variation, breaks, and cracks in the bones” (p. 86) which resembles, for example, a hypnotic suggestion to see through X-ray spectacles. Snyder and Rasmussen refer to perceiving one as having a crystal body that glows with a brilliant light, just as with a hypnotic hallucination. It is not just modern-day practitioners, but also the canonical literature of Theravada that provides examples of apparently hypnotic responses. In the Pali suttas, the powers that may be experienced include making multiple copies of oneself, recollecting past lives, flying through the air (even to the sun), and perceiving things far away (e.g., Bodhi, 2005, p. 274; see also Nanamoli, 1999, Chapter XII)⁴.

If at least some of these examples are taken as hypnotic (i.e., strategic self-deception about intentions in order to further one's goals), then they indicate that extensive training in mindfulness is consistent with a degree of hypnotic response (and in Semmens-Wheeler, 2013, meditators showed some responsiveness, on average). In addition, some hypnotic-like suggestions exist in certain modern mindfulness exercises (Chapter 19; Lynn et al., 2012; Yapko, 2011), also indicating some mutual compatibility. How should cold control theory accommodate these observations? On the one hand, the examples could be seen as demonstrating how different practices in a single tradition can coexist even though they develop opposite tendencies (just as meditations emphasizing mindfulness versus compassion, both key practices within the Buddhist traditions, may have opposite effects on the amygdala response to emotional images; Desbordes et al., 2012). On the other hand, these examples may indicate that there is no tension at all between mindfulness and hypnotic response, contrary to cold control theory. Maybe the poor hypnotizability of long-term meditators reflects merely that the traditional hypnotic context is not one where it is clear to practitioners that their hypnotic skills are relevant. What may be needed is to place hypnotic response into a Buddhist context so that an understanding of the relevance of their hypnotic capacities to the task is made clear. Then, on this account, long-term meditators may respond no worse than average to imaginative tasks presented not as hypnotic but as Buddhist exercises⁵.

⁴ It is not clear how many meditators have these canonical supernatural experiences, or indeed if, historically, the description of such experiences entered into the canon purely for propaganda reasons, when competing with other Indian religions.

⁵ A further response is to argue that the examples listed are not cases of hypnosis or cold control at all. Perhaps one might accept that, for example, the energy channels are no more the product of the imagination than is the outside world itself—and on the idealism and “non-duality” that often goes with tantric traditions, though not typically Theravadan ones, the distinction between imagination and perception takes on a certain subtlety; contrast Hamilton (2000), Gombrich (2009), and Siderits (2007). Nonetheless, whatever the personal metaphysics of the practitioner, if the experience of the energy channels is phenomenologically one of being aware of what is there, a good case for the use of cold control can be made.

Hypnotic suggestions phrased in a Buddhist way

We formulated a task context that aimed to present standard hypnotic suggestions as Buddhist exercises, or at least as exercises relatively consistent with Buddhist beliefs (the preamble was about the same length as a standard hypnotic induction; see Appendix 1 for the “Buddhist-friendly” and standard hypnotic preamble/induction). For example, the Buddhist preamble emphasized how the skillful use of attention can make the mind pliable, how thoughts automatically condition further mental states and actions, how imagination can act as a seed for bringing about experiences, how advanced practitioners can create dreams at any time, and how there is a not a self to author actions. Through statements such as these, it was hoped to motivate the experience of actions as involuntary and imagination as perception.

Andreea Avram, for her Honors final-year project at the University of Sussex, recruited 14 mindfulness meditators from Buddhist centers around Brighton, who had been practicing regular mindfulness meditation for at least 5 years; 14 non-meditators were recruited matched for age and gender. Half of each group was randomly assigned either to a normal hypnosis session or to a “Buddhist-friendly” version with the same suggestions (rephrased to remove reference to hypnosis). Each session started with the preamble; then expectation ratings were taken for each upcoming suggestion; then an induction and the suggestions were delivered⁶. Ten suggestions were used from the WSGS:C (Bowers, 1993), excluding the age regression and post-hypnotic suggestions. Suggestions were scored according to both the scoring criteria of the WSGS:C and to a subjective rating taken immediately after each suggestion⁷.

Now, to summarize predictions. If we have succeeded in motivating the tasks as Buddhist friendly, the meditators’ expectations should improve for the Buddhist-friendly rather than the traditional suggestions. Ideally, the expectations should become at least as great as those for non-meditators. If there is a genuine contradiction between a tendency to mindfulness and hypnotic response, then meditators should nonetheless remain less responsive than non-meditators, even though we have strived to make the suggestions Buddhist friendly.

The expectations for meditators were low, though somewhat higher for the Buddhist-friendly version (mean = 0.9 out of a maximum of 5, SE = 0.19) compared to the standard hypnosis version (mean = 0.4, SE = 0.09), $t(12) = 2.52$, $p = 0.027$. The preamble increased the motivations of meditators somewhat. For non-meditators, the mean expectation for the Buddhist-friendly version was 1.5 (SE = 0.13) and for the standard hypnosis version was 1.8 (SE = 0.36). The interaction of script type with group was significant, $F(1, 24) = 4.37$, $p = 0.047$. Thus, the Buddhist-friendly script differentially impacted the expectations of meditators and non-meditators. Nonetheless, we were not entirely successful: non-meditators still had higher expectations for an imaginative response than meditators, even for just the Buddhist-friendly script, and by a large margin, $t(12) = 2.77$, $p = 0.017$.

We now turn from expectations to the actual effects. For meditators, changing the context from standard to Buddhist-friendly increased the subjective experience of hypnotic response, from 0.1

⁶ An example expectation rating is: “If you were to imagine that you hear and feel a mosquito, and you attended clearly to this idea, how strongly do you expect that you would have some sensation of hearing or feeling a mosquito on you? On a scale from 0 to 5, say 0 if you know you will not feel any such sensation, 5 if you are completely certain you will feel some sensation of a mosquito being there, and any number in between depending on how strongly you expect you would feel some sensation.”

⁷ An example subjective rating was: “On a scale from 0 to 5, how strongly you felt the sensation of a mosquito being there, in either sound or touch, where 0 means you felt no sensation and 5 means you felt by any means as if there actually was a mosquito there.”

(SE = 0.6) (out of 5) to 0.5 (SE = 0.11), $t(12) = 2.89$, $p = 0.014$. The corresponding scores for non-meditators were both considerably greater, 1.9 (SE = 0.42) and 2.0 (SE = 0.47) respectively. Thus, despite the mild modulation of meditators' responses, meditators remained substantially less responsive than non-meditators, no matter what the script, $F(1, 24) = 26.09$, $p < 0.001$.

In summary, we at least replicated the low hypnotic response of meditators versus non-meditators (cf. Semmens-Wheeler, 2013), despite trying to make the suggestions more Buddhist-friendly. However, we did not succeed in making the suggestions highly plausible as Buddhist exercises. Future research could depart from the content of standard hypnotic suggestions to make the suggestions more distinctively Buddhist and, thus, more severely test our conjecture. We hope others may be tempted to take up this task. Perhaps using meditators with extensive experience in both tantra and mindfulness would prove revealing about the value of extensive experience in finessing the combination of mindfulness and cold control in precise ways. However, for the time being, the conjecture that meditators who cultivate mindfulness do not respond very well hypnotically survives.

A key problem with the preceding studies is that they are correlational. The acid test is what happens to hypnotic response after a mindfulness intervention to which participants are randomly assigned. Working with Clara Strauss and Kate Cavanagh, who have developed online mindfulness interventions (e.g., Cavanagh et al., 2013), we have established two types of online mindfulness interventions, based on the distinction between first-order and second-order mental states. Thus, if a key aspect of mindfulness is accurately and non-reactively being aware, then one could be mindful of the world (first order) or else mindful of one's mental states (second order). In one intervention we have developed, *mindfulness of the world*, meditations, and exercises concern exclusively present-centered awareness of the physical world⁸. In another matched intervention, *mindfulness of mental states*, meditations, and exercises concern exclusively awareness of one's mental states (including sensations, thoughts, and intentions). If one can, in a couple of weeks, cultivate mindfulness of the world without developing much mindfulness of mental states, and vice versa, then the mindfulness of mental states intervention should, according to cold control, reduce hypnotic response more than the mindfulness of the world intervention, which may have an effect little different from a waiting-list control. So far, this remains a prediction we make in advance of data collection^{9,10}.

⁸ Dunne (2013, p. 77) traces a focus on present-centered awareness in Buddhism to the seventh-century scholar Dharmakirti.

⁹ Interestingly, the Stoics developed mindfulness practices where the first order and second order are conceptually separated as different endeavors. A defining part of Stoicism, from the beginning with Zeno of Citium (fl. 300BC), was the tranquil, detached assessment of mental impressions so as not to accept their content automatically (e.g., Graver, 2007) (i.e., second-order mindfulness). Acceptance of fate, including the world as it is, was always part of Stoic (though not Buddhist) principles (Bobzien, 2001), and at least by the time of Seneca (fl. AD50), we have the beautiful articulation of the value of present-moment awareness of the world (e.g., Davie, 2007) (i.e., first-order mindfulness). Thus, in traditional terms, first-order mindfulness was part of Stoic physics and second-order mindfulness was part of Stoic ethics (cf. Sellars, 2013). Or, in Hadot's (2001) turn of phrase (in analyzing the work of the Stoic emperor Marcus Aurelius, fl. AD150), the *discipline of assent* concerns accurately and non-reactively assessing mental states (second-order mindfulness) while the *discipline of desire* concerns tranquil and joyous acceptance of the present worldly state of affairs (first-order mindfulness). Mindfulness practices in Stoicism and Buddhism may have developed independently, as they are presented in distinctive ways, but see McEvilley (2006).

¹⁰ The distinction between these two types of mindfulness practice may prove useful for other research as well (e.g., into impulsivity).

Mindfulness meditation promotes awareness of intentions

Dreyfus (2013) laments that the absence of mindfulness

... is glaring in the considerable literature concerning the awareness of intentions, their role in action and the degree to which they play causal roles. I am deeply struck by the fact that I have never seen the idea of mindfulness mentioned in this context or heard about its use in relevant experiments. And yet, I would think that mindfulness practitioners would be ideal subjects for such experiments and discussions, since they are supposed to have the ability to pay close attention to their bodily and mental states. Hence, they should be able to distinguish more carefully their own intentions and the degree to which those precede their actions or fail to do so. (p. 53)

Indeed, if mindfulness makes one more readily aware of intentions, it should impair cold control, which is the argument of this chapter. We attempted to directly test this conjecture by use of the Libet task (Libet, Gleason, Wright, & Pearl, 1983), in which people make a spontaneous movement and then indicate when they were aware of either the movement itself or else the intention or urge to make the movement.

Haggard, Cartledge, Dafydd, and Oakley (2004) were the first to apply the Libet paradigm to a hypnotic context. They were interested in awareness of the timing of the movement of the finger itself. They showed that the subjective timing for an ideomotor action (i.e., an action suggested to feel involuntary) was more similar to a passive movement than a fully voluntary one. Semmens-Wheeler (2013) followed up the research, comparing highly hypnotizable subjects with low hypnotizable simulators, as well as with experienced meditators, in terms of their awareness of when they voluntarily moved their finger. Overall, the mean timings did not differ significantly across groups¹¹. What is crucial for current concerns, though, is not awareness of when the finger moved but awareness of the timing of intentions.

Lush, Dienes, and Naish (submitted) focused on this crucial aspect of cold control theory: awareness of the timing of intentions. Participants rested their hand in an apparatus that enabled the pressure of one finger to complete a circuit. They were asked to lift their finger (so breaking the circuit) at any time of their choosing. The apparatus included a clock with a hand that completed a single revolution every 2400 ms. Participants used the clock position to indicate the time that they had first experienced their immediate intention to move, while the apparatus itself logged the time when the finger actually moved. There were four groups of participants. Three groups were selected from the University of Sussex hypnosis screening database. Specifically, there were 7 high, 19 low, and 20 medium hypnotizable subjects (as determined by the WSGS:C). For the fourth group, 11 meditators were recruited from Buddhist centers in Brighton; they had a mean of 13 years of meditation experience and 15 hours per month of meditation.

Comparing the declared "intention time" with the actual moment of lifting, Lush et al. found highly hypnotizable people gave significantly later timings (+23 ms, SE = 19 ms) than either mediums (+69 ms, SE = 22 ms) or lows (−101 ms, SE = 26 ms). Meditators (−149 ms, SE = 14 ms) responded even earlier than mediums (or highs). While meditators and lows did not differ significantly in mean timings, the meditators were highly consistent: their variance in timings

¹¹ Though Bayesian analyses indicated that the null findings were not sensitive. Subjective timings for simulators, meditators, and reals were −29 (SE = 25 ms), 5 (SE = 36 ms), and +56 (SE = 43 ms) for voluntary movements, where a negative number indicates the estimated time of the movement occurred prior to the movement. Semmens-Wheeler (2013) found that reals had significantly greater (later) timing errors for ideomotor actions than simulators, suggesting that the findings of Haggard, Cartledge, Dafydd, and Oakley (2004) were not due to demand characteristics.

(SD = 48 ms) was significantly lower than that of lows (SD = 113 ms). Interestingly, if, post hoc, the meditators were split according to meditation experience (more than 9 years), the 7 meditators in the more experienced group had a standard deviation of only 11 ms in the stated timing of their intention—a remarkably consistent estimate.

In summary, we confirmed predictions. Hypnotizability is associated with a delayed awareness of intending to make a voluntary movement; conversely, mindfulness meditation experience is associated with an early awareness. Explaining the results requires making a first order/second order distinction. The first-order intention will be a continuously evolving neural event which may (Libet et al., 1983) or may not (Schurger, Sitta, & Dehaene, 2012) be related to the readiness potential that precedes the movement by some hundreds of milliseconds. Our second-order concepts are unlikely, in general, to be as fine-grained as the first-order states themselves (contrast Miller & Schwarz, 2014), if only because we evolve or learn for any capacity to be just good enough. For example, for visual perception, Overgaard and Sørensen (2004) found that just four categories of clarity were sufficient and natural for participants to introspect the clarity of first-order states.

Our awareness of the formation of an intention will depend on how fine-grained our relevant mental state concepts are. At least some highs may have coarse categories of the nature of first-order intentions—and intentions thus remain unconscious for longer compared to mediums (because the intentional state has to continuously develop for longer until it can be detected by the application of a relatively coarse concept). Indeed, for these highs, it may be just the natural propensity of intentions to remain unconscious a bit longer that enables them to strategically render the intentions unconscious altogether, thus creating illusions of involuntariness. Conversely, meditators, through training, may have fine-grained mental state concepts, enabling them to catch intentions sooner. Indeed, watching mental states arise and pass is crucial to Buddhist meditation. It would be surprising if such extensive experience did not fine-tune the metacognitive processes engaged. (There is also another possibility that we could not fully evaluate from debriefing participants: the meditators may have learned a theory about the timing of intentions through their tradition, and this theory influenced awareness of intentions in a top-down way.)

We have recently explored another relation between intentions and timing. Haggard, Clark, and Kalogeras (2002) were the first to demonstrate intentional binding, using a procedure that followed an action by a contingent outcome, such as a bell ringing. The task of the subject was to estimate the duration of the time lapse between action and outcome. That estimate was shorter if the action was intentional rather than externally caused (e.g., by transcranial magnetic stimulation). The degree of intentional binding, as measured by the change in time estimation, seems related, in part, to the subjective sense of agency in causing the external event (Ebert & Wegner, 2010). Thus, intentional binding seems linked to metacognition, and not just the presence of an intention. However, intentional binding is not a measure of the timing of awareness of intentions, but an implicit measure sensitive to cues for whether intentions are causally relevant to an external outcome (Moore & Haggard, 2008). It is thus hard to make clear predictions for what differences our varying groups of participants may show in intentional binding.

Lush, Parkinson, & Dienes (submitted) tested high, medium, and low hypnotizable groups and experienced meditators on intentional binding with a voluntary movement¹². They did

¹² The study is a prelude to investigating ideomotor action and intentional binding, and displaced robotic agency, with meditators and groups of different hypnotizability, together with Pedro Da Gama, Axel Cleeremans, and Patrick Haggard.

not find an effect of hypnotizability, but meditators had stronger intentional binding than the other groups. One explanation may be that meditators were able to attend to the task more consistently than non-meditators (cf. e.g., Lutz et al., 2009; Tan, Dienes, Jansari, & Goh, 2014, for positive effects of meditation on attention tasks; cf. e.g., Dienes et al., 2009; Kallio, Revonsuo, Hämäläinen, Markela, & Gruzelier, 2001, for the weak relation of hypnotizability, overall, to performance on various attention tasks). However, there was no difference between meditators and non-meditators in within-participant variability in RTs, implying the same consistency of paying attention between groups.

Intentional binding is comprised of two components, and meditators showed a stronger effect with one of those components. Specifically, intentional binding consists of (i) the estimate of the time of the action moving toward the outcome, and (ii) the estimate of the time of the outcome moving toward the action. For meditators, the timing of the outcome was shifted strongly toward the action; the evidence for a difference in the converse shift of the action toward the tone was insensitive. According to one model of intentional binding (Waszak, Cardoso-Leite, & Hughes, 2012), the outcome component of intentional binding is due to more quickly perceiving an outcome that is highly predicted from the action. It may be that constant practice in being mindful of intentions and their consequences led to stronger predictive models for meditators than non-meditators (compare the fourth foundation of mindfulness, which explicitly includes practice in being mindful of intentions, and also the first foundation of being mindful of bodily actions; Gunaratana, 2012, Chapter 2). Interestingly, the stronger intentional binding of meditators compared to non-meditators is a case where mindfulness training is associated with less accurate judgments (of the tone as being sooner than it actually was). In any case, whatever the explanation, even if highs did not behave in the opposite way to meditators, they also did not behave like them on this task.

Mindless hypnotic response

The final type of evidence concerning the relation between mindfulness and hypnotic response considers what happens to hypnotic response if metacognition is experimentally impaired. Rounis, Maniscalco, Rothwell, Passingham, and Lau (2010) found that rTMS (repetitive transcranial magnetic stimulation) to the left dorsolateral prefrontal cortex (DLPFC) reduced awareness of seeing shapes when overall first-order awareness was controlled. That is, the DLPFC may be involved in maintaining accurate higher-order thoughts, so disrupting it reduces the accuracy of awareness of mental states. Dienes and Hutton (2013) reasoned that if it were harder to have accurate higher-order thoughts, it would be easier to respond hypnotically, according to cold control theory. Dienes and Hutton applied rTMS to the left DLPFC or to a control site, the vertex, in counterbalanced order. Subjects were given four hypnotic suggestions by a hypnotist blind to the site stimulated. Subjects rated their subjective response on a 0–5 scale. Stimulation of the DLPFC increased hypnotic response overall (by about a third of a rating point), as predicted¹³.

Sayette, Reichle, and Schooler (2009) showed that alcohol also reduces metacognition (specifically, the awareness that one's mind has wandered). Thus, with a similar logic to Dienes and Hutton (2013), Semmens-Wheeler et al. (2013) administered real or placebo alcohol to participants who were given nine hypnotic suggestions, which were also rated on a 0–5 subjective response scale. As predicted, the participants who had alcohol rather than placebo were more responsive to hypnotic suggestion (by 0.8 of a rating point).

¹³ A direct replication of this study is in progress by Max Coltheart, Amanda Barnier, and Rochelle Cox at Macquarie University.

In both these studies, an insult was delivered to the prefrontal cortex, an insult calculated to reduce metacognition, but one that would have had other effects as well. Other evidence useful for putting the results in context is that there is little consistent relation between frontal task performance generally, such as attentional or inhibitory tasks, and hypnotic response (e.g., Dienes et al., 2009). Further, there is evidence that hypnotic response actively involves executive processes (Crawford, Knebel, & Vendemia, 1998; see Kirsch & Lynn, 1998b, for a review of conflict-ing behavioral studies up to that time; for more recent work, see Naish, 2014; Tobis & Kihlstrom, 2010; Wyzenbeek & Bryant, 2012). Thus, the conjecture that it is specifically the disruption of metacognition that made the insult effective remains viable.

While the effect of rTMS to the left DLPFC on meditation has not been tested, meditation has been associated with increased activity in the left DLPFC (e.g., Brefczynski-Lewis, Lutz, Schaefer, Levinson, & Davidson, 2007; Newberg et al., 2001). Sayette et al.'s (2009) finding that alcohol increases mind wandering while reducing one's awareness that one's mind has wandered clearly shows alcohol reduces mindfulness.

One further recent study is relevant. "Ego depletion" is a manipulation that briefly disrupts later executive functioning by performing an initial difficult, rather than easy, inhibitory task. For a while after the "depletion," self-control is impaired (cf. Baumeister, Bratslavsky, Muraven, & Tice, 1998, and Kurzban, Duckworth, Kable, & Myers, 2013, for different theoretical accounts). In unpublished studies, Ryan Scott has not yet found an effect of ego depletion on metacognition in a learning or a perception context. What would the effect of ego depletion be on hypnotic response? Scott, Williamson, and Dienes (in preparation) gave participants either a difficult or easy Stroop task (the ego depletion manipulation) and then four hypnotic suggestions. Depletion *reduced* hypnotic response (by about half a point on the equivalent of a 0–5 scale). The reduction in hypnotic response is consistent with evidence that hypnotic responding uses executive resources (e.g., Wyzenbeek & Bryant, 2012). In summary, hypnotic response is not about having impaired executive function in general. We speculate that hypnotic response is specifically related to metacognition.

Conclusion

In this chapter, first we have argued that according to cold control theory, mindfulness and hypnotic response involve a tension, and then, we have reviewed new relevant studies conducted since our last opinion piece on this topic (Semmens-Wheeler & Dienes, 2012). Specifically, we replicated the low hypnotizability of experienced meditators; found that highs had an especially late awareness of intentions and meditators, an especially early awareness; and found that whereas disruptions of frontal function (with alcohol, TMS to the DLPFC) known to impair metacognition enhanced hypnotic response, disruptions that are not shown to impair metacognition (ego depletion) impaired hypnotic response. We conclude that it may be hard to be mindless about an intention if one's general tendency is to be mindful. One route to high hypnotizability may be to avoid chronic mindfulness.

Researchers have previously postulated that there are multiple pathways to high hypnotizability or multiple ways of being highly hypnotizable (Barber, 1999; Hilgard, 1979; Sheehan & McConkey, 1982; Terhune & Brugger, 2011). Sometimes, a distinction is made that is relevant to this chapter. Barber's three-dimensional theory of high hypnotizability distinguished amnesic subjects, who spontaneously tend to forget life events, from subjects who are extremely motivated and have strong expectations about their ability to respond hypnotically. (The remaining category of high hypnotic responder was fantasy-prone.) The Pali word for mindfulness is *sati*, which means literally "to remember" (Gethin, 2013); amnesic subjects are not mindful. Yet there

is no reason to think highly motivated subjects are, in themselves, mindless. Crucially, Terhune, Cardeña, & Lindgren (2011) showed that high hypnotizables can be separated into high and low dissociating groups (as assessed by the Dissociative Experiences Scale, DES) which differ in their performance on executive tasks and the conditions under which they mind wander (see also Marcusson-Clavertz, Terhune, & Cardeña, 2012; Terhune & Brugger, 2011). Note that the DES is negatively correlated with mindfulness ($r = -0.3$, as measured by the FFMQ; de Bruin, Topper, Muskens, Bögel, & Kamphuis, 2012). Thus, one possibility is that there are two ways of implementing cold control—the mindless and the mindful.

Dienes (2012) distinguished HOT coupling from HOT control: HOT coupling is the general tendency to have accurate higher-order thoughts (i.e., for HOTs to be accurately coupled to first-order states); HOT control is the ability to have accurate HOTs or not, according to plan. One way of being highly hypnotizable is by having low HOT coupling in general (mindless). However, maybe highly mindful people can respond hypnotically if they have high HOT control. Note though that our meditators have not been highs. Could they be trained to be highs with, for example, the Carleton Skills Training Package for modifying hypnotic susceptibility (Bertrand, Stam, & Radtke, 1993)? This is a matter for future research.

While we argue that there is a tension between hypnosis and mindfulness, there remains plenty of room for exploring the role of demand characteristics and suggestion in meditation (see Chapters 10 and 19). Our own data show that suggestion can, to some degree, coexist with high levels of mindfulness. For example, according to one tradition (Buddhaghosa, 2003), when a person concentrates on the breath or other object for an extended period, a sign of concentration being established is the arising of a visual image (the “nimitta”), as if by itself, which then becomes the focus of concentration (see e.g., Shankman, 2008). Not everyone comes to see the nimitta. Is there a relation between those that see it and hypnotizability? While cold control theory argues against suggestion playing a key role in meditation, that surely means we should explore just what role suggestion does play.

One way of criticizing the approach in this chapter concerning the relation between hypnosis and meditation is to argue that either or both of hypnosis or meditation have not been properly characterized. For example, it could be argued that the essence of hypnosis is not cold control but the weakening of the conceptual role of a unified enduring self (cf. Hilgard, 1977; Kihlstrom, 1997), and that is also the point of Buddhist meditation (Collins, 1982), so the two are similar (see Chapter 20). Or it could be argued that the essence of hypnosis is executive disruption (Woody & Sadler, 2008) and the essence of meditation is attentional regulation (cf. Lutz, Slagter, Dunne, & Davidson, 2008), so the two are different (but not precisely in the respect that cold control dictates). Or it could be argued that the essence of both hypnosis and meditation is expectation and suggestion; this could make them similar (Chapter 19; Yapko, 2011) or different, because the content of those expectations and suggestions are different in radical ways, resulting in them working differently (Farb, 2012). Or the essence of both hypnosis and meditation may be a reduction in the operation of interoceptive prediction error signals (within a predictive coding framework) (see Chapter 17), so the two are similar.

Both hypnosis and meditation are rich phenomena. We hope we have shown the value of taking cold control and mindfulness as respectively central to each because of the experiments motivated through this approach and, thus, the preliminary evidence we have been able to present in this chapter.

Acknowledgment

This research was supported by Interuniversity Attraction Poles Program of the Belgian Federal Science Policy Office (grant 7/33) and by the Sackler Centre for Consciousness Science.

References

- Analayo (2003). *Satipatthana: the direct path to realization*. Cambridge: Windhorse Publications.
- Aronson, H. B. (2004). *Buddhist practice on Western ground: reconciling Eastern ideals and Western psychology*. London: Shambala.
- Baer, R. A. (2013). Measuring mindfulness. In J. M. G. Williams & J. Kabat-Zinn (Eds.), *Mindfulness: diverse perspectives on its meaning, origins and applications* (pp. 241–261). London: Routledge.
- Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment*, **11**(3), 191–206.
- Barber, T. X. (1999). Hypnosis: a mature view. *Contemporary Hypnosis*, **16**, 123–127.
- Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: is the active self a limited resource? *Journal of Personality and Social Psychology*, **74**, 1252–1265.
- Benham, G., Woody, Z., Wilson, K. S., & Nash, M. R. (2006). Expect the unexpected: ability, attitude, and responsiveness to hypnosis. *Journal of Personality and Social Psychology*, **91**, 342–350.
- Bertrand, L. D., Stam, H. J., & Radtke, H. L. (1993). The Carleton Skills Training Package for modifying hypnotic susceptibility—a replication and extension: a brief communication. *International Journal of Clinical and Experimental Hypnosis*, **41**, 6–14.
- Black, K. N., & Green, J. P. (2014). *Examining hypnotizability, meditation-attentional focus, and performance solving anagrams*. Paper presented at the annual convention of the American Psychological Association, Washington DC, August 2014.
- Bobzien, S. (2001). *Determinism and freedom in Stoic philosophy*. Oxford: Oxford University Press.
- Bodhi, B. (2005). *In the Buddha's words: an anthology of discourses from the Pali Canon (teachings of the Buddha)*. Massachusetts: Wisdom Publications.
- Bowers, K. S. (1993). The Waterloo-Stanford Group C (WSGC) Scale of Hypnotic Suggestibility: normative and comparative data. *International Journal of Clinical and Experimental Hypnosis*, **41**, 35–46.
- Brefczynski-Lewis, J. A., Lutz, A., Schaefer, H. S., Levinson, D. B., & Davidson, R. J. (2007). Neural correlates of attentional expertise in long-term meditation practitioners. *Proceedings of the National Academy of Sciences*, **104**, 11483–11488.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, **84**(4), 822–848.
- Buddhaghosa, B. (translated by B. Nanamoli) (2003). *The path of purification: Visuddhimagga*. Onalaska, USA: Pariyatti Press.
- Burn, C., Barnier, A. J., & McConkey, K. M. (2001). Information processing during hypnotically suggested sex change. *International Journal of Clinical and Experimental Hypnosis*, **49**, 231–242.
- Cardena, E., van Duijl, M., Weiner, L., & Terhune, D. (2009). Possession/trance phenomena. In P. Dell & J. O'Neill (Eds.), *Dissociation and the dissociative disorders: DSM-V and beyond* (pp. 171–181). Routledge.
- Carruthers, P. (2000). *Phenomenal consciousness: a naturalistic theory*. Cambridge University Press.
- Cavanagh, K., Strauss, C., Cicconi, F., Griffiths, N., Wyper, A., & Jones, F. (2013). A randomised controlled trial of a brief online mindfulness-based intervention. *Behaviour Research and Therapy*, **51**, 573–578.
- Collins, S. (1982). *Selfless persons*. Cambridge: Cambridge University Press.
- Crawford, H. J., Knebel, T., & Vendemia, J. M. C. (1998). The nature of hypnotic analgesia: neurophysiological foundations and evidence. *Contemporary Hypnosis*, **15**, 24–35.
- Davidson, R. J., & Goleman, D. J. (1977). The role of attention in meditation and hypnosis: a psychological perspective on transformations of consciousness. *International Journal of Clinical and Experimental Hypnosis*, **25**, 291–308.
- Davie, J. (2007). *Seneca: dialogues and essays*. Oxford: Oxford University Press.

- de Bruin, E. I., Topper, M., Muskens, J. G. A. M., Bögel, S. M., & Kamphuis, J. H. (2012). Psychometric properties of the Five Facets Mindfulness Questionnaire (FFMQ) in a meditating and a non-meditating sample. *Assessment*, **19**, 187–197.
- Desbordes, G., Negi, L. T., Pace, T. W. W., Wallace, B. A., Raison, C. L., & Schwartz, E. L. (2012). Effects of mindful-attention and compassion meditation training on amygdala response to emotional stimuli in an ordinary, non-meditative state. *Frontiers in Human Neuroscience*, **6**, 292. doi: 10.3389/fnhum.2012.00292
- Dienes, Z. (2012). Is hypnotic responding the strategic relinquishment of metacognition? In M. Beran, J. L. Brandl, J. Perner, & J. Proust (Eds.), *The foundations of metacognition* (pp. 267–278). Oxford: Oxford University Press.
- Dienes, Z., Brown, E., Hutton, S., Kirsch, I., Mazzoni, G., & Wright, D. B. (2009). Hypnotic suggestibility, cognitive inhibition, and dissociation. *Consciousness and Cognition*, **18**, 837–847.
- Dienes, Z., & Hutton, S. (2013). Understanding hypnosis metacognitively: rTMS applied to left DLPFC increases hypnotic suggestibility. *Cortex*, **49**, 386–392.
- Dienes, Z., & Perner, J. (2007). The cold control theory of hypnosis. In G. Jamieson (Ed.), *Hypnosis and conscious states: the cognitive neuroscience perspective* (pp. 293–314). Oxford: Oxford University Press.
- Dienes, Z., & Semmens-Wheeler, R. (2012). Response to Terhune: testing cold control theory. *Journal of Mind–Body Regulation*, **2**(1), 169–171.
- Dreyfus, G. (2003). *The sounds of two hands clapping: the education of a Tibetan Buddhist monk*. Berkeley: University of California Press.
- Dreyfus, G. (2013). Is mindfulness present-centred and non-judgmental? A discussion of the cognitive dimensions of mindfulness. In J. M. G. Williams & J. Kabat-Zinn (Eds.), *Mindfulness: diverse perspectives on its meaning, origins and applications* (pp. 41–54). London: Routledge.
- Dumont, L., Martin, C., & Broer, I. (2012). Functional neuroimaging studies of hypnosis and meditation: a comparative perspective. *The Journal of Mind–Body Regulation*, **2**, 58–70.
- Dunne, J. (2013). Towards an understanding of non-dual mindfulness. In J. M. G. Williams & J. Kabat-Zinn (Eds.), *Mindfulness: diverse perspectives on its meaning, origins and applications* (pp. 71–88). London: Routledge.
- Ebert, J. P., & Wegner, D. M. (2010). Time warp: authorship shapes the perceived time of actions and events. *Consciousness and Cognition*, **19**, 481–489.
- Ellingson, T. (1998). Arrow and mirror: interactive consciousness, ethnography, and the Tibetan State Oracle's trance. *Anthropology and Humanism*, **23**, 51–76.
- Farb, N. A. S. (2012). Mind your expectations: exploring the roles of suggestion and intention in mindfulness training. *Journal of Mind–Body Regulation*, **2**, 27–42.
- France, K. L. (2013). *Hypnotic induction of unconscious anxiety: a new perspective*. Unpublished Masters dissertation, University of Sussex.
- Frewen, P. A., Evans, E., Maraj, N., Dozois, D. J. A., & Partridge, K. (2008). Letting go: mindfulness and negative automatic thinking. *Cognitive Therapy and Research*, **32**, 758–774.
- Frewen, P. A., Lundberg, E., Mackinley, J., & Wrath, A. (2011). Assessment of response to mindfulness meditation: Meditation Breath Attention scores in association with subjective measures of state and trait mindfulness and difficulty letting go of depressive cognition. *Mindfulness*, **2**(4), 254–269.
- Gethin, R. (2013). On some definitions of mindfulness. In J. M. G. Williams & J. Kabat-Zinn (Eds.), *Mindfulness: diverse perspectives on its meaning, origins and applications* (pp. 263–280). London: Routledge.
- Gombrich, R. F. (1996). *How Buddhism began: the conditioned genesis of the early teachings*. School of Oriental and African Studies, London: Munshiram Manoharlal Publishers.
- Gombrich, R. F. (2006). *Theravada Buddhism: a social history from ancient Benares to modern Colombo (The library of religious beliefs and practices)*. London: Routledge.

- Gombrich, R. (2009). *What the Buddha thought* (Oxford Centre for Buddhist Studies monographs). Sheffield: Equinox Press.
- Grant, J. A., & Rainville, P. (2005). Hypnosis and meditation: similar experiential changes and shared brain mechanisms. *Medical Hypotheses*, **65**, 625–626.
- Graver, M. R. (2007). *Stoicism and emotion*. Chicago: University of Chicago Press.
- Grossman, P., & Van Dam, N. T. (2013). Mindfulness by any other name . . . : trials and tribulations of sati in Western psychology and science. In J. M. G. Williams & J. Kabat-Zinn (Eds.), *Mindfulness: diverse perspectives on its meaning, origins and applications* (pp. 219–239). London: Routledge.
- Gunaratana, B. H. (2012). *The four foundations of mindfulness in plain English*. Massachusetts: Wisdom Publications.
- Hadot, P. (2001). *The inner citadel: the meditations of Marcus Aurelius*. Cambridge, MA: Harvard University Press.
- Haggard, P., Clark, S., & Kalogeras, J. (2002). Voluntary action and conscious awareness. *Nature Neuroscience*, **5**, 382–385.
- Haggard, P., Cartledge, P., Dafydd, M., & Oakley, D. A. (2004). Anomalous control: when free-will is not conscious. *Consciousness and Cognition* **13**, 646–654.
- Hamilton, S. (2000). *Early Buddhism: a new approach: the I of the beholder*. London: Routledge.
- Hargus, E., Crane, C., Barnhofer, T., & Williams, J. M. G. (2010). Effects of mindfulness on meta-awareness and specificity of describing prodromal symptoms in suicidal depression. *Emotion*, **10**, 34–42.
- Haywood, J. W., & Varela, F. J. (Eds.) (1992). *Gentle bridges: conversations with the Dalai Lama on the sciences of mind*. London: Shambala.
- Hilgard, E. R. (1977). *Divided consciousness: multiple controls in human thought and action*. New York: Wiley-Interscience.
- Hilgard, J. R. (1979). *Personality and hypnosis: a study of imaginative involvement* (2nd edn.). Chicago: University of Chicago Press.
- Houghton, L. A., Calvert, E. L., Jackson, N. A., Cooper, P., & Whorwell, P. J. (2002). Visceral sensation and emotion: a study using hypnosis. *Gut*, **51**, 701–704.
- Kabat-Zinn, J. (2013). Some reflections on the origins of MBSR, skilful means, and the trouble with maps. In J. M. G. Williams & J. Kabat-Zinn (Eds.), *Mindfulness: diverse perspectives on its meaning, origins and applications* (pp. 281–306). London: Routledge.
- Kallio S., Revonsuo A., Hämäläinen H., Markela J., & Gruzelier J. (2001). Anterior brain functions and hypnosis: a test of the frontal hypothesis. *International Journal of Clinical and Experimental Hypnosis*, **49**, 95–108.
- Keng, S. L., Smoski, M. J., & Robins, C. J. (2011). Effects of mindfulness on psychological health: a review of empirical studies. *Clinical Psychology Review*, **31**, 1041–1056.
- Kihlstrom, J. F. (1997). Consciousness and me-ness. In J. Cohen and J. Schooler (Eds.), *Scientific approaches to consciousness* (pp. 451–468). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Kihlstrom, J. F. (2007). Consciousness in hypnosis. In P. D. Zelazo, M. Moscovitch, & E. Thompson (Eds.), *Cambridge handbook of consciousness* (pp. 445–479). Cambridge: Cambridge University Press.
- Kirsch, I. (1985). Response expectancy as a determinant of experience and behaviour. *American Psychologist*, **40**, 1189–1202.
- Kirsch, I., Cardena, E., Derbyshire, S., Dienes, Z., Heap, M., Kallio, S., . . . Whalley, M. (2011). Definitions of hypnosis and hypnotizability and their relation to suggestion and suggestibility: a consensus statement. *Contemporary Hypnosis and Integrative Therapy*, **28**(2), 107–111.
- Kirsch, I., & Lynn, S. J. (1998a). Social-cognitive alternatives to dissociation theories of hypnotic involuntariness. *Review of General Psychology*, **2**, 66–80.
- Kirsch, I., & Lynn, S. J. (1998b). Dissociation theories of hypnosis. *Psychological Bulletin*, **123**, 100–115.
- Kozhevnikov, M., Louchakova, O., Josipovic, Z., & Motes, M. A. (2009). The enhancement of visuospatial processing efficiency through Buddhist deity meditation. *Psychological Science*, **20** (5), 645–653.

- Kurzban, R., Duckworth, A., Kable, J. W., & Myers, J. (2013). An opportunity cost model of subjective effort and task performance. *Behavioural and Brain Sciences*, **36**, 661–679.
- Libet, B., Gleason, C. A., Wright, E. W., & Pearl, D. K. (1983). Time of conscious intention to act in relation to onset of cerebral activity (readiness-potential). The unconscious initiation of a freely voluntary act. *Brain*, **106**, 623–642.
- Lifshitz, M., Bonn, N. A., Fischer, A., Kashem, I. F., & Raz, A. (2013). Using suggestion to modulate automatic processes: from Stroop to McGurk and beyond. *Cortex*, **49**, 463–473.
- Lifshitz, M., Campbell, N., & Raz, A. (2012). Varieties of attention in hypnosis and meditation. *Consciousness and Cognition*, **21**, 1582–1585.
- Lutz, A., Slagter, H. A., Dunne, J. D., & Davidson, R. J. (2008). Attention regulation and monitoring in meditation. *Trends in Cognitive Sciences*, **12**, 163–169.
- Lutz, A., Slagter, H., Rawlings, N. B., Francis, A. D., Greischar, L. L., & Davidson, R. J. (2009). Mental training enhances attentional stability: neural and behavioral evidence. *Journal of Neuroscience*, **29**, 13418–13427.
- Lynn, S. J., Malaktaris, A., Maxwell, R., Mellinger, D. I., & van der Kloet, D. (2012). Do hypnosis and mindfulness practices inhabit a common domain? Implications for research, clinical practice, and forensic science. *The Journal of Mind–Body Regulation*, **2**, 12–26.
- Lynn, S. J., Rhue, J. W., & Weekes, J. R. (1990). Hypnotic involuntariness: a social cognitive analysis. *Psychological Review*, **97**, 169–184.
- Marcusson-Clavertz, D., Terhune, D., & Cardeña, E. (2012). Individual differences and state effects on mind-wandering: hypnotizability, dissociation, and sensory homogenization. *Consciousness and Cognition*, **21**, 1097–1108.
- McEvilley, T. (2006). *The shape of ancient thought*. New York: Allworth Press.
- Miller, J., & Schwarz, W. (2014). Brain signals do not demonstrate unconscious decision making: an interpretation based on graded conscious awareness. *Consciousness and Cognition*, **24**, 12–21.
- Moore, J., & Haggard, P. (2008). Awareness of action: inference and prediction. *Consciousness and Cognition*, **17**, 136–114.
- Naish, P. L. N. (1986). Hypnosis and signal detection: an information processing account. In P. L. N. Naish (Ed.), *What is hypnosis?* (pp. 121–144). Milton Keynes, UK: Open University Press.
- Naish, P. L. N. (2014). Inhibition and disinhibition in hypnosis. *Contemporary Hypnosis and Integrative Therapy*, **30**, 135–141.
- Nanamoli, B. (translator) (1999). *Visuddhimagga: the path of purification*. Onalaska: Pariyati Publishing.
- Nash, M., & Barnier, A. (Eds.) (2008). *The Oxford handbook of hypnosis: theory, research, and practice*. Oxford: Oxford University Press.
- Newberg, A. B., Alavi, A., Baime, M., Pourdehnad, M., Santanna, J., & d'Aquili, E. G. (2001). The measurement of regional cerebral blood flow during the complex cognitive task of meditation: a preliminary SPECT study. *Psychiatry Research: Neuroimaging*, **106**, 113–122.
- Oakley, D. A., & Halligan, P. W. (2013). Hypnotic suggestion: opportunities for cognitive neuroscience. *Nature Reviews Neuroscience*, **14**, 565–576.
- Olendzki, A. (2013). The construction of mindfulness. In J. M. G. Williams & J. Kabat-Zinn (Eds.), *Mindfulness: diverse perspectives on its meaning, origins and applications* (pp. 55–70). London: Routledge.
- Overgaard, M., & Sørensen, T. A. (2004). Introspection distinct from first order experiences. *Journal of Consciousness Studies*, **11** (7–8), 77–95.
- Peacock, J. (2014). Sati or mindfulness? Bridging the divide. In M. Bazzano (Ed.), *After mindfulness: new perspectives on psychology and meditation* (pp. 3–22). Hampshire: Palgrave Macmillan.
- Proust, J. (2012). *Philosophy of metacognition: mental agency and self-awareness*. Oxford: Oxford University Press.
- Raij, T. T., Numminen, J., Närvänen, S., Hiltunen, J., & Hari, R. (2009). Strength of prefrontal activation predicts intensity of suggestion-induced pain. *Human Brain Mapping*, **30**, 2890–2897.

- Rainville, P., Hofbauer, R. K., Paus, T., Duncan, G. H., Bushnell, M. C., & Price, D. D. (1999). Cerebral mechanisms of hypnotic induction and suggestion. *Journal of Cognitive Neuroscience*, *11*, 110–125.
- Raz, A., Kirsch, I., Pollard, J., & Nitkin Kaner, Y. (2006). Suggestion reduces the Stroop effect. *Psychological Science*, *17*, 91–95.
- Rosenthal, D. (2005). *Consciousness and mind*. Oxford: Oxford University Press.
- Rounis, E., Maniscalco, B., Rothwell, J., Passingham, R. E., & Lau, H. (2010). Theta-burst transcranial magnetic stimulation to the prefrontal cortex impairs metacognitive visual awareness. *Cognitive Neuroscience*, *1*, 165–175.
- Sayette, A. M., Reichle, E. D., & Schooler, J. W. (2009). Lost in the sauce: the effects of alcohol on mind wandering? *Psychological Science*, *20*, 747–752.
- Schurger, A., Sitta, J. D., & Dehaene, S. (2012). An accumulator model for spontaneous neural activity prior to self-initiated movement. *Proceedings of the National Academy of Science*, *109*, 16776–16777.
- Sellars, J. (2013). *Stoicism*. California: University of California Press.
- Semmens-Wheeler, R. (2013). *The contrasting role of higher order awareness in hypnosis and meditation*. Unpublished PhD Thesis, University of Sussex.
- Semmens-Wheeler, R., & Dienes, Z. (2012). The contrasting role of higher order awareness in hypnosis and meditation. *Journal of Mind–Body Regulation*, *2*(1), 43–57.
- Semmens-Wheeler, R., Dienes, Z., & Duka, T. (2013). Alcohol increases hypnotic susceptibility. *Consciousness and Cognition*, *22* (3), 1082–1091.
- Shankman, R. (2008). *The experience of Samadhi: an in-depth exploration of Buddhist meditation*. London: Shambhala.
- Sheehan, P. W., & McConkey, K. M. (1982). *Hypnosis and experience: the exploration of phenomena and processes*. Hillsdale, NJ: Erlbaum.
- Siderits, M. (2007). *Buddhism as philosophy: an introduction*. Surrey: Ashgate.
- Snyder, S., & Rassmusen, T. (2009). *Practicing the Jhanas: traditional concentration meditation*. Boston: Shambhala Publications.
- Spanos, N. (1986). Hypnotic behaviour: a social–psychological interpretation of amnesia, analgesia, and “trance logic.” *Behavioural and Brain Sciences*, *9*, 449–502.
- Spanos, N. P., Brett, P. J., Menary, E. P., & Cross, W. P. (1987). A measure of attitudes toward hypnosis: relationships with absorption and hypnotic suggestibility. *American Journal of Clinical Hypnosis*, *30*(2), 139–150.
- Spanos, N. P., Radtke, H. L., & Dubreuil, D. L. (1982). Episodic and semantic memory in post-hypnotic amnesia: a re-evaluation. *Journal of Personality and Social psychology*, *43*, 565–573.
- Tan, L. F., Dienes, Z., Jansari, A., & Goh, S. Y. (2014). Effect of mindfulness meditation on brain–computer interface performance. *Consciousness and Cognition*, *23*, 12–21.
- Tasso, A. F., & Perez, N. A. (2008). Parsing everyday suggestibility: what does it tell us about hypnosis? In M. Nash & A. Barnier (Eds.), *The Oxford handbook of hypnosis: theory, research, and practice* (pp. 283–310). Oxford: Oxford University Press.
- Teasdale, J. D., Moore, R. G., Hayhurst, H., Pope, M., Williams, S., & Segal, Z. V. (2002). Metacognitive awareness and prevention of relapse in depression: empirical evidence. *Journal of Consulting and Clinical Psychology*, *70*, 275–287.
- Terhune, D. B., & Brugger, P. (2011). Doing better by getting worse: posthypnotic amnesia improves random number generation. *PLoS ONE*, *6*(12), e29206. doi:10.1371/journal.pone.0029206
- Terhune, B., Cardena, E., & Lindgren, M. (2011). Dissociative tendencies and individual differences in high hypnotic suggestibility. *Cognitive Neuropsychiatry*, *16*, 113–135.
- Tobis, I., & Kihlstrom, J. F. (2010). Allocation of attentional resources in posthypnotic responding. *International Journal of Clinical and Experimental Hypnosis*, *58*, 367–382.

- Waszak, F., Cardoso-Leite, P., & Hughes, G. (2012). Action effect anticipation: neurophysiological basis and functional consequences. *Neuroscience and Biobehavioral Reviews*, **36**(2), 943–959.
- White, R. W. (1941). A preface to a theory of hypnotism. *Journal of Abnormal and Social Psychology*, **36**, 477–505.
- Williams, P. (2009). *Mahayana Buddhism: the doctrinal foundations* (2nd edn.). London: Routledge.
- Williams, P., & Tribe, A. (2000). *Buddhist thought: a complete introduction to the Indian tradition*. London: Routledge.
- Wilson, S. C., & Barber, T. X. (1982). The fantasy-prone personality: implications for understanding imagery, hypnosis, and parapsychological phenomena. In A. A. Sheik (Ed.), *Imagery: current research theory and application* (pp. 340–390). New York: Wiley.
- Woody, E., Z., & Sadler, P. (2008). Dissociation theories of hypnosis. In M. Nash & A. Barnier (Eds.), *The Oxford handbook of hypnosis: theory, research, and practice* (pp. 81–110). Oxford: Oxford University Press.
- Wyzenbeek, M., & Bryant, R. A. (2012). The cognitive demands of hypnotic response. *International Journal of Clinical and Experimental Hypnosis*, **60**, 67–80.
- Yapko, M. D. (2011). *Mindfulness and hypnosis: the power of suggestion to transform experience*. New York, NY: Norton.
- Yeshe, T. (1998). *The bliss of inner fire: heart practice of the six Yogas of Naropa*. Massachusetts: Wisdom Publications.

Appendix 1

Buddhist-friendly preamble

We will explore some exercises involving attention, concentration, how the skillful use of attention may be associated with a pliable mind. Scientific research supports the experience of meditators that learning the skillful use of attention makes a real difference to how the mind works. We are interested in how attention changes our experiences. For example, we are interested in how strongly attending to an idea, such as a movement, may make that movement automatically happen. Of course, if your sustained imagination makes your arm move, you could stop the movement anytime, if you wished, just by changing your attention and imagination. Your mind is pliable and responds to your thoughts, each state conditioned on the previous. But if you are willing to play the game, you could keep the movement happening, seemingly by itself, if you attend in the right way. Similarly, when we create an image in our imagination, and concentrate on it, we create a seed for the imagination becoming real. By imagining a feeling in a clear way, we can make the feeling actually happen. Imagining us being compassionate in all directions, helps make us compassionate. Tantric Buddhist practices make particular use of this principle; imagining the embodiment of an ideal in a sustained way, helps us achieve the ideal. We are interested in exploring this principle on a small scale, seeing how imagining, say, a feeling of heaviness could make your hand heavy.

Maybe, for example, you can imagine a subtle body within your own body, an inner body with many channels of energy flow of its own. We will try flowing some inner energy in your limbs and seeing its effect on the physical body.

What is the difference between imagination and reality? Is reality a dream? You may know the answer better than me! But our perception of reality is constructed, just as a dream is. In dream yoga, skilled adepts learn to control their dreams. Some people can produce a dream, any time of the day, just by intending it. I wonder if you can produce dream-like experiences by the way you attend and imagine.

We often impute a “self,” a thinker, a controller, an author of our mental states. Yet, in agreement with the arguments of Gotama 2500 years ago, who perhaps first proposed the thesis, there seems not to be a self to be found above and beyond our mental and physical constituents. Thus, while we may think “I intended my arm to move,” for example, this imputation is not necessary. Consider thinking about your arm moving, and then your arm moving. There is an idea of movement. Then there may be movement conditioned by the idea. But we need not think “I made my arm move.” In effect, one may be aware of an idea of one’s hand moving down, and aware of the arm thereby moving down, and thus aware of the arm moving without oneself having to intend it. Our behaviors happen because of mental states that condition them; a self is not needed. I wonder if you will notice this or not in the exercises that we will perform.

Do you have any questions? For any exercise you do not wish to perform, that is OK, just tell me. All exercises will involve clear awareness of your environment, should you wish that, and of your body and your mind, just as you wish. The exercises are about regulation of attention and imagination. We will now describe each one first before we actually try them. Let’s begin!

Induction

1. Now, please seat yourself comfortably and rest your hands in your lap. That’s right. Rest your hands in your lap. Now close your eyes and just focus on my voice. We will begin by being aware of our body, and making our attention pliable, flexible. You have shown your willingness by coming here today, and so I am assuming that your presence here means that you want to experience all that

you can. Pay close attention to my words, and let happen whatever you feel is going to take place. Just let yourself go. Pay close attention to what I tell you to think about; if your mind wanders, that will be okay; just bring your thoughts back to my words. Nothing will be done to embarrass you.

2. Now take it easy and just let yourself relax. Whatever you experience is all right. Just let yourself experience whatever happens and keep focusing on my words. You will find that you can relax, but at the same time sit up comfortably in your chair with little effort. You will be able to shift your position to make yourself comfortable as needed, without it disturbing you. Now starting with your right foot, be aware of your foot . . . the muscles of your right leg . . . now be aware of your left foot . . . the muscles of your left leg . . . be aware of your right hand . . . your right forearm . . . upper arm . . . and shoulder . . . that's right . . . now your left hand . . . and forearm . . . and upper arm . . . and shoulder . . . be aware of your chest . . . your neck . . . now scan your head from bottom to top . . .

All right then, now we will begin the exercises.

Hypnosis induction

1. Now, please seat yourself comfortably and rest your hands in your lap. That's right. Rest your hands in your lap. Now close your eyes and just focus on my voice. I am about to help you to relax, and meanwhile I will give you some instructions that will help you to gradually enter a state of hypnosis. You can become hypnotized if you are willing to do what I tell you to, and if you concentrate on what I say. You have already shown your willingness by coming here today, and so I am assuming that your presence here means that you want to experience all that you can. Pay close attention to my words, and let happen whatever you feel is going to take place. Just let yourself go. Pay close attention to what I tell you to think about; if your mind wanders, that will be okay; just bring your thoughts back to my words, and you can easily experience more of what it's like to be hypnotized.

Hypnosis is perfectly normal and natural, and follows from the conditions of attention and suggestion we are using together. It is chiefly a matter of focusing sharply on some particular thing. Sometimes you experience something very much like hypnosis when driving along a straight highway and you are oblivious to the landmarks along the road. What is important here today is your willingness to go along with the ideas I suggest and to let happen whatever is about to happen. Nothing will be done to embarrass you.

2. Now take it easy and just let yourself relax. Whatever you experience is all right. Just let yourself experience whatever happens and keep focusing on my words. You will find that you can relax completely, but at the same time sit up comfortably in your chair with little effort. You will be able to shift your position to make yourself comfortable as needed, without it disturbing you. For now, just relax more and more. As you think of relaxing, your muscles will actually begin to relax. Starting with your right foot, relax the muscles of your right leg . . . now the muscles of your left leg . . . just relax all over . . . relax your right hand . . . your forearm . . . upper arm . . . and shoulder . . . that's right . . . now your left hand . . . and forearm . . . and upper arm . . . and shoulder . . . relax your neck, and chest . . . more and more relaxed . . . completely relaxed . . . completely relaxed.

3. As you become relaxed, your body will feel deeply at ease . . . comfortably heavy. You will begin to have this pleasant feeling of heaviness and comfort in your legs and feet . . . in your hands and arms . . . throughout your body . . . as though you were settling deep into the chair. Your body feels comfortable and heavy . . . your eyelids feel heavy too, heavy and tired. You are beginning to feel very relaxed and comfortable. You are breathing freely and deeply, freely and deeply. You are becoming more and more deeply and comfortably relaxed.

4. You now feel very relaxed, but you are going to become even more relaxed. You feel pleasantly, deeply relaxed and very comfortable as you continue to hear my voice. Just let your thoughts dwell on what I'm saying. You are going to become even more relaxed and comfortable. Soon you will be deeply hypnotized, but you will have no trouble hearing me. You will remain deeply hypnotized until I tell you to awaken later on. Soon I shall begin to count from one to twenty. As I count, you will feel yourself going down further and further into a deeply relaxed, a deeply hypnotized state . . . but you will be able to do all sorts of things I ask you to do without waking up . . . one . . . you are going to become more deeply relaxed and hypnotized . . . two . . . down, down deeper, and deeper . . . three . . . four . . . more and more deeply hypnotized . . . five . . . six . . . seven . . . you are sinking deeper and deeper into hypnosis. Nothing will disturb you . . . just let your thoughts focus on my voice and those things I tell you to think of. You are finding it easy just to listen to the things I tell you. Eight . . . nine, ten . . . halfway there . . . always deeper . . . eleven . . . twelve . . . thirteen . . . fourteen . . . fifteen . . . although deeply hypnotized you can hear me clearly. You will always hear me distinctly, no matter how deeply hypnotized you become. Sixteen . . . seventeen . . . eighteen . . . deeply hypnotized. Nothing will disturb you. You are going to experience many things that I will tell you to experience . . . nineteen . . . twenty. Deeply hypnotized now! You will not wake up until I tell you to. You will wish to remain relaxed and hypnotized and to have the experiences I describe to you.

Even though you are deeply relaxed and hypnotized, I want you to realize that you will be able to write, to move, and even to open your eyes if I ask you to do so, and still remain just as hypnotized and comfortable as you are now. It will not disturb you at all to open your eyes, move about, and write things. You will remain hypnotized until I tell you otherwise. All right, then . . .

Chapter 7

Q. No.	Query
AQ1	Please check if heads have been set properly in this chapter.