Controlling phenomenology by being unaware of intentions

Zoltan Dienes, Peter Lush, & Bence Palfi

University of Sussex

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Abstract

This chapter reviews evidence that people have, to a varying degree, a trait ability to control phenomenology; that is, to construct subjective experiences according to situational requirements. The experiences can be subjectively compelling ones of involuntariness (for actually intentional movements); of perceptions (that grossly misrepresent reality); and of having beliefs (that in fact one only pretends to have, e.g. being of the opposite gender). Phenomenological control produces the neural and physiological processes that underlie having the subjective experiences. We argue that phenomenological control is best understood by distinguishing first order states from higher order thoughts; in particular, phenomenological control is produced by intentionally creating the required first order states while thinking one is not so intending. Phenomenological control can be used in any context where having a subjective experience would help convince yourself and others that you share group values. It can be used in a hypnotic context to create hypnotic responses. But it can also be used in the context of psychological experiments to construct the phenomena postulated by the researcher where those phenomena are suggested by demand characteristics.

According to higher order thought theory (Rosenthal, 1986, 2005), any mental state can be unconscious if one does not have a higher order thought about being in it. Thus, intentions can be unconscious when one is not aware of having them (Rosenthal, 2008). Indeed, an intentional action would appear as automatic or involuntary if one had the thought one did not intend it, even though one did intend it. In this way, a person could carry out strategic actions, consistent with their goals and plans, while experiencing the actions as happening by themselves, or as caused by other agents. Indeed, if it were consistent with one's goals and plans to experience an action as involuntary, the involuntary nature of the action can itself be strategically produced to fulfil the requirements of the situation, by strategically not having accurate higher order thoughts of intentions, but rather the thought that one did not intend the action.

It might sound strange to be strategically unaware of a mental state. But consider a person in a hypnotic context. They want to be a good hypnotic subject. The hypnotist tells them that their right arm will rise as if by itself. It is consistent with the goals and strivings of the subject to form the intention to lift their right arm in order to make it rise, which is part of what the hypnotist has requested (White, 1941). It is also part of the subject's goals to experience the arm rising as involuntary. If a person is not aware of their intention, and even on reflection thinks they did not intend the action, then they can sincerely report the action was not intentional. That is, what is important for what the person reports about the intention is not the first-order intention itself, but the content of thoughts about that intention (Rosenthal, 1986). Some people are better at this metacognitive trick than others. Some people cannot help but have relatively accurate higher order thoughts of intending when requested to reflect on whether they are intending; but, taking response to motor suggestions to hypnosis as a measure, most people can play this trick on themselves to some extent (Hilgard, 1965). That is, most people can intentionally perform an action, while having the thought they did not intend it.

Dienes and Perner (2007) presented this account as a theory of hypnotic response: A person can respond to a hypnotic suggestion by intentionally producing the motor or cognitive action required, while avoiding accurate higher order thoughts of intending it; indeed, thinking they did not intend the action. As the theory postulates executive control without accurate HOTs (higher order thoughts) of intending, they called the theory cold control theory. It postulates that the difference between a normal action and a hypnotic action is purely metacognitive, that is, at the second order or higher level and not at the first order level. The theory identifies a common mechanism postulated by some key earlier theories of hypnosis (Hilgard, 1977; Spanos, 1986), while being inconsistent with other theories of hypnosis (Woody & Bowers, 1994; Kirsch, 1985). It is thus not the only theory of hypnotic response, but it is a simple one (see later for evidence; also for reviews Dienes, 2012; Dienes, Lush, Palfi, et al., 2020; Dienes, Lush, Semmens-Wheeler, et al., 2016).

When one intends to perform a motor action, but thinks one is not intending, there is an illusion of involuntariness (cf Polito, Barnier, & Woody, 2013). When one perceptually imagines an object, but believes one is not intending to imagine, the perceptual representation may be experienced as a genuine perception (Frith, 1992). When one engages in pretend play, but does not think one is intending to pretend, the pretend beliefs can present as delusions (e.g. of being the opposite gender, Noble & McConkey, 1995). When one attends away from memory cues, or from pain cues, but is unaware of the intention to direct attention, one may experience automatic memory loss or pain relief (Spanos, 1986). In this way, one can manipulate one's subjective experience to fit situational requirements.

When one engages in these actions, and the corresponding metacognitive trick, in a hypnotic context, such cold control produces a hypnotic response. But there is no need for cold control to

restrict itself to hypnotic contexts. More broadly, the ability to control one's subjective experience in order to fit situational demands, in any context, we call phenomenological control (Dienes et al., 2020). One theory of phenomenological control is cold control, but one need not accept specifically cold control theory to see the importance of phenomenological control. We will now review evidence that a) people can create genuine changes in subjective awareness to fit task requirements; b) that a good theory of such phenomenological control is cold control; and c) people use their phenomenological control abilities in many contexts, including those of psychological experiments - thereby manufacturing the experiences the demand characteristics call for, convincing both participants and experimenters that there is more going on than just demand characteristics.

Phenomenological control

Hypnotic effects can be so striking or odd, one reaction is to regard them as faked. Indeed, such a hypothesis is sufficiently straight forward, it should be dealt with first before any other theories of hypnosis are considered. The point is whether or not claims of changes in subjective experience are sincerely believed. There may be contexts where faking is common, for example in TV hypnosis, where potential participants on a TV show may realize the more they ham it up, the more likely it is that they get selected to appear before millions. The academic and clinical context is different however (even non-televised stage hypnosis may be rather different from the televised case; Crawford, Kitner-Triolo, Clarke, & Olesko, 1992). If one is undergoing major orthodontic surgery using hypnosis as anesthetic, is there a pay-off to playing a joke on the poor doctor by pretending you don't feel any pain (cf. Esdaile, 1847)? Nonetheless, there are plenty of contexts where the demands may push in favour of faking (Wagstaff, 1981), so we need to consider the evidence.

Orne (1959) introduced the "real simulator design" which contrasts real subjects (those selected to be high on ability to respond hypnotically) and simulators (those selected to be low on ability to respond hypnotically). The subjects are recruited by one experimenter, who instructs the simulators to try to fool the hypnotist that they are in fact good hypnotic subjects. The second experimenter, the hypnotist, does not know who are reals and who are simulators. The behavior of nominally real subjects can then be compared to those we know are faking. Kinnunen, Zamansky, & Block (1994) used the real-simulator design and the fact that typically on average people give higher Skin Conductance Responses (SCRs) when lying rather than telling the truth (see also Kinnunen, Zamansky, & Nordstrom, 1998). After responding to a series of hypnotic suggestions, subjects were asked for each suggestion about the genuineness of their experience (e.g. "were you really unable to bend your arm?"). They found that 89% of responses for reals, but only 35% of responses for simulators, met the SCR criterion for truthfulness. (These are not the percentages of those telling the truth; SCR does not allow that degree of precision. The important point is rather there is a very large difference in the SCR between reals and simulators.)

Kirsch, Silva, Carone et al. (1989) introduced the surreptitious observation design (see also Perugini Kirsch, Allen, et al., 1998; Spanos, Burgess, Roncon, et al., 1993). Subjects were played a tape of hypnotic suggestions while being watched by an experimenter or else "alone". Subjects were told that the aim of the study was to determine whether people were more or less responsive when alone rather than in the presence of others. When subjects were alone, they were of course being surreptitiously observed. Did subjects realize this? The behavior of simulators was used to determine whether different demands were created in the two situations. Simulators passed 8.7 suggestions out of 10 when with the experimenter; and only 2.7 when alone. Even this 2.7 is really an overestimate; the simulators performed the suggestions half-heartedly, and often engaged in

suggestion inappropriate behavior, such as flipping through magazines or playing with their hair. That is, the demands were indeed very different when alone compared to when the experimenter was present. The real subjects passed 9.8 suggestions with the experimenter present - and 9.6 when alone, and engaged in no inappropriate behavior. Despite there being apparently no one to fool, highly hypnotizable subjects still gave a convincing performance.

Ward, Oakley, Frackowiak, and Halligan (2003) hypnotically suggested paralysis in an arm or asked the same subjects to fake paralysis. When asked to attempt to move, PET brain scan showed for the faking in contrast to the hypnotic condition there was more activation in the left ventrolateral prefrontal cortex, an area related to deception (Spence, Kaylor-Hughes, Farrow, & Wilkinson, 2008). In the hypnotic rather than faking condition there was more activation in movement related areas such as the cerebellum.

Another tack that appears relevant, but doesn't directly answer the question of whether claimed experience is genuine, is to pressure subjects to resist suggestions. Coe (1996) reviewed work on breaching hypnotic amnesia; for example, urging subjects to be honest; using the "bogus pipeline" (including sometimes telling subjects the lie detector says they are lying, so they must be able to remember really); or playing back a video of the forgotten material. Any one breaching method worked to some extent, with increasing pressure by combining methods eventually leading to complete breaching, that is, subjects recalling the events they were told they could not remember. The flip side is that subjects will continue to respond to suggestions even in the presence of reasonable pressure to resist (e.g. Connors, Barnier, Coltheart, et al., 2012; Levitt, Baker & Fish, 1990; Noble & McConkey, 1995). Levitt et al. (1990) found that 50% of highs did not resist a suggestion when informed they would receive \$100 if they did resist. In all these cases, the subject's task is to determine what the experimenter actually wants, as the subjects will try to produce the experiences that satisfy the situational demands. When the demands are ambiguous, naturally the experiences produced by subjects can be variable, even given they are genuine. In support of the relevance of demand characteristics, Lynn, Nash, Rhue et al. (1984) found that subjects whom had been previously told that good subjects can resist hypnotic suggestions, could resist them when subsequently asked; and those previously told that good hypnotic subjects could not resist them, did not resist them then subsequently asked. Both groups reported high involuntariness (though it was higher in the group who believed they could not resist). That is, the extent to which subjects construct experiences depends on the extent to which the subject believes that they are expected, and that the self-deception they practice to produce the experiences is appropriate.

These studies show that subjects are typically genuine in their claims about their hypnotic experiences in an academic context (while showing those experiences are also responsive to demand characteristics, and hence constructed according to the subjects' requirements). Another line of evidence relevant to showing hypnotic experience is genuine concerns whether there are the first order representations that one would expect when subjects claim to have certain experiences. This is a different sort of evidence than showing people are sincere in their claims of what they experience, as the absence of first order representations is consistent with the presence of relevant second order thoughts (Lau & Brown, 2019). Nonetheless, the presence of first order representations supports claims of the corresponding experiences – and theoretically shows that the experiences are not created by simply having the second order thoughts without the first order states. Thus, the presence of first order states also happens to support cold control theory, given its claim that people intentionally create the first order states.

Derbyshire, Whalley, and Oakley (2009) asked fibromyalgia patients to decrease or increase pain after a hypnotic induction. Subjective reports of pain correlated with activation in the "pain matrix"

as shown by fMRI (though a clear relation between suggested pain report and the pain matrix may be specific to people who suffer chronic pain, see Derbyshire, Whalley, Seah, & Oakley, 2017). In terms of somato-sensory evoked potentials, the P200 may be a marker of pain sensations; De Pascalis, Decace, and Massicotte (2008) found hypnotic analgesia reduced the P200 (and N140) in highly hypnotizable subjects.

Kosslyn, Thompson, Costantini-Ferrando, et al. (2000) asked subjects after a hypnotic induction to add colour to a greyscale image, or to drain colour from a coloured image. Subjectively the colour changes were reported to occur; correspondingly, PET showed changes in the left and right fusiform (i.e. colour areas) (see also McGeown, Venneri, Kirsch, et al., 2012, with fMRI). Similarly, perceptual evoked potentials are reduced in highly hypnotizable subjects obstructing the stimulus with a hypnotic hallucination (for a review of different components and modalities, see Spiegel, 2003).

Hypnotic experiences can be so compelling, participants often express surprise about them (Heap, Alden, Brown, et al., 2001). It might be thought that compelling changes in subjective experience according to goals requires a hypnotic induction. Surely, unusual phenomena require unusual causes. A number of studies have compared response to suggestions after a hypnotic induction and those same suggestions given with no induction. In reviewing key studies, Martin and Dienes (2019) found an average increase in number of suggestions successfully passed of 1.46 out of 10. An induction increases performance from about four suggestions passed out of ten to about five (but see later where there is better performance without rather than with an induction). This small increase is accompanied by an equivalent increase in subjects' expectancy that they will respond after an induction rather than without (Braffman & Kirsch, 1999).

In general, any suggestion that can be passed after an induction can be passed without an induction. For example, in the Derbyshire et al (2009) study, subjects were also asked to increase and decrease pain without a hypnotic induction. Subjects could dramatically control pain with or without an induction, with only a small advantage in the latter case. Hypnotic analgesic suggestions can produce large reductions in pain, but comparable reductions can be achieved by psychological methods outside the hypnotic context (e.g. Stoelb, Molton, Mark et al., 2009, for a review). Following up Kosslyn et al. (2000), Kirsch, Roberts, Mazzoni et al. (2008) found that after an induction highly hypnotizable subjects could make a grey scale appear 70% coloured, and conversely drain the colour from a coloured image to make it appear only about 35% coloured. The corresponding percentages for those who did not have an induction were 60% and 30%, just as impressive - and those subjects rated themselves as not being hypnotized (see also Mazzoni, Rotriquenz, Carvalho, et al., 2009). Subjects given the posthypnotic suggestion that words on the screen are written in a meaningless foreign script can halve Stroop interference (Parris, Dienes, & Hodgson, 2013; Raz, Shapiro, Fan & Posner, 2002); but the same suggestion without a hypnotic induction about halves Stroop interference as well (Raz, Kirsch, Pollard, & Nitkin-Kaner, 2006; see also Parris & Dienes, 2013). In fact, the only effect that appears to show an induction to be particularly important is a suggestion for mirror identification delusion ("when you look in the mirror you will see a stranger"), which 70% of highs passed after induction but only 22% with no induction (Connors et al, 2012); it would be useful to explore if that difference follows demand characteristics (for related effects with no induction, see Caputo, 2010, 2011; Fonseca-Pedrero, Badoud, Antico, et al 2015).

As we have reviewed, when people exert phenomenological control they create not only the required subjective experiences, but also the neural processes that underlie those experiences (e.g. De Pascalis et al, 2008; Derbyshire et al, 2009; McGeown et al 2012; Spiegel, 2003), as well as other physiological changes. For example, Damaser, Shor, and Orne (1963) found hypnotically inducing different emotions led to different heart rates and galvanic skin potentials. Barber and Coules (1959)

gave a posthypnotic suggestion that the posthypnotic cue, an action by the experimenter, would cause the subjects' head to itch. The sight of the cue triggered a galvanic skin response. That is, when people respond to demand characteristics with phenomenological control, one can expect neural and physiological measures to respond likewise.

The ability to engage in phenomenological control can be measured by scales of hypnotic response (Acunzo & Terhune, 2019; Lush, Moga, McLatchie, & Dienes, 2018; Oakley, Walsh, Lillelokken, et al., 2020). Because people often share various cultural myths about hypnosis, for example that it is related to sleep, or that a trance state is necessary for response, or that response may reflect weakness of will, we decided to strip the hypnotic context from the measurement of phenomenological control (Lush et al., in preparation). Subjects were randomly assigned to either a hypnotic context, where they were given a standard hypnotic induction and the suggestions were defined as hypnotic; or else the same suggestions were given as exercises in the use of imagination to create certain experiences, with a short preamble telling subjects that the aim was to see how much they could control the way they experience some simple events. The average subjective experience on a 0 (no experience) to 5 (an experience as compelling as the corresponding real event happening) was 1.5 for hypnotic suggestions (N = 246) and a higher 1.9 (N = 249) for the imaginative exercises (the phenomenological control scale). We phrased the imaginative exercises as an ability (rather than a response to suggestion), and this may have stopped some subjects who had a negative attitude to hypnosis from reacting against the notion of being "suggestible" and instead allowed them to construct the required experiences. Indeed, on the phenomenological control scale the tail of lows who respond barely at all was removed, making the distribution more normal than the corresponding standard hypnosis scale.

Cold control

Given a trait of phenomenological control, there is the problem of explaining how people can control their subjective experiences. According to cold control theory, the person intentionally performs a cognitive or motor action, thereby creating any required first order representations, while thinking, even on sustained reflection, that they are not so intending (Dienes, 2012; Dienes & Perner, 2007). Opposing theories deny that subjects intentionally perform the actions or intentionally create the requisite first order representations. What sort of intention could one deny a person having when they perform a motor or cognitive action? Cold control theory postulates the intentions are those formed in the executive system, and thus are those controlling representations that can overcome habit or organize novel behavior (Norman & Shallice, 1986). Thus, one line of attack is to say the executive frontal system is not involved in hypnotic response; instead the suggestion directly triggers automatic processes (Woody & Bowers, 1994, dissociated control theory). The problem with this approach is that hypnotic response can overcome strong habits, can inhibit strong pre-potent responses, and can involve novel and creative behavior, all hallmarks of the executive system (Dienes & Perner, 2007).

Another idea is that hypnotic response is like the placebo effect; expectations directly create the required experiences and behaviors (Kirsch, 1985, response expectancy theory). Thus, the intention to create the required first order representation is not needed; it is created by expectancy. This idea corresponds to the simplest way predictive processing theory (Clark, 2016) might explain phenomenological control: Give more weight to top down priors (see Martin & Pacherie, 2019, for a different elegant application of predictive processing to hypnosis). In favour of response expectancy theory, the best predictor of hypnotic response is the expectancy that one will respond (Braffman &

Kirsch, 1999). However, it is doubtful that expectancy alone can create the precise yet compelling experiences that arise in hypnosis: consider how you can see that your keys are not on the table no matter how strongly you expected them to be there, under clear and sustained viewing conditions (see Dienes & Perner, 2007). Further, secondary tasks interfere with hypnotic responses (a little less for challenge suggestions, including rigid arm, amnesia or analgesia, where attention redeployed to the secondary task can in itself aid achieving the suggested effect), implying hypnotic responses are active processes (e.g. Kirsch, Burgess, & Braffman, 1999). The placebo effect for pain on the other hand is independent of secondary tasks, with Bayesian evidence for no interaction (Buhle, Stevens, Friedman, & Wager, 2012). (Some apparent placebo effects may be based on phenomenological control, however; consider Olson, Suissa-Rochelleau, Lifshitz et al., 2020.)

Because cold control theory claims that the difference between hypnotic and normal action is all at the level of higher order thoughts, the first order states underlying behaviour would typically have the same causal powers whether the response was hypnotically suggested or simply requested (cf Rosenthal, 2008). This is a key prediction, and would contradict any theory claiming that one gains extra abilities hypnotically, that is, when using phenomenological control, compared with normal voluntary action (e.g. Hilgard, 1977). Palfi, Parris, McLatchie, et al. (2018, forthcoming) in a Registered Report used an effect that is on the face of it challenging to cold control theory: The fact that subjects can dramatically reduce Stroop interference when given the posthypnotic suggestion that the words on the screen will be written in a meaningless foreign script (Raz et al., 2004). Does this word blindness effect indicate a special power only available when people use phenomenological control? Palfi et al. contrasted the posthypnotic word blindness suggestion with a simple request: Subjects were asked to voluntarily imagine the irrelevant words as words of a foreign language. Crucially, subjects rated their experience as more involuntary in the suggestion condition than the request condition, and that their experience of meaninglessness felt more like perception in the suggestion condition and more like imagination in the request condition. That is, we had set up conditions where phenomenological control was being exerted in the suggestion condition but not in the request condition. Further, instructions were phrased sufficiently compellingly in both conditions that the expectancy that subjects would be able to name the colour word easily were equivalent between the suggestion and the request conditions, and both higher than the control condition. According to cold control theory, the imagination in the request condition should be able to reduce Stroop interference just as much as the posthypnotic suggestion. Stroop interference was 100ms in the control condition; this reduced by 28 ms by the posthypnotic suggestion, replicating the standard word blindness effect. Importantly, the request reduced interference by 32 ms, with Bayesian evidence of no difference from the effect produced by the posthypnotic suggestion. That is, our results support the prediction of cold control that phenomenological control does not grant one more first order abilities. (One reviewer at Stage 1, i.e. when the rationale and method of a Registered Report is submitted before data are collected, doubted the point of doing the experiment because they felt it obvious cold control would fail the test! According to Popper, 1963, that makes the test a severe one.) Imagining a counterfactual world in which one cannot read may in itself reset control parameters so that read words interfere less, whether or not one is aware of the intention to imagine (Palfi, Parris, & Dienes, 2019; cf. also the dyslexia priming effect of Augustinova & Ferrand, 2014). We also conclude that unconscious intentions can be just as effective as conscious ones (Rosenthal, 2008).

Armed with phenomenological control, people can manufacture phenomena. Imagine living in a society where doing well in the group depends on buying into the theory the group has about the spirit world. The group's theory predicts phenomena: Spirit possession, for example. Using phenomenological control, one can become possessed by great spirits, convincing both yourself and others of their reality (cf. Deeley, Oakley, Walsh et al., 2014). Maybe this is the reason phenomenological control evolved, if it did evolve (Dienes & Perner, 2007). The function of phenomenological control may be to deceive yourself in order to convince others about the reality of a phenomenon, as revealed by subjective experience. Phenomenological control may be useful in any situation where being part of a group may be enhanced by having certain subjective experiences. Using phenomenological control one can have out-of-body experiences (they can be hypnotically suggested, Casiglia, Al Khafaji et al., 2019; Terhune & Cardeña, 2009), or reduced feelings of ownership both of the movements of a hand (because it is controlled by someone else, according to hypnotic suggestion) and of the content of what the hand automatically writes (Walsh, Mehta, Oakley et al., 2015). These and other experiences may be useful in spiritual contexts. A martial arts student can also feel the ki (energy) of his master, making the student break fall, become paralyzed, unable to breathe, or knocked out at a distance, convincing both student and master of the power of the master's ki (e.g. Dillman, 2020; Ki Master, 2020; Yamaue, 2020a,b¹).

One social situation people occasionally find themselves in is the psychologists' experiment. The demand characteristics may suggest certain experiences. A participant may construct those experiences (Orne, 1962, 1969). Both participant and experimenter may then be convinced of the reality of the experiences, and hence of the phenomena postulated by the experimenter. Phenomenological control has then performed its function. The experimenter may believe that because the experiences were genuine, and measurements of underlying neural and physiological processes back that up, that therefore demand characteristics could not be at play (after all, demand characteristics would only produce "response bias"). But the experimenter may have seen only their own ideas reflected back from the minds of undergraduate subjects trying to second guess the experimenter – even if the ideas tested were false.

Researchers may have taken demand characteristics too lightly not only because of not taking phenomenological control into account, but also because of using methods ill-suited to dealing with the problem. A frequently used method is the post-experimental inquiry; if the subject when asked about the purpose of the experiment just completed does not state the experimenter's theory, then the matter may be considered closed. However, Orne (1962,1969) pointed out that part of the demand characteristics can be to not know about the demand characteristics. Maybe pointing out that the experimenter's cover task was tissue thin is awkward. If told that a group of pedophiles liked picture A more than B, the subject may realize that the experimenter does not really have a cage of pedophiles out back; rather it is simply that the subject is expected to like picture B more than A.

Orne (1962, 1969) recommended as one approach to demand characteristics the "non-experiment": Describe to a group of subjects what happens in the experiment from a subject's point of view, and ask how they expect subjects should respond. Lush (2020) used this approach for the rubber hand illusion. For this illusion, the subject's hidden hand is stroked at the same time as a rubber hand that is in view. The subject comes to feel touch on the rubber hand, ownership of the rubber hand and to feel their own hand has moved towards the rubber hand (proprioceptive drift) (Riemer, Trojan,

¹ One of us (ZD) trained with Yamaue for a week at a retreat in Norway in 2002. When he asked Yamaue how he explains the people who do not respond to his ki manipulation, Yamaue said "they have bad ki."

Beauchamp, & Fuchs, 2019). Researchers have attempted to address demand characteristics by comparing response to statements that genuinely reflect the illusion, such as “I felt as if the rubber hand were my hand,” with control statements that do not reflect the illusion such as “It felt as if my (real) hand were turning “rubbery”.” Researchers had found that subjects endorse illusion statements more than control statements, and endorse illusion statements more when their hand and the rubber hand are stroked synchronously rather than asynchronously (e.g., Kalckert & Ehrsson, 2012). Does that mean demand characteristics have been ruled out as an explanation? Lush performed a non-experiment, describing the procedure to subjects and asked them how they expected subjects to respond: Subjects thought they were expected to respond more for synchronous than asynchronous stroking and more for illusion statements than control statements. In other words, far from controlling demand characteristics, the distinction between synchronous and asynchronous stroking and between control and illusion statements is apparent to subjects, and subjects in fact fulfill the demand characteristics of the procedure by responding differentially to the different types of stroking and statements. We are also running a non-experiment to determine expectancies for proprioceptive drift - and indeed already in the data collected thus far subjects believe there is expected to be a difference in proprioceptive drift between synchronous and asynchronous conditions, which also mimics that of drift in the illusion (Lush et al, in prep).

Do subjects use phenomenological control to produce the rubber hand illusion? Lush, Botan, Scott, et al. (in press) tested 353 participants on hypnotic response (where each suggestion was rated on a 0, no experience, to 5 scale, experience as compelling as the corresponding real event) and on the rubber hand illusion. Subjects expected to respond more in the synchronous than asynchronous condition, and expectancies predicted experience of the rubber hand illusion. For the crucial synchronous condition, each unit increase in hypnotic response was associated with a 0.3 unit increase in subjective response on the illusion statements (on a -3, completely disagree, to +3, completely agree, scale); mean score +1.3. The degree of proprioceptive drift increase by 0.6 cm for each unit increase in hypnotic response (and the mean amount of drift was 1.1 cm). This is consistent with phenomenological control making a substantial contribution to the experience of the illusion. Might phenomenological control be the only mechanism? One can investigate this by estimating the extent of the illusion in people low in phenomenological control. For the proprioceptive drift measure which has a true zero, people low in hypnotic response (bottom 10%) reported their arm was 0.4 cm (SE = 0.5) in the wrong direction (i.e. away from the rubber hand), which provides Bayesian evidence for no effect¹. Thus, as measured by drift, there is no effect left requiring an explanation beyond phenomenological control. If we take the difference between synchronous and asynchronous response to get a true zero point for the subjective ratings, there remains an effect for lows (Lush et al, in press). Residual effects can be due to demand characteristics reflected as compliance rather than phenomenological control – or something else entirely, such as multimodal integration. That as yet remains unresolved (though see Roseboom & Lush, 2020). Similar relationships exist between hypnotizability and mirror synaesthesia (Lush et al, in press).

A context in which people may feel they are expected to have certain experiences is meditation. While there is a small negative relation between phenomenological control and mindfulness (Dienes et al. 2016), that relation is sufficiently small for it to be possible for meditators to use phenomenological control. In concentration meditation, an object of meditation is focused on for prolonged periods of time. A fraction of people after intense and extensive practice may enter a series of specific states, the jhanas, which occur in a sequence with defined phenomenological contents (Hagerty, Isaacs, Brasington et al., 2013; Snyder & Rassmusen, 2009), though what fraction

of people under what conditions can enter jhana has not been properly estimated. We wondered if we could hypnotically suggest the sequence of four jhana states in first year undergraduates with no experience of meditation. Robert Avery found with highly hypnotizable subjects, about 20% subjectively reported the states we had suggested (Dienes & Avery, in preparation). Was it real jhana they experienced? We do not claim to answer that, but we do raise an epistemological issue for Buddhists: How could one tell the difference between the subjectively compelling jhana-like states produced by phenomenological control and those produced otherwise? And does it matter?

As we go through life, situations may require certain experiences that would convince both ourselves and others that we share group values: Happiness or sadness at certain events (widget sales up, the passing of our great leader); the smell of out-group members; the sight of the multitude who attended; the empathic pain we feel because of the pain of others; selective amnesia for events; the sight and memory of the foul committed by the opposing team; the descent of the holy ghost; the power of our master. Sometimes phenomenological control may contribute to having those experiences. The world we live in is indeed a controlled hallucination in more ways than one.

Conclusion

Rosenthal's (2005) higher order thought theory has suggested to us a principle by which people may control their subjective experiences: By intentionally generating first order representations and having inaccurate higher order thoughts about those intentions, one can experience the first order representations as unconstructed. We argue such cold control allows, in some people more than others, a trait ability of phenomenological control. Phenomenological control expresses itself in any context where the having of an experience facilitates group status (or facilitates addressing one's own needs arising from internalizing those social values). One can produce the experiences required in a hypnotic context (including the experience of trance suggested by a hypnotic induction). One can also produce the experiences asked for by psychologists in experiments, such as a rubber hand being one's own. The fact that people may use phenomenological control may mean researchers have dismissed demand characteristics too quickly, and various phenomena in psychology may need reconsidering.

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ⁱ Boton, Fan, Critchley, and Ward (2018) found an average overall drift of 1.5cm for their control subjects in the synchronous condition; this informed us how big an effect we could expect. For the bottom 10% of hypnotic responders, the drift was -0.4cm, SE = 0.5cm, $B_{H(0,1.5cm)} = 0.19$, which is evidence for no effect.