
Just in Time—Dreamless Sleep Experience as Pure Subjective Temporality

A Commentary on Evan Thompson

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In this commentary, I propose a strategy for extending Evan Thompson's argument on the existence of dreamless sleep experience. My first aim is to show that the Indian debate on reports of having slept peacefully is importantly similar to debates in scientific dream research and contemporary Western philosophy on the trustworthiness of dream reports. This analogy leads to a surprising conclusion: the default view of conscious experience as that which disappears in dreamless sleep, though widely accepted in cognitive neuroscience, is in fact inconsistent with the methodological background assumptions of scientific dream research. Importantly, the methods already used in scientific dream research, as well as the theoretical justification on which they are based, can be extended to the investigation of dreamless sleep experience. Second, I sketch the outlines of a conceptual model of dreamless sleep experience as involving pure subjective temporality, or phenomenal experience characterized only by the phenomenal *now* and the sense of duration, but devoid of any further intentional content. I suggest that understood in this manner, dreamless sleep experience is a candidate for minimal phenomenal experience, or the simplest form in which a state can be phenomenally conscious. This model also extends existing work on minimal phenomenal selfhood in dreams. Third, I discuss three empirical examples that I take to be particularly promising candidates of dreamless sleep experience. These are certain forms of minimal or imageless lucid dreams, white dreams, and sleep-state misperception of the type most dramatically seen in subjective insomnia.

Keywords

Dreaming | Dreamless sleep | First-person reports | Insomnia | Lucidity | Minimal phenomenal experience | Minimal phenomenal selfhood | Sleep-state misperception | Time consciousness | White dreams

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1 Introduction

The default view in philosophy of mind and cognitive neuroscience has long been that the very notion of phenomenal experience occurring during dreamless sleep is nonsensical and involves a conceptual contradiction.¹ In this view, consciousness is „that which disappears in dreamless sleep and reappears when we wake up or dream” (Thompson 2015, this collection, p. 1), and dreamless sleep is simply characterized by the absence of conscious experience.² In his target article, Evan Thompson casts doubt on this view. Drawing from classical Indian philosophy as well as evidence from sleep and dream research, he argues that dreamless sleep experience is a theoretically coherent and empirically tractable target for future research. Yet, in order to even begin to make sense of dreamless sleep experience, a more fine-grained taxonomy

of sleep states and new experimental protocols integrating disciplined first-person reports as well as neuroscientific methods are needed.

Here, I take up this challenge and attempt to sketch the outlines of a positive account of dreamless sleep experience. This commentary has three main aims. The first is to propose that Thompson’s case for dreamless sleep experience can be strengthened by constructing a rough analogy between the historical Indian debate on dreamless sleep and contemporary Western debates from scientific dream research and philosophy on the epistemic status of dream reports. Based on this analogy, I argue that the default view is inconsistent with the methodological background assumptions of scientific sleep and dream research. This internal inconsistency lends additional urgency to Thompson’s demand for a more fine-grained taxonomy of sleep states. I then use the Indian debate as a foil to sketch the outlines of an integrated theoretical position on the trustworthiness of first-person reports of dreams and dreamless sleep experience. I take this approach to be in the spirit of the type of cross-cultural approach recommended by Thompson and hope to show that valuable lessons can be learned on both sides.

My second aim is to sketch the outlines of a positive account of dreamless sleep experience. Here, my key claim is that dreamless sleep experience can be described as pure temporal experience. By this I mean phenomenal states that aside from their temporal structure are devoid of any further intentional content and characterized only by the subjective experience of time. Pure temporal experience (or pure subjective temporality, as I will also sometimes call it) is not structured around perceptual objects, events or emotions; it is the experience of being *just in time*.³ This account of dreamless sleep

1 In some readings of the term dreamless sleep, the default view is not just obviously false, but it is also unclear that it is actually endorsed by many researchers working on dreaming and sleep. Most would acknowledge, for instance, that hypnagogic imagery during sleep onset or repetitive and non-progressive types of sleep thinking involve phenomenal experience during sleep; yet, because they are also commonly distinguished from full-fledged dreaming, they can be said to occur in dreamless sleep. This, however, is different from the type of dreamless sleep experience that Evan Thompson has in mind and that is the focus of this commentary. As will become clear later, in the narrower reading endorsed by Thompson, dreamless sleep “is that sleep state in which there are no sensory or mental objects of awareness, that is, no images and no thoughts” (p. 14); the question, denied by the default view, is whether this state of sleep can sometimes involve phenomenal experience. Dreamless sleep experience of this type, if it exists, is also distinct from experiences occurring during sleep-wake transitions in that it is thought to occur during deep sleep. In the context of this commentary, I will always, unless explicitly noted otherwise, use the term dreamless sleep experience in this narrow sense. In other readings, the default view may be thought to be trivially true: if one defines dreams as involving *any* kind of phenomenal experience during sleep (Flanagan 2001), then the occurrence of phenomenal experience during dreamless sleep is indeed ruled out by conceptual considerations. This reading, however, is too permissive in that it fails to acknowledge the distinction between different types of experiences occurring during sleep, ranging from imagistic, narratively complex, and often emotional dreams to thought-like activity. For now, this suggests that the default view is too simple: the question is not whether there are experiences during sleep that fall short of full-fledged dreaming in some particular sense but whether there is a further group of experiences—call them dreamless sleep experience in the narrow sense—that is distinct from *any* of the established forms of conscious experience during sleep, including hypnagogic imagery and sleep-thinking. Thompson acknowledges this issue (p. 14) and I only emphasize it here to avoid misunderstanding.

2 Note that throughout this commentary, I will use the terms “experience”, “subjective experience”, and “consciousness” interchangeably to describe states that have phenomenal character, or for which there is something it is like to have them.

3 At first sight, there is an inherent ambiguity in the concept of pure subjective temporality in that it can refer to the experiential character of *nowness*, but also to the experience of duration and of succession. In section 4, it will become clear that in the account defended here, the two aspects of *nowness* and duration are not strictly dissociable: the simplest forms of temporal experience are characterized by both a phenomenal *now* and the experience of duration, because

experience is attractive, or so I claim, because it offers a way of spelling out not just what is distinctive about dreamless sleep experience, but also how dreamless sleep experience can be integrated into a broader theoretical framework describing different kinds of sleep experiences, including dreams. The key idea is that while even the simplest forms of dreaming are characterized by phenomenal selfhood, or the experience of being or having a self, the transition from dreaming to dreamless sleep experience occurs when even this minimal form of phenomenal selfhood is lost. While the analysis of dreaming can help identify the conditions for minimal phenomenal selfhood, the analysis of dreamless sleep experience may provide a glimpse of an even simpler (and perhaps even minimal) form of phenomenal experience. In the final part of the commentary, I identify what I take to be the three most promising candidates for a future research program on dreamless sleep experience. These are lucid dreamless sleep, white dreams, and sleep-state misperception of the type most commonly seen in subjective insomnia. These examples broaden the scope of the target phenomenon by suggesting that the theoretical and experimental investigation of dreamless sleep experience extends beyond the case of expert meditators discussed by Thompson.

2 From the classical Indian debate to a new taxonomy of experience during dreamless sleep

In *Dreamless Sleep, the Embodied Mind, and Consciousness*, Evan Thompson retraces the steps of the classical Indian debate between the Advaitins and the Nyāyīyikas on the occurrence of conscious experience during dreamless sleep (see also Thompson 2014, chap. 8). The classical Indian debate is important, according to Thompson, because if the Advaita Vedānta

and Yoga claims about the persistence of consciousness during dreamless sleep are correct, the default view of consciousness as that which disappears during dreamless sleep is false and requires revision. In this section, I briefly reconstruct Thompson's main arguments and sharpen the precise points of agreement and disagreement in the classical Indian debate, as well as their overlap with questions raised in cognitive science and contemporary philosophy of mind. I also introduce three challenges to Thompson's view.

Thompson's reconstruction of the classical Indian debate starts out from a deceptively simple question: How, after awakening from sleep, do we know that we have slept peacefully? The Yoga and Advaita Vedānta schools argue that retrospective reports of having slept peacefully are memory reports: we directly and non-inferentially remember (and hence are able to report) a state in which we were phenomenally conscious, but did not experience any particular thoughts or images. Dreamless sleep experience is, in this view, devoid of intentional content; it is a state of knowing nothing and at least in principle, it can be remembered and accurately reported upon awakening. The Nyāyas disagree, arguing that reports of having slept peacefully are inferential. Their point is that if dreamless sleep involves a particular form of ignorance, or of not-knowing, this not-knowing cannot itself be known, either during sleep or retrospectively. Because the means for knowledge are lacking during dreamless sleep, we can at best infer, when we wake up feeling refreshed and remember nothing, that we must have slept peacefully.

As Thompson (sec. 3) points out, the classical debate about conscious experience during dreamless sleep has to be seen in the larger context of how these schools construe the relationship between consciousness and the self. For the Nyāyas, consciousness is an adventitious property of the self, meaning that the self can persist throughout sleep even when consciousness ceases. They also claim that cognition always involves taking something as its object, where this object is necessarily distinct from the cognitive state itself. This view is compatible with

the phenomenal *now* itself is temporally stretched. Though for reasons of space, I cannot discuss this any further here, note that once the distinction between the phenomenal *now* and the experience of duration collapses, the experience of seriality or of succession disappears as well: if the phenomenal *now* is no longer embedded within a larger temporal reference frame, then there will be no separate events that can be experienced as succeeding each other.

the occurrence of object-directed thought and dream-related imagery during sleep, but prohibits the occurrence of objectless cognitive states. For the Advaitins, the situation is different. Because for them, the self is pure, reflexive (or self-luminous) consciousness, they cannot allow that consciousness can disappear altogether even during sleep, because this would entail a disappearance of the self. Unlike the Nyāyas, the Advaitins do not, however, take consciousness to be necessarily object-directed. Instead, they regard the essentially reflexive and self-luminous character of consciousness and the self as separate from and indeed as the very condition of object-directed thought. A prediction would be that “pure” cases of reflexive, self-luminous consciousness should occur even in the absence of object-directedness, for instance during sleep.

Despite these differences, the debate on dreamless sleep experience unfolds before a background of mutual agreement. Both schools agree, for instance, that object-directed consciousness can (and does, for instance in the form of dreams) occur during sleep, but also that it does not persist throughout sleep. Both also agree that dreamless sleep is a state in which object-directedness is lost. And finally, both agree that the self persists throughout dreamless sleep, even in the absence of object-directedness. Their disagreement thus hinges, first, on what exactly it means to say that the self persists during dreamless sleep, understood in the sense of a state in which object-directed thought is lost, and second, on how to construe the relationship between consciousness, the self, and memory reports. Both points are relevant, as we will see, for assessing the relationship between the Indian debate and contemporary research as well.

How, then, to adjudicate between the two sides in the debate? Thompson (p. 6) reconstructs the Nyāya claim that our knowledge of dreamless sleep is inferential as involving a five-step syllogism. His discussion of the Nyāya syllogism is already so clear that nothing would be gained from rehearsing it once more here. Instead, I want only to recall to readers’ attention that Thompson’s reconstruction of the Advaitin re-

sponse shows the Nyāya syllogism to be inherently fallacious: it is either circular or results in an infinite regress. In order to infer from the fact that I was in a special state that I knew nothing in this state, I must first have a reason for saying that I was indeed in a special state; and if this reason is that I knew nothing in this state, I am presuming what is supposed to be shown and the argument is circular. Alternatively, if I say that the means for knowledge were lacking in this special state, for instance because the mental faculties and the senses were inactive, then this further claim has to be backed up by independent evidence. Saying that I felt refreshed upon awakening will not do—for in order to know that feeling refreshed after awakening is correlated with the inactivity of the mental faculties and the senses during sleep, I would either once more have to appeal to memory (which, on pains of circularity, I cannot do), or I would be headed for an infinite regress. Thompson sums up his critique of the Nyāya syllogism by formulating a general principle:

More generally, the only way I can know that the means for knowledge were absent in deep sleep is by knowing that there was no knowledge present in this state. Only by knowing the effect—my not knowing anything—can I infer the cause—the absence of the means for knowledge. So unless I already know what the inference is trying to establish—that I knew nothing—I cannot establish the reason on which the inference relies. (p. 7)

The Advaitin view offers an easy way out. As Thompson points out, it can be reconstructed as involving the phenomenological claim

that when I wake up from a dreamless sleep, it seems that I can sometimes knowingly say I have just emerged from a dreamless sleep, and this saying seems to be a reporting of my awareness, not the product of having to reason things out. (p. 8)

At least in principle, the subjective impression of having awakened from dreamless sleep can be

reflected in veridical reports of awareness during dreamless sleep.

It is important to see that Thompson's assessment of the Indian debate does not lead to a whole-hearted endorsement of the Advaitin view; the view he promotes is in fact much more subtle, and also more humble. Thompson's main goal is to establish the logical possibility of dreamless sleep experience. For this, it is sufficient that veridical memories of having slept dreamlessly are possible in principle (p. 5, p. 9). He also explicitly allows that there could be cases in which one's memory of having slept peacefully and dreamlessly is mistaken. Thompson's view is also weaker than the Advaitin position in that it is not committed to the persistence of conscious experience throughout sleep, but leaves room for periods of unconsciousness during sleep. According to Thompson, the mere possibility of dreamless sleep experience challenges the default view and highlights the need for a refined taxonomy of sleep states, because such a refined taxonomy is the condition for investigating dreamless sleep experience experimentally (p. 3).

To be sure, Thompson also offers some factual evidence for thinking that dreamless sleep experience actually exists: experienced meditators report witnessing or becoming lucid during dreamless sleep, and they show a changed pattern of EEG activity during slow wave sleep. Meditative training may, as Thompson suggests, facilitate cognitive access to the state of dreamless sleep (p. 11) and with it, more accurate reports. But his main point is that conceptual and empirical questions about dreamless sleep experience are well worth asking and that in order to do so, prominent theories of sleep, but also of consciousness (such as Tononi's *Integrated Information Theory*; see [Tononi 2008](#)) should at least make room for the possibility of its occurrence and require revision.

While I find Thompson's case for the logical possibility and conceptual coherence of dreamless sleep experience compelling, I worry that its humility makes it vulnerable to three related objections. A proponent of the default view could acknowledge that veridical reports of dreamless sleep experience are logically possible

but could insist that unless such veridical reports are identifiable and can be distinguished from nonveridical ones, such reports cannot be used for the experimental investigation of dreamless sleep experience, or only in a very small and admittedly special group of highly trained subjects. Thompson's own suggestions for the future investigation of dreamless sleep experience assume that this basic problem has been solved. For instance, he proposes that because dreamless sleep experience is supposed to be devoid of intentional objects, asking participants to report anything that was going through their minds before awakening, which is a question about the objects of awareness or the contents of consciousness, might be poorly suited to the target phenomenon. A good alternative, he suggests, would be to direct participants' attention to the phenomenal character of sleep itself, for instance by asking them to report any feelings or any qualitative states experienced before awakening (p. 12). Here, the proponent of the default view might object that this strategy falls short of a methodology for investigating dreamless sleep experience: In order to use reports of dreamless sleep experience as evidence, some rationale for distinguishing veridical reports from nonveridical ones is needed. Without this, the large-scale revision of standard sleep-state taxonomy demanded by Thompson may seem premature; Thompson's case for the mere possibility of dreamless sleep experience lacks the empirical grounding and research methodology to justify such a move.

A related problem is that in order to empirically investigate the occurrence of dreamless sleep experience, it is not enough to identify veridical reports of such experiences and distinguish them from nonveridical ones. Instead, in order to determine the frequency of dreamless sleep experience, one has to determine whether subjects can reliably report not just the presence of dreamless sleep experience, but also its absence. This problem is especially pronounced because Thompson's claim is not that experience persists throughout sleep. As we saw earlier, his view departs from the Advaitin claim in that he thinks that dreamless sleep experience occurs only occasionally and contrasts

with periods of genuine unconsciousness during sleep. A report-based methodology for investigating dreamless sleep experience will consequently have to assume not only that reports of dreamless sleep experience reliably indicate the presence of such experience during the preceding sleep period, but also that the absence of such experiences can be reliably reported, or at least that it can be inferred from the absence of reports of dreamless sleep experience. Unless this second condition is fulfilled, reports of dreamless sleep experience could be highly reliable in that they occur only when dreamless sleep experience was in fact present during the preceding sleep period, but could nonetheless fail to be sensitive to its actual frequency, for instance by only following a small proportion of such sleep experiences (for a discussion of the reliability and sensitivity of first-person reports, see [Fink unpublished manuscript](#)).

Thompson himself shies away from both commitments. In fact, he casts doubt on the assumption, common in cognitive neuroscience, “that a content of consciousness is a reportable content, and that reportable contents are ones that can be attentionally selected, held in working memory, and used to guide thought and action” (p. 12). Relatedly,

the general point that retrospective oblivion does not prove a prior lack of consciousness must be kept in mind whenever we are tempted to infer that consciousness is absent in deep sleep because people report not being able to remember anything when they are woken up. (p. 11)

Here, he might be read as effectively denying the possibility of using retrospective reports as a source of evidence for the scientific investigation of dreamless sleep experience. Moreover, given these doubts about the reliability and sensitivity of retrospective reports, Thompson’s (p. 17) proposal that meditation makes positive occurrences of dreamless sleep experience accessible to verbal report is not enough; a proponent of the default view could object that expertise of the relevant type is acquired only if meditation enables periods of unconscious sleep

to be retrospectively reported as well (or at least to be measured indirectly through the inability to report conscious experiences from the preceding sleep period).

Finally, a proponent of the default view might grant that reports of expert meditators are more trustworthy than those of laypeople in both respects: meditators can report both when dreamless sleep experience was present and when it was absent.⁴ Yet, it could still be objected that the example of expert meditators is simply too remote to justify the large-scale revision of sleep-state taxonomy that Thompson has in mind. For all practical purposes, or so the objection might go, the default view of consciousness and dreamless sleep as diametrically opposing and mutually exclusive states stands.

To be clear, I do not think these objections are particularly worrisome; but I do think they help set the agenda for how best to develop Thompson’s view, defend it against skeptical objections, and place it on broader empirical grounding. The first step, taken in the next section, is to introduce a stronger defense of the trustworthiness of reports of dreamless sleep experience, as well of reports of its absence. If successful, this provides a sound methodological basis for the experimental investigation of dreamless sleep experience. The second step is to provide a broader theoretical and empirical basis by proposing a conceptual framework of dreamless sleep experience as well as additional candidates for its future investigation.

3 Are reports of dreamless sleep experience trustworthy? The analogy between the Indian debate on dreamless sleep and the contemporary debate on dream reports

In this section, I draw an analogy between the Indian debate on dreamless sleep experience and the contemporary debate on the trustwor-

⁴ It remains controversial whether different forms of meditation actually enhance introspective accuracy. While there is some evidence in support of this claim (Fox et al. 2012; Sze et al. 2010), at least one study has suggested that meditators may feel more confident than controls about their ability to successfully perform interoceptive tasks (such as heartbeat detection), but that this confidence is not paralleled by an actual improvement in task performance (Khalsa et al. 2008).

thiness of dream reports. This analogy provides the resources for overcoming the first two challenges to Thompson's argument. In particular, it reveals the default view to be inconsistent with the methodological background assumptions of scientific sleep and dream research. Given their own methodological commitments, researchers in these fields should reject the default view.

3.1 The methodological background assumptions of scientific dream research: Lessons for the investigation of dreamless sleep experience

The first step towards seeing why the default view is inconsistent with scientific dream research is to realize that this field, at least implicitly, relies on the assumption that reports of conscious experience during sleep are trustworthy: at least when they are given under certain (sufficiently) ideal conditions and immediately after awakening from sleep, such reports are taken to reflect what was experienced during the preceding sleep period, and indeed whether anything was experienced at all. What exactly the (sufficiently) ideal conditions for reporting sleep experiences consist in is an empirical question, and in scientific dream research, much work has been dedicated to its investigation (for discussion and further references, see [Windt 2013, 2015](#), chaps. 3 and 4). There is widespread agreement that temporal proximity is a crucial factor: reports given immediately after awakening are commonly taken to be least vulnerable to forgetting. The sleeping environment (at home versus in the laboratory), method of awakening, interaction with experimenters, and precise wording of questions also play an important role ([Domhoff 1996, 2003](#); [Hall & Van de Castle 1966](#); [Kramer 2013](#); [Winnet 1979](#)). Different reporting techniques may be suitable for different research questions, and aside from being asked for verbal reports, participants may be encouraged to produce a dream drawing or compare the visual imagery in their dream with photographs with varying degrees, for instance, of color saturation or brightness ([Rechtschaffen & Buchignani 1992](#)). While there

may be uncertainty, in a given case, as to the sincerity of a report, this is a practical matter, not a deep theoretical problem.⁵ The key idea is that by improving reporting conditions and tailoring the reporting technique used in a given study to the specific research question, this risk can be minimized. For now, my main point is that this strategy, which is already well established in scientific sleep and dream research, only makes sense against a background of basic trust in at least a subset of dream reports.

This basic idea is very much in keeping with Thompson's proposal of asking participants to report any feelings or qualitative states experienced prior to awakening, rather than asking them to focus on the contents of conscious thought. By directing participants' attention to certain aspects of sleep experience or even introducing new experiential categories for their description (an excellent example of this strategy is [Lutz et al. 2002](#)), the expressive granularity⁶ of individual reports can be increased: types of experiences can be rendered reportable that would otherwise be forgotten. A compelling possibility is that in the case of dreamless sleep experience, such improvements in reporting conditions may not just supplement training, as suggested by Thompson, but may even facilitate the investigation of dreamless sleep experience in participants who lack any particular introspective training.⁷

Admittedly, this approach does not provide a fail-safe method for avoiding or even identifying nonveridical reports. Rather than fo-

⁵ Researchers occasionally worry, for instance, that participants may underreport embarrassing dream content; censorship of this type may be why sexual dream content is only rarely reported in laboratory studies ([Hobson 1988](#)); see also [Rosen's \(2013\)](#) discussion of willful narrative fabrication of dream reports. For the investigation of dreamless sleep experience, which is, after all, thought to be devoid of such content, such worries about censorship do not seem to apply.

⁶ I owe this term to Sascha Fink; see for instance [Fink 2015](#), p. 23; for discussion, see [Windt 2015](#), p. 92.

⁷ As [Solomonova et al. \(2014\)](#) note, it is important to distinguish questions about the range of possible experiences in dreams (or the "depth" of dreaming) from those about their typical characteristics in the general population (or the "breadth" of dreaming), and what counts as the ideal reporting conditions in the context of a given study depends on which of these questions is being addressed. For now, note that because expertise is likely most useful for answering questions about the depth of experience, and because expert reports may not be representative of the breadth of the target phenomenon, broadening the investigation of dreamless sleep experience beyond expert groups is an important goal for future research.

cusing on the veridicality of individual reports, the strategy is to identify which types of reports are best tailored to a given question and under which conditions they are most likely to be obtained. The problem of identifying individual reports of a certain type for which this strategy has failed is thus not obliterated, but minimized.⁸ What is more important is that there is, in this view, a distinction to be drawn between *general opinions* about experience and *reports of individual experiences*. Note that reports, in this context, are broadly construed as the product of (verbal or nonverbal) behaviors con-

ducted with the *sincere intent of conveying or recording certain relevant information about a specific dream* (for details, see Windt 2015, chap. 3.3) Questionnaires asking participants to assess the general frequency with which, for instance, they dream in color do not count as experience reports in this narrow sense. Indeed, there are good reasons for doubting the trustworthiness of responses to such general questionnaires, and in some cases, they have even been shown to be at odds with individual reports (Schwitzgebel 2002, 2011, chap. 1; Windt 2013, 2015, chap. 4.3). At best, such general questionnaires tap into opinions about experience, but whether these opinions match the phenomenal character of the corresponding experiences is a separate question. Importantly, questions about the relative trustworthiness of responses to general questionnaires can be meaningfully investigated only if the trustworthiness of at least a subgroup of dream reports is assumed (Windt 2015, chap. 4.4). This subgroup can then act as a baseline and can be used to determine the relative trustworthiness of answers to general questionnaires, but also of different types of reports. While the exact details continue to be debated (for instance on the laboratory effect), there is widespread agreement in scientific dream research that dream reports gathered immediately upon awakening, as is common in laboratory studies using timed awakenings from different sleep stages, are the gold standard against which other types of dream reports (such as home dream diaries compiled following spontaneous awakening) can be measured (again the debate on dream color is a good example; see Hoss 2010; Murzyn 2008; Schredl et al. 2008).

Importantly, as discussed earlier, the assumption that dream reports are trustworthy translates into a research strategy only if reports of nondreaming are taken to be equally trustworthy as reports of dreaming, at least when they are gathered under the same conditions. If the reporting conditions used in a given study are (sufficiently) ideal, it would, surely, be arbitrary to disqualify a subset of these reports on the basis of their content alone. In order to do so, some independent reasons for at-

⁸ Strictly speaking, it cannot be ruled out that even for reports obtained under seemingly ideal conditions—for instance immediately after awakening, and using appropriately worded questions—certain subject groups are particularly prone to memory failure or confabulation (Rosen 2013), or that results are distorted because of further disturbing factors that have so far been overlooked. The challenge will then be to identify such potentially disturbing factors, manipulate them experimentally, and derive certain predictions on how they will affect data obtained from the analysis of dream reports. These factors can then be integrated into a future, improved and more empirically plausible account of the ideal conditions of dream reporting. For now, my main point is that this strategy only makes sense if one already assumes that some subset of dream reports can be used as a baseline against which other, less trustworthy ones can be measured. The study of dream emotions is a nice example of how this strategy has been put to work in dream research. Views on the both the frequency and the types of emotions experienced in dreams have changed quite dramatically as new methods of collecting and scoring dream reports have been developed. Whereas older studies using classical dream content analysis suggested that dream emotions are relatively rare (Hall & Van de Castle 1966), the frequency of reported dream emotions increases tenfold when subjects are specifically asked to report their emotions on a line-by-line basis (Merritt et al. 1994). Affirmative probes of this sort suggest that dreams are “hyperemotional”, with emotions being mentioned in 95 percent of dream reports and the average dream report containing several different types of emotions. A plausible explanation is that dream emotions are underreported in free dream reports of the type used in older studies; free dream reports, in this view, are insufficient to capture the actual frequency of dream emotions. Until very recently, the accepted view was that the types of emotions experienced in dreams differ from those experienced in wakefulness in that dream emotions are predominately negative (Hobson et al. 2000). However, a recent study compared external ratings of emotions in dream reports to scores obtained when participants answered a standard emotion questionnaire themselves. Sikka et al. (2014) found that external ratings underestimate not only the frequency but also the types of emotions experienced in dreams. A particularly surprising result was that self-ratings showed positive dream emotions to be six times more frequent than negative ones. The systematicity of the differences is compelling and the same pattern was found in a number of follow-up studies (Sikka et al. 2014), suggesting that the use of self-ratings is a more reliable method for capturing the frequency and types of dream emotions than the use of external raters. This is not so say that the conditions for reporting and scoring dream emotions cannot be further improved. But this example does illustrate that theoretical views on dream emotions changed in tandem with changed and likely improved reporting and scoring conditions. Again, the idea is that methodological adjustments can obscure or render visible different aspects of the phenomenology of dreaming.

tributing reports of nondreaming to disturbing factors would be needed. It does not make sense to trust dream reports, but selectively distrust reports of nondreaming gathered under the same conditions and in the absence of any empirical evidence for distrusting them. Put differently, dreams will have to be regarded as reportable experiences, in the sense that given sufficiently ideal reporting conditions, their presence or absence, respectively, can actually be reported. Importantly, both assumptions are implicit in the scientific investigation of dreams. A brief excursion into the history of philosophical and scientific theorizing about sleep and dreaming illustrates this point.

The beginning of scientific dream research coincided with a new experimental paradigm: the practice of obtaining polysomnographic measurements of EEG activity, muscle tone and eye movements from subjects sleeping in the sleep laboratory and of obtaining mentation reports following timed awakenings. This methodology revealed reports of dreaming to be most frequent following awakenings from REM (rapid eye movement) sleep, whereas awakenings from NREM (non-REM) sleep were typically followed by an inability to recall any dreams. In their groundbreaking paper on the correlation between dreaming and REM sleep, [Aserinsky & Kleitman \(1953\)](#) optimistically claimed that that the method of timed awakenings from REM sleep “furnishes the means of determining the *incidence and duration of periods of dreaming*” ([Aserinsky & Kleitman 1953](#), p. 274; my emphasis).⁹ They very naturally took the reports given by their subjects to reflect conscious experience during the preceding sleep period, noting that “of 27 interrogations during [sic] ocular motility, 20 revealed detailed dreams usually involving visual imagery” ([Aserinsky & Kleitman 1953](#), p. 273; my emphasis). Because the method of obtaining reports following timed awakenings in the laboratory is, arguably, the backbone of scientific dream research, this assumption is not unique to Aserinsky and Kleit-

man’s original study. Instead, scientific dream research generally relies on the assumption that dream reports (at least when gathered under ideal reporting conditions, of which timed awakenings in the laboratory are taken to be a prime example) are epistemically transparent in the sense that they are trustworthy sources of evidence about the occurrence and phenomenal character of experience during sleep. I call this the *transparency assumption* ([Windt 2013, 2015](#)).¹⁰

It is important to see that on its own, the transparency assumption would be insufficient to establish the presumed correlation between dreaming and REM sleep. Claims about the sleep-stage or neural correlates of dreaming require that reports of dreaming and of nondreaming, when gathered under the same conditions, are equally trustworthy: if only reports of dreaming were trustworthy, but reports of nondreaming were not, then the analysis of dream reports would be insufficient to determine the occurrence and frequency of dreams during different sleep stages. Saying that dream reports are transparent is not quite enough: one will also have to assume that dreams are reportable experiences in the sense that had any dream occurred in a given sleep stage, one would in fact be able to report it, at least under sufficiently ideal reporting conditions. I call this the *reportability assumption* (for details, see [Windt 2015](#), chap.s 3 and 4). Only this added assumption casts reports of dreaming and of nondreaming as equally trustworthy and thus enables reports to be indicative of the occurrence and frequency of dreaming in different sleep stages. The emerging picture is that scientific dream research not just uses dream reports, *under the assumption of transparency*, to investigate *conscious experience during sleep*, but that in doing so, it is also *methodologically constrained by the space of reportable dreams*. Its implicit commitment to the

¹⁰ Here, I use the concept of epistemic transparency in a non-technical and metaphorical sense, intending to capture the intuition that dream reports are the closest researchers can come to “watching the sleeping mind” ([Cartwright 2010](#), p. 17). The choice of terminology also reflects the fact that dream reports are not identical with, but better conceived of as separate from dreaming. Finally, transparency is a nod to the historical situation that the theoretical problems raised by dream reporting were nearly invisible throughout most of the history of philosophical theorizing about dreaming.

⁹ Today, it is widely recognized that dreams can occur in all stages of sleep and are not exclusively a REM sleep phenomenon. Incidentally, this recognition may also lead to refined sleep-stage scoring systems and a blurring of the borders between REM and NREM sleep ([Nielsen 2000](#); see also [Windt 2015](#), chap. 2).

trustworthiness of reports of dreaming and of nondreaming means that it cannot go beyond what is in fact reported without risking internal inconsistency; it can only strive to render further aspects of dreaming reportable. Metaphorically speaking, the space of reportable dreams can be expanded; it can be broadened to cover more aspects of what characterizes typical dreams, or perhaps also to include more diverse types of dreams; and it can be deepened, by probing the unique aspects of certain types of dreams (such as nightmares) or the dreams of certain subject groups (such as meditators) in more detail (see [Solomonova et al. 2014](#)). Importantly, this reliance on dream reports is not a liability, a problem to be overcome: it is built into the very nature of dream research. Conversely, studies relying only on the polysomnographic analysis of sleep stages and/or neuroimaging data gathered independently of dream reports do not form part of dream research proper ([Windt 2015](#), chap. 3.2).

How does this account of dream reporting help address the objections to Thompson's argument discussed at the end of the last section? The strategy of focusing on reports gathered under (sufficiently) ideal reporting conditions and working towards a continuous improvement of these conditions is clearly relevant to the first objection, according to which the mere possibility of veridical reports is not enough. As soon as we broaden our focus from reports of dreamless sleep experience to reports of sleep experience (including dreams) more generally, it becomes clear that scientific dream research has long been centered on the project of identifying and optimizing the trustworthiness of such reports, as well as on determining the adequacy of different kinds of reports for addressing various research questions. Indeed, the very existence of scientific dream research hinges on the assumption that this can be done. Moreover, we have seen that the assumption that reports of dreaming and of nondreaming are equally trustworthy is implicit in this research strategy. This assumption is directly relevant to the second objection, according to which reports of dreamless sleep experience can be

used for the investigation of dreamless sleep experience only if they help detect both its presence and its absence.

Moreover, this proposal is, I think, compatible with Thompson's own strategy of focusing on reports from certain expert groups and improving the wording of questions. Indeed, this strategy of directing participants' attention to certain aspects of their experience rather than asking for a free report nicely parallels recent work suggesting that a self-scoring method, where participants respond to a standard questionnaire, for instance, about the emotions experienced in a particular dream, is a better measure of dream emotions than data obtained by external raters scoring free dream reports ([Sikka et al. 2014](#); see footnote 8 for discussion). This suggests that Thompson does not mean to reject, as a matter of principle, the claims that conscious experiences are reportable and that an absence of memory is sufficient to infer an absence of experience. Rather, I think his position involves the weaker claim that we should not easily and uncritically trust just any type of experience report to actually reflect the presence of such experience, nor should we easily and uncritically trust just any failure to remember previous experience as indicating an absence of such experience. But this weaker position is in keeping with the account of dream reporting outlined in this section. The challenge then becomes how to narrow the gap between experiences that are in fact reported and those that could (and would) be reported, given sufficiently ideal conditions. I think this is exactly the problem that large parts of report-based dream research are already trying to address.

Note that nothing I have said so far suggests that the transparency and reportability assumptions are theoretically justified (but see [Windt 2013, 2015](#)); if my analysis is correct, however, both are implicit in and in fact crucial for the entire field of scientific dream research. This shifts the burden of proof: while reports of dreamless sleep experience may seem to be an easy target, if only because of the novelty and alleged remoteness of Thompson's proposal for investigating dreamless sleep experience, we can now see that the proponent of the default view

will in fact have to take on the entire field of (report-based) scientific dream research as well. This raises the bar considerably; but first, more has to be said about how the methodological background assumptions of scientific dream research actually parallel questions asked in the classical Indian debate.

To begin with, note that the transparency assumption is analogous to the Advaitin and Yoga claim that upon awakening from dreamless sleep, we can veridically remember and report that we experienced nothing during sleep. To be sure, this type of report describes an experience marked by the absence of the complex imagery and narrative contents that characterize dreaming. Yet, in the Advaitin view, these are reports of an experiential state: in reporting having slept dreamlessly, we are reporting that we *experienced* nothing, in the relevant sense, during sleep;¹¹ we are not reporting the absence of experience. Thompson suggests that in order to turn the Advaitin view into a research strategy, the most reasonable and cautious approach is to assume that dreamless experience exists only intermittently, rather than persisting throughout dreamless sleep. The frequency with which dreamless sleep experience is reported to occur upon awakening will then be regarded as indicative of the actual occurrence of such experience. This is analogous to the reportability assumption. To endorse the stronger claim that dreamless sleep experience persists throughout sleep, at least prior to empirical investigation, would be to legislate an answer to the question of dreamless sleep experience. The weaker claim complements the assumption, implicit in scientific dream research, that periods of dreaming contrast with periods of nondreaming, which is quite different from saying that dreaming persists throughout sleep.

By combining my analysis of the methodological background assumptions of scientific dream research with Thompson's proposal on

the investigation of dreamless sleep experience, we can see that if we were to translate the Yoga and Advaitin view into a research methodology, we would find it to rely on assumptions that run parallel to those of scientific dream research. Dreamless sleep experiences, or so a modern-day, scientifically-minded Advaitin would be forced to admit, are reportable experiences; and if it should happen that (under sufficiently ideal reporting conditions, such as immediately after having awakened from sleep) one were unable to recall any such experience having happened during sleep, this would indicate that no such experience had occurred.

This also tells us that reports of nondreaming should be further qualified: reporting the absence of experience during sleep is not the same as reporting dreamless sleep experience. The former is an instance of reporting an absence of experience, the latter is an instance of reporting a form of experience characterized by the absence of intentional objects; but it is still an experience report. Yet, while this requires terminological adjustments and shows that the concept of reporting a state of nondreaming is ambiguous, this adjustment is consistent with the familiar methodology; indeed, it falls out of the methods already used in dream research, when they are applied to the target of dreamless sleep experience.

From this, we can conclude that the default view of dreamless sleep as being characterized by the absence of subjective experience is intrinsically flawed for two related reasons. The first is that by treating dreamless sleep experience as a conceptual absurdity rather than as an open and empirically tractable question, it misconstrues the nature of the question of dreamless sleep experience. The second is that it stands in outright contradiction to the assumptions implicit in the scientific investigation of conscious experience during sleep. Dream research, understood as the scientific investigation of conscious experience during sleep, should be expanded to include dreamless sleep experience as well. And while this certainly will involve an adjustment of its conceptual resources, the good news is that its existing methodological background assumptions can remain largely intact.

¹¹ At this point, it might be objected that this formulation rides on a reification of the word "nothing", as if "nothing" itself could be turned into an object of experience. I return to this problem in section 4; as will hopefully become clear, my own positive model of dreamless sleep experience avoids this problem by introducing a qualified reading of what is described, in the Advaitin view, as experiencing or knowing nothing.

3.2 The Indian debate revisited: Lessons for the philosophical debate on the trustworthiness of dream reports

The analogy between the Indian debate on dreamless sleep experience and the background assumptions of scientific dream research not only highlights the inconsistency of the default view. There are also valuable lessons to be learned in the other direction, and considering the historical Indian debate can enrich contemporary debates on the status of dream reports as well. In particular, note that it is one thing to say that scientific dream research is implicitly committed to the transparency and reportability assumptions; but it is another to say that these assumptions are also theoretically justified. Elsewhere, I have defended the view that explanatory considerations justify the transparency and reportability assumptions: construing dream reports as (largely veridical) memory reports provides a *better explanation* of dream reporting behavior than skeptical alternatives that construe dream reports as the result of inference, misremembering or outright confabulation (Windt 2013, 2015, chap. 4). Here, I want only to point out that similar considerations apply to reports of dreamless sleep experience. In fact, Thompson’s response to the Nyāya argument against dreamless sleep experience shows that casting reports of having slept dreamlessly as based on inference rather than memory is not a proper explanation at all. Instead, it leads to an argument that either results in an infinite regress or is circular. Again, there is a striking similarity to a similarly skeptical account of dream reporting from the 20th century. This time, the analogy with the historical Indian position will lend additional support to anti-skepticism about dream reporting.

To see why, another brief excursion into the history of theorizing about scientific dream research is instructive. Let us consider Norman Malcolm’s (1956, 1959a) skeptical argument against the claims that dreams are conscious experiences occurring during sleep and that dream reports transparently show this to be the case. This argument was a direct reaction to early attempts, following the discovery of REM sleep,

to operationalize dreaming as a REM sleep phenomenon. Malcolm’s argument hinges on the conceptual claim that “if a person is in *any* state of consciousness it logically follows that he is not sound asleep” (Malcolm 1956, p. 21). According to Malcolm, even though we use the same language to describe dreams and waking experiences, dreams (or at least such dreams as occur during sound sleep, which Malcolm, again for conceptual reasons, takes to be representative of dreaming proper) are not experiences, and for the same reason dream thoughts, feelings, and emotions are not real instances of their kind. As Malcolm puts it,

if a man had certain thoughts and feelings in a dream it no more follows that he had those thoughts and feelings while asleep, than it follows from his having climbed a mountain in a dream that he climbed a mountain while asleep. (Malcolm 1959a, pp. 51-52)

Malcolm’s view is complex and a detailed discussion is beyond the scope of this commentary; suffice it to say that one of its more controversial upshots is that dream recall is not a real instance of remembering experience during sleep. Instead, “statements of the form ‘I dreamt so and so’ are always inferential in nature” (Malcolm 1959a, p. 65): one infers that one has dreamt when one realizes, upon awakening, that the events one seems to remember did not in fact occur. This claim struck many of his critics as contradicting both the common-sense understanding and the phenomenology of dream recall (see Dunlop 1977 for a collection of some of the most important critical essays; see Windt 2013, 2015, chap. 1 for discussion). Elsewhere, (Malcolm 1959b) explains that he takes dream recall to be inferential not in the psychological sense of actually drawing this inference when we notice that we have dreamt, but in the sense that we could give grounds for our belief that we dreamt if pressed to do so. However, because he fails to clarify what exactly these grounds are, his account remains sketchy. By applying Thompson’s reconstruction of the Nyāya syllogism to Malcolm’s claim, it quickly becomes

clear that even a more complete reconstruction of the inference would be intrinsically flawed. The result would be something like this:

1. While I was sound asleep, I had no experiences, including sensations, conscious thoughts, feelings, beliefs, or emotions.
2. This is because (i) I was in a special state (that is, not awake) or (ii) I lacked the necessary means for having experiences, including sensations, conscious thoughts, feelings, beliefs, or emotions (that is, my senses and mental faculties were shut down).
3. Whenever (i) I am in a special state (that is, whenever I am not awake) or (ii) I lack the necessary means for having experiences, including sensations, conscious thoughts, feelings, beliefs, or emotions (whenever my senses and mental faculties are shut down), I do not have experiences, including sensations, conscious thoughts, feelings, beliefs, or emotions.
4. As in the case of fainting or a blow to the head.
5. While I was sound asleep, I had no experiences, including sensations, conscious thoughts, feelings, beliefs, or emotions.

Malcolm concludes that sound sleep is comparable to other states of unconsciousness, and “to a person who is sound asleep, ‘dead to the world,’ things cannot even seem” (Malcolm 1956, p. 26).

If we follow this reasoning, then dream reports cannot ever be veridical experience reports: if we cannot have thoughts, feelings or emotions during sleep, then we also cannot have them during dreams, and we cannot actually remember (or veridically report) having had them after awakening. Rather, we sometimes awaken with the impression of having had such thoughts, feelings and emotions during sleep; and when we realize that they did not in fact occur, we infer that we dreamt.

To be fair, there might well be cases in which dream recall does have such an inferential nature. To use Malcolm’s example, it seems possible that I could awaken with the particularly vivid impression of having climbed a mountain

and then might realize, from the simple fact that I was lying in bed and nowhere near a mountain, that I had not actually climbed a mountain, but had been asleep. However, even if I was now quite sure that I had merely dreamt that I had climbed a mountain, it would not follow that the thoughts and feelings I remember having in the dream did not really occur. In order to draw this further inference, I would have to know that dreaming is a special state that is devoid of any experiences whatsoever.¹² As is the case for the Nyāya syllogism, this immediately invites the dual threats of circularity and of infinite regress: If I say I was in a special state because the thoughts and feelings I experienced in my dream were not real instances of their kind, I am reasoning in a circle. And if I say that I was in a special state because the mental faculties required for having thoughts and feelings were shut down (or because, as would better befit Malcolm’s argument, I had temporarily lost the capacity for producing the types of behavioral evidence that would enable another person to verify that I had been dreaming), then independent evidence would be needed—and so on. Again, without appealing to memory, no such evidence is available.

At this point it might seem that there is an easy solution: Perhaps, independent evidence for saying that dreaming is a special state has, in the meantime, become available. Malcolm’s analysis of dreaming was a direct reaction to early studies, discussed in section 3.1, on the correlation between REM sleep and dreaming, and his argument made much of the alleged impossibility of acquiring independent evidence,

¹² Incidentally, note that if it were the case that dreams are devoid of any experiences whatsoever, it would be utterly mysterious why we should awake with the vivid impression of having had such experiences in the first place. Indeed, Malcolm provides no explanation of why this happens. By contrast, my erroneous impression of having climbed a mountain during sleep is nicely explained by saying that during sleep, I had experiences that were sufficiently similar to their waking counterparts to create this impression. Again, this comes back to the idea that explanatory considerations favor the view that dream reports are actual memory reports, and not inferential. Perhaps, the difference between dreams that are belief-inviting beyond the borders of sleep, for instance by making us actually believe, if only for a moment, that the corresponding events actually occurred, and more commonplace dreams that do not induce such false beliefs can even be described in phenomenological terms (for a first proposal of how this might be done, see Windt 2015, chap. 10).

over and above dream reports, for the occurrence of dreams during sleep. Among Malcolm's critics, there was widespread agreement that he was simply mistaken about this latter point: sleep behavior, (for instance in patients with REM sleep behavior disorder, who are thought to act out their dreams due to a loss of REM sleep-related muscular atonia; see [Schenck 2005](#), [Valli et al. 2012](#)) sleep talking, and also polysomnographic measurements were (and continue to be) thought to provide exactly such independent evidence, perhaps even to the point of enabling researchers to verify dream reports (see for instance [Ayer 1960](#); [Rosen 2013](#); signal-verified lucid dreams are another example, as proposed by [Revonsuo 2006](#); see sec. 5.1 for a fuller discussion). Yet, even though the appeal to scientific dream research slightly changes the content of the argument, this merely restates the familiar syllogism, including its problems in a new guise.

To see why, let's say that rapid eye movements had indeed been found (as stated by the so-called scanning hypothesis; see [Dement & Kleitman 1957](#), to be directly related to visual dream imagery. Could we now analyze these eye movement patterns to diagnose the occurrence (and perhaps even the content) of dreaming even in the absence of (or in contradiction to) dream reports (see [Dennett 1976](#) for the discussion of this possibility)? Note that this is not an abstract philosophical issue: dream researchers have long dreamt the dream of moving beyond dream reports in the study of dreaming altogether. This ranges from science fictional visions of televising dreams ([Hall & Van de Castle 1966](#)) or of perhaps modeling them as an immersive, interactive virtual environment, as in [Antti Revonsuo's](#) (2006, pp. 300-303) dream catcher test, to real-world attempts to predict the content of dream reports from behavioral ([Leclair-Visonneau et al. 2010](#)) or neuroimaging ([Horikawa et al. 2013](#)) data. Again, the idea is that in the future, the analysis of neuroimaging data might be a way to verify dream reports, or even to move beyond their collection and analysis altogether. Elsewhere, I have argued that such attempts are circular: Dream reports, under the assumption of transparency, are used to

identify potential sleep-stage and neural correlates of dreaming; but the evidence such potential correlates provide is only as strong as the correlation, and so one cannot then turn around and use such measures as independent evidence to verify dream reports. Now, the Nyāya syllogism and its failure present a nice and crisp illustration of why this is the case. I think this is a nice example of the fruitfulness of a cross-cultural perspective on the methodological and conceptual issues involved in studying the occurrence of consciousness during sleep.

But there is another lesson to be learned. This is that the Nyāya syllogism is not an outdated problem, but one that persists even if we place it in the context of scientific dream research. The question of whether reports of having slept dreamlessly are experience reports or inferential is not of mere theoretical interest, but makes a real difference: assuming such reports, at least when given under ideal reporting conditions, to be veridical memory reports is the condition for a report-based scientific investigation of the relevant experiences in the first place. The historical debate, and [Thompson's](#) reconstruction of it, nicely highlights the need for acknowledging the relevance of first-person reports. Together, they also strengthen the theoretical case against skepticism about the trustworthiness of dream reports. With this anti-skeptical account in place, we can now move forward. In the next section, I sketch the outlines of a conceptual framework for describing dreamless sleep experience and its relation to dreaming.

4 From minimal phenomenal selfhood to minimal phenomenal experience: Towards a conceptual model of experience during dreamless sleep as pure subjective temporality

If what I have said so far is on the right track, then the question of whether dreamless sleep, at least on occasion, involves phenomenal experience is open to empirical investigation, and progress towards answering it can be made by applying the methods already used in scientific dream research, for instance by combining

timed awakenings in the sleep laboratory with questionnaires that are carefully calibrated to direct participants' attention towards the relevant features of such experiences and facilitate their reportability. Even occasional reports of dreamless sleep experience will support the claim that dreamless sleep experience exists. The next step towards turning the question of dreamless sleep experience into a scientifically tractable research project is to draw a more precise conceptual map of the territory. Sketching at least the rough outlines of such a conceptual map is my aim in this section.

Thompson's reconstruction of the classical Indian debate as well as his own positive proposals for how to study dreamless sleep experience provide a helpful point of departure. To begin with, as Thompson points out, the concept of dreamless sleep itself requires phenomenological refinement (p. 13). If dreamless sleep experience exists, then it is not enough to characterize dreamless sleep by the absence of dreaming or its electrophysiological correlates. Rather, dreamless sleep can now be seen to be a blanket term covering different types of conscious and nonconscious mental activity. Some forms of conscious mental activity that are commonly contrasted with dreaming (and in this simple sense can be said to occur in dreamless sleep), such as hypnagogic imagery during sleep onset or repetitive and non-progressive types of sleep thinking, are not candidates for the kind of dreamless sleep experience described in the Indian debate. Dreamless sleep experience in this narrow sense, if it exists, is a form of phenomenal experience characterized by nonintentional awareness (Thompson 2015, p. 2): "When we're deeply asleep [...] we don't cognize anything—there's no object being cognized and no awareness of the 'I' as knower. Nevertheless, [...] we feel this absence while we sleep and remember it upon awakening" (Thompson 2015, p. 238). Dreamless sleep experience is not just characterized by the absence of certain object-directed forms of conscious experience, but by the fact that this is an *experienced* absence. Moreover, it is not just the objects of experience that are absent, but also the subject of experience, or the "I". A very basic experiential fea-

ture, namely that of being an epistemic agent or a potential possessor of knowledge, has been lost (cf. Metzinger 2013 for a fuller discussion of the term of an "epistemic agent model"). Dreamless sleep experience is characterized by a dissolution of subject-object duality, or, to put a more contemporary gloss on this, by a breakdown of even the most basic form of the self-other distinction (Windt et al. 2014).

This last point is important because it suggests a way of differentiating between dreaming and dreamless sleep experience. Many different definitions of dreaming exist—indeed, the lack of a uniform definition is an important desideratum for theoretical and experimental work on dreaming—but work on dreaming in philosophy of mind often focusses on a structural feature of dream experience. The assumption that dreaming involves the experience of a self in a world marks a point of convergence for philosophers of different stripes, ranging from contemporary philosophers of mind working towards an empirically informed theory of dreaming (Metzinger 2003; Revonsuo 2006) to authors working in the tradition of classical phenomenology (Husserl 2006; Conrad 1968).¹³ Studies have shown that an overwhelming majority of dream reports describe the presence of a dream self (Strauch & Meier 1996) though the precise way in which the dream self is represented is variable (Occhionero et al. 2005; McNamara et al. 2007). The description of dreams as involving not just a self in a world, but an intersubjective world has even informed theories on the functions of dreaming (see for instance

¹³ Note that this way of thinking about phenomenal selfhood is quite different from the way the term "self" is used in the classical Indian literature. In his reconstruction of the Advaita Vedānta concept of witnessing, Fasching (2010) notes that the "witness" (sāksin) is not understood as an observing entity standing opposed to what it observes, but as the very taking place of 'witnessing' itself, and 'witnessing' is nothing other than the taking place of the experiential *presence* of the experiences, in which the experiences have their very being-experienced and thereby their existence." (p. 204) In this conception, "the 'self' is nothing other than becoming aware of experiential presence (consciousness) as such" (p. 207); it is "not a structural moment of what is given, but is the *very taking place of givenness itself*" (p. 210). Recall that one of the points of agreement between the Advaitins and the Nyāyas was that the self persists throughout sleep. But this is not the reading of the concept of "self" that Thompson (2014; see for instance chap. 10) has in mind when he says that in dreamless sleep experience, there is no longer an awareness of the "I", or what I mean when I speak of phenomenal selfhood.

Revonsuo et al.'s 2015 theory of dreaming as a simulation of social reality). Importantly, the description of dreaming as the experience of a self in a world also informs Thompson's own work on dreaming. In *Waking, Dreaming, Being*, he tells us that "the core feature of full-blown dreaming is the experience of immersion in the dream world" (Thompson 2014, p. 127), and also that this immersive quality is exactly what distinguishes hypnagogic imagery during sleep onset from dreaming (pp. 135ff.). The hypnagogic state is a state of absorption, in which attention is fully captured by a series of dynamically changing and often short-lived images; "the hypnagogic state blurs the boundaries between inside and outside, self and world" (p. 124).

This description coincides nicely with my own theoretical work on dreaming. Elsewhere, I have argued that the analysis of self-experience is the key towards understanding not just different types of dreaming (Windt 2010, 2015, chap.s 11 and 12), but also the relationship between dreaming and waking experience. In this view, the common denominator underlying different types of dreams, such as lucid and nonlucid dreams, but also nightmares and false awakenings is their immersive quality. Even in simple forms of dreaming, there is still a sense of presence, a phenomenal *here*, or the sense of being located at a specific point in space, as well as a sense of duration centered on a phenomenal *now*. This basic structure is preserved even when the features that characterize a majority of dreams, such as interaction with non-self dream characters, objects, emotions, or even visual imagery are lost. In such minimal dreams, phenomenal selfhood takes the form of pure spatiotemporal self-location, arising independently of more complex forms of phenomenal selfhood that involve the experience of being a thinking self and embodied agent. There may even be the experience of phenomenal disembodiment, or of lacking a body, and the dream self may be experienced (and later described) as an abstract, undefined volume of indeterminate extension or even as an unextended point in space. Even though this sense of identification with a phenomenal *here* and *now* in-

volves a drastically reduced form of phenomenal selfhood, it is still sufficient to ground retrospective claims of having had a self in dream reports. The basic structural feature of a self that is experienced as distinct from and located at a precise point within the world is preserved. To be sure, the locus of self-location and self-identification is more fluid in dreams than in wakefulness—the phenomenal *here* is subject to sudden shifts, and sometimes, we identify with a dream character or even a series of dream characters that are quite distinct from our waking self (Rosen & Sutton 2013). Yet, as long as there still is a world experienced as distinct from the self, at least a basic form of the self-other distinction continues to exist.

Within this framework, immersive spatiotemporal hallucination, or self-location with respect to a largely nonveridical, spatiotemporal reference frame, marks the cutoff line between dreaming and nondreaming. It also helps isolate and empirically ground minimal phenomenal selfhood (Blanke & Metzinger 2009), or the simplest conditions under which the experience of being or having a self arises. Here, I would like to suggest that this framework can be extended to dreamless sleep experience as well. A very basic point is that we can now sharpen the claim that dreamless sleep experience is a selfless state. Within the present framework, in order for dreamless sleep experience to count as selfless, even the basic form of self-other distinction that underlies spatiotemporal self-location must be lost. The next step is to consider the spatial and the temporal characteristics of self-location independently of each other and ask whether either of them, considered on their own, would be sufficient to give rise to phenomenal selfhood. An affirmative answer would mean that we had not yet identified the phenomenal signature of dreamless sleep experience; an even more simplified account would be needed.

Considering the spatial and temporal aspects of self-location separately, there seems to be a strong conceptual link between the phenomenal *here* and the sense of being located in and relative to a larger spatial expanse. A spatial reference frame, according to the present

theory, turns into an experienced world when it is centered on a phenomenal *here*, which in turn is identified as the self. The spatial variant of presence thus seems to have the self, or some rudimentary form of self-other distinction, written into it. Moreover, the attempt to conceive of an experience characterized by a phenomenal *here* but lacking any temporal characteristics whatsoever strains the limits of conceivability. Speaking of an experience that is both instantaneous, lacking any temporal extension, and fails to have temporal location seems to be a contradiction. It is not clear how this could count as an experience at all, and even less how it could count as a reportable one.

By contrast, the phenomenal *now* does not appear to carry the same conceptual commitments. At least intuitively, the notion of a form of temporal experience that is independent of and perhaps more basic than the experience of being or having a self seems more acceptable than that of an immersive but nonetheless selfless form of spatial experience. Moreover, we can at least conceive, it would seem, of a phenomenal *now* that fails to be differentiated from or clearly located relative to a larger temporal reference frame.¹⁴ And we can also, it would seem, conceive of an experience characterized only by temporal but not by spatial characteristics. Thinking, for instance, is not always experienced as having spatial location (as in thoughts occurring in one's head), but it certainly has temporal dynamics.¹⁵ Spatiality does not seem to be essential to phenomenality in quite the same way as temporality.

Note that I do not intend these conceptual considerations to carry too much weight. In the framework I am working towards, conceptual

distinctions are informed by differences in the structure of phenomenal experience and such differences should at least in principle be memorable and describable, for instance in dream reports or reports of dreamless sleep experience.¹⁶ I also think that the most empirically plausible view will allow for gradual transitions between states involving a phenomenal self and those retrospectively described as selfless; and the same may also be true for the emergence of the simplest forms of phenomenal experience. If this is correct, then we should expect there to be a certain amount of uncertainty when dealing with borderline cases. Where exactly to draw the cutoff line for minimal phenomenal selfhood in a given case may well be hard (if not impossible) to determine; but even so, it might still be useful to introduce a conventional cutoff line (for instance by saying that minimal phenomenal selfhood involves both the spatial and the temporal aspects of self-location) if this helps pick out a theoretically meaningful transition in the structural features of experience and guides future research in a constructive manner. We will also expect such a theoretical conception to be reasonably well aligned with the way such experiences are described in retrospective reports.¹⁷ I think that both types of considerations support the claim that spatiotemporal self-location can be meaningfully described as a minimal form of phenomenal selfhood, or at least as a theoretically salient point of transition on the trajectory from states described as

¹⁶ This is not to deny that experiences (or qualitative aspects of experiences) could exist that are beneath the cutoff line of memorability and reportability. Certain subtle aspects of phenomenal experience, such as hues of color, do seem to outrun our ability to categorize and reidentify them over time (Raffman 1995). Here, I am only claiming that such subtle aspects of experience are not candidates for the report-based type of scientific investigation I am interested in here.

¹⁷ This is a prediction, and different subjects may mean different things when they describe an experience as selfless. For some this may mean an experience characterized by spatiotemporal self-location, but in which they had the experience of being a disembodied entity (cf. Windt 2015, chap. 7); others may describe episodes characterized only by their temporal features as involving a self. There is also the familiar problem that reports of selfless experiences easily slip into a performative self-contradiction, of the type "I had a dream in which I was not present"; such episodes are clearly remembered and reported by someone. But we should not expect the folk-psychological use of terms such as "I" or "self" to align perfectly with a particular technical definition. This is a good example of where specific interview questions might increase the expressive granularity of retrospective reports.

¹⁴ In fact, if we conceive of temporal experience as involving a specious present, we might say that the phenomenal *now* simply is identical with a rudimentary form of a temporal reference frame. I return to this point later. Alternatively, if we conceive of temporal experience as consisting of a series of unconnected moments that themselves have no temporal extension, then again it would seem that each of these could occur in isolation and without being embedded in a larger temporal reference frame.

¹⁵ This phenomenological observation is reflected in the classical idea that the mind cannot be spatially located in the physical world. Mental states persist over time, but they do not have spatial characteristics such as expansion or separable parts. Perhaps, this phenomenological observation lies at the root of metaphysical claims about the relationship between mind and body.

selfless to states involving self-experience in a fuller sense. By contrast, the phenomenal *now*, when it arises independently of spatial self-location, is a candidate for a structural feature of phenomenal experience that provides the conditions of possibility for self-experience but that when occurring on its own is still prior to it. I would like to suggest, then, that pure subjective temporality is a candidate for minimal phenomenal experience; it is a condition for but still more basic than minimal phenomenal selfhood. It can be described as subjective only because it involves phenomenal experience; yet, it does not involve the additional experience of being a self, or a separate entity having the experience.¹⁸

There is, of course, a rich philosophical debate on the nature of time experience, as well as a large empirical discussion (for an introduction, see [Dainton 2010](#); [Arstila 2014](#); [LePoidevin 2015](#)). I cannot begin to do justice to this literature here, but want only to focus on one specific aspect. This is the idea, which we find in William James as well as in Husserlian phenomenology, but also in the neuroscience of time consciousness (see for instance [Pöppel 2003](#)), that even the smallest unit of temporal experience, the temporal *now*, is extended rather than instantaneous.¹⁹ Following this con-

ception, a rudimentary form of duration would be intrinsic to the phenomenal *now*; and neuroscientific work seems to suggest that this temporal *now* is itself variable ([Wykowska & Arstila 2014](#)). The window of simultaneity, or the maximum time-frame within which two different events are experienced as occurring *now*, is modality-specific. The cutoff line for two stimuli being experienced as simultaneous is, for instance, larger for visual stimuli than for auditory ones. As [Wykowska & Arstila \(2014, p. 443\)](#) note,

it might be that a relatively broad window of simultaneity is actually beneficial. The human brain needs to exhibit some degree of tolerance to asynchronous stimuli in order to be able to bind different sensory inputs into one event. The window of simultaneity can be seen as an integration window for stimuli and, as such, is a necessary mechanism for binding signals from different pathways into one single object or event.

Human temporal resolution is flexible, it is easily affected by attentional processes as well as by training and expertise ([Wykowska & Arstila 2014](#)). Duration perception might be state-dependent as well, showing characteristic changes in altered states of consciousness and psychiatric disorders ([Noreika et al. 2014](#)); and perhaps the same is true for the degree to which the experienced *now* itself is stretched in time. There also seems to be a close relationship between changes in time perception and alterations in self-experience. When the self becomes the focus of attention, when we attend to our current mental or emotional state, or to bodily sensations (such as hunger or pain), time seems to slow down; by contrast, when we are thoroughly absorbed in an activity, time contracts and seems to move faster ([Wittmann in press](#)). When self-experience is lost, as in selfless states, the loss of a reference point may be associated with feelings of timelessness ([Wittmann in press](#)); the phenomenal *now* is stretched indefinitely. There is a sense of duration, but the sense of

¹⁸ Note that this is related to a terminological difficulty that is implicit in the Indian debate, as well as in Thompson's reconstruction of it. As noted earlier, both sides in the Indian debate assumed the self to persist throughout sleep; they merely disagreed whether the self is necessarily conscious. My proposal that we redescribe dreamless sleep experience in terms of pure subjective temporality captures this idea that the self persists in a thin sense even when awareness of any intentional contents is lost. At the same time, recall that dreamless sleep experience is thought to be characterized by a collapse of subject-object duality and by an absence of any intentional objects of awareness. In this state, nothing, including the self, is thought to be known or cognized. There is no longer an individual, consciously experienced first-person perspective. It is this thicker and more substantial notion of a self experienced as distinct from other objects or persons that I propose is lost in dreamless sleep experience; the persistence of such a self would mean that there would still be an intentional object of awareness, and thus would indicate a more complex state than that characterized in the Indian debate as dreamless sleep experience.

¹⁹ This could, of course, turn out to be false. Even if the underlying neural representations are temporally extended, the same may not be true of conscious states themselves; these may still be conceived of as elementary and momentary events lacking spatial or temporal structure. For a recent defense of such a view, inspired by the Abhidharma doctrine of momentariness, see [Chadha \(forthcoming\)](#). Yet, even if the experience of continuity and persistence over time turned out to be an illusion, this would still be an interesting structural feature of phenomenal experience. For present purposes, the basic phenomenological claim, according to which the phenomenal *now* is temporally stretched rather than momentary and discrete, is enough.

succession, of there being a chain of present moments, has been lost.

Importantly, this way of thinking about subjective temporality and the experienced *now* is one which Thompson (2015) endorses. He explicitly appeals to the Husserlian conception of time experience in his defense of retrospective reports of dreamless sleep experience. Here, he suggests that memories of dreamless sleep experience may be grounded by retentional awareness, “the holding onto the just-past as an intentional content belonging to our consciousness of the passage of time, including our mental lives as flowing in time” (p. 9). Because temporal experience has the retention of the immediate past and protention, or the anticipation of the next moment, written into it, the moment after awakening still carries with it the traces of dreamless sleep experience: “Immediately, the ego sense appropriates the lingering impression or retention of not-knowing and associates this retention with itself, thereby generating the retrospective thought, ‘I did not know anything’” (p. 10).

In *Mind in Life*, Thompson (2010) endorses a version of Husserl’s conception of time-consciousness according to which the streaming, flowing character of subjective experience is both the “condition of possibility for every other kind of consciousness, but is not itself made possible by some other, still deeper level of consciousness” (p. 324). This absolute flow of consciousness is self-constituting (p. 324); it is also prior to and essential for phenomenal selfhood. As Thompson (2010) puts it,

to be aware of phenomena across time, consciousness must be retentionally and protentionally aware of itself across time. Therefore, time-consciousness entails prereflective self-awareness. In other words, our being conscious of external temporal phenomena entails that our temporally enduring experiences of those phenomena are self-aware. Inner time-consciousness is thus nothing other than prereflective self-awareness. (p. 328)

This prereflective awareness that consciousness has of itself (its self-luminousness, reflexivity, or

self-acquaintance²⁰) is not yet the same as being or having a phenomenal self in the sense used here. Rather, this minimal form of phenomenal experience is the condition for the emergence of minimal phenomenal selfhood.

My suggestion, then, is that we can enrich our theoretical conception of dreamless sleep experience by applying Thompson’s account of how we *remember* dreamless sleep experience (namely with the help of retentional awareness) to the description of dreamless sleep experience itself. Dreamless sleep experience involves pure subjective temporality that is not yet structured around intentional objects, including a phenomenal self. As Thompson (2015) puts it, “although deep sleep creates a gap or a rupture in our consciousness, we often feel the gap immediately upon awakening. [...] We are aware of the gap from within our consciousness” (p. 4). Just as upon awakening, I am directly aware that it was I who was asleep and unknowing, I am typically aware that a certain (though perhaps indefinite) amount of time has passed. Following Proust’s more poetic formulation in the passage quoted by Thompson,

a sleeping man holds in a circle around him the sequence of the hours, the order of the years and world. He consults them instinctively as he wakes and reads in them in a second the point on the earth he occupies, the time that has elapsed up to his

²⁰ Again, there are subtle terminological differences. For instance, Williford (2015a, pp. 10-11; see also Williford 2015b) writes that reflexivity or self-acquaintance is “an essential structural feature of all consciousness; and I take it to be a phenomenological datum. All streams of consciousness are immediately aware of themselves, and that is the foundation of all other forms of self-representation, autobiographical cognition, and so on. This reflexivity is subjective character (for-me-ness), but it is a mistake to turn this structural feature into a kind of entity or homunculus.”

My account is compatible with much of what Williford says here; I agree that we are considering a basic and essential feature of conscious experience, and one that should not lead us to posit an independent entity that is identified as the self. Yet, I think there is room for phenomenal selfhood as a structural feature of experience over and above the reflexivity of even the simplest kinds of phenomenal states. Even readers who disagree with my description of this as a form of phenomenal selfhood might still agree that the target property of spatiotemporal self-location is distinct from the more basic reflexivity of consciousness. Adopting the conceptual convention of describing this as a form of self-experience does not, I take it, require us to reify the self or to slip into a homuncular view, but simply offers a conceptual tool for describing the way we experience ourselves as being or having a self.

waking; but their ranks can be mixed up, broken. (p. 3)²¹

We might even say that metaphorically speaking, subjective temporality provides a reference frame that is still empty, but poised to integrate and lend temporal structure to intentional contents such as thoughts, objects and events, but also the self, as they arise—for instance by imposing sequential order on them and representing some of them as simultaneous, and others as successive. Yet, this form of temporality is more basic than the events it later integrates; it predates them and provides a space in which they can appear.

Incidentally, this idea fits in nicely with the Vedantan view that, “deep sleep is a kind of ‘ground state’ of consciousness, a lowest-energy state from which the ‘excited states’ of dreaming and waking arise” (Thompson 2014, pp. 260-261). Again, deep sleep is the baseline, the causal source from which other conscious states arise; it is also called “seed sleep”, because it is thought to contain the seeds of both dreaming and waking consciousness. Perhaps we can begin to make sense of this idea by saying that dreamless sleep experience, understood as pure subjective temporality, is a candidate for minimal phenomenal experience.²²

²¹ A prediction that seems implicit in Proust’s observation that if we are suddenly overcome by sleep, we no longer know what time it is upon awakening, is that dreamless sleep experience may bear an interesting relation to the ability to estimate how long one has slept. Perhaps, intermittent periods of dreamless sleep experience even ground our awareness that some time has passed or are responsible for the ability, which may be more pronounced in certain subjects, to awaken just before the alarm clock goes off (thanks to Valdas Noreika for pointing this out). By contrast, if we awaken from a state lacking any form of phenomenal experience whatsoever—as in some forms of anesthesia—there may be no sense of a preceding temporal gap and a more profound sense of temporal disorientation. At present, this is, of course, entirely speculative, but it might be a question worth asking.

²² The temporally dynamic nature of experience is also of central importance for understanding the neural correlates of conscious experience. As Melloni (2015) points out, while the mechanisms for updating the contents of consciousness have been investigated by numerous studies, the mechanisms underlying the maintenance or the flow of conscious experience fall outside the scope of most existing paradigms. She also proposes that the temporal flow of consciousness is a fundamental property of experience and an important target—perhaps the most important target—for future research on the neural correlates of consciousness. Similarly, Noreika (2015) suggests that focusing on the analysis of individual contents of consciousness, as is standardly done in mainstream research on the neural correlates of consciousness, misses the temporality of consciousness; instead, to make progress toward understanding this more fundamental property, he proposes contrasting conscious and nonconscious states.

How can we make progress on identifying real-world cases of dreamless sleep experience? Importantly, if the account of dreamless sleep experience defended here is even remotely correct, we should not expect dreamless sleep experience to be restricted to experienced meditators. Instead, dreamless sleep experience might be fairly prevalent even in people without any formal training in contemplative traditions. This approach requires disambiguating between at least two variants of the target phenomenon. Note that within the Indian conception of dreamless sleep, we can distinguish between an insight component and a more basic experiential component. The insight component refers to the ability to become aware, during sleep, of the nature of this state. This is not necessarily a conceptually mediated form of knowing *that* you are currently sleeping dreamlessly, but rather consists “in being able to witness the state of dreamless sleep and recall its phenomenal clarity upon awakening” (Thompson 2015, p. 15). Still, even this nonconceptual form of witnessing is not epistemically neutral, but can lead (or fail to lead) to veridical retrospective reports. To be sure, this form of insight or awareness itself can have a particular phenomenal feel—it bears the phenomenal signature of knowing (Metzinger & Windt 2014, 2015), the feeling of just having become aware of the nature of one’s ongoing state—but importantly, this type of phenomenal experience carries with it epistemic commitments. My feeling of knowing can be true or false. It also seems plausible, as suggested by Thompson, that meditation facilitates this type of lucid dreamless state, or perhaps could even be a way of inducing it systematically.

But the model of dreamless sleep experience as pure subjective temporality also points to a more basic experiential component that as such bears no obvious connection to an epistemic state of knowing or of being aware of the nature of the state one is currently experiencing. Dreamless sleep experience in this primary phenomenological reading refers to a kind of experience during sleep; but this does not require the ability to conceptualize this *as* a form of sleep experience. In principle, you can have dreamless sleep experience without realizing

that you are asleep: dreamless sleep experience is a form of experience occurring *in* sleep, but it is not necessarily an experience of sleep *as* a state of sleep. It might enable us to estimate how long we have slept, but it can also be misleading, maybe even leading us to misjudge whether we have slept at all. This is particularly obvious if dreamless sleep experience is construed as an answer to the question of how we know, upon awakening, that we slept peacefully (Thompson 2015, p. 4). Thompson's reconstruction of the Indian debate, taken together with my analysis, suggests that because this state is characterized only by its temporal character, we have the sense of there being a gap between two periods of wakefulness; and because this gap is devoid of intentional objects, we describe it as peaceful. Yet, this does not seem to require that we were aware of (or took ourselves to be aware of) the nature of this state while it was occurring, namely during sleep. If any sophisticated epistemological reading of insight were indeed crucial to dreamless sleep experience, the experience of having slept peacefully would have to be reserved for special subject groups, such as experienced meditators—and it would be quite mysterious why clearly, it is not.

Perhaps we can model the relationship between the epistemic and the phenomenological components of dreamless sleep experience on the relationship between lucid and nonlucid dreaming. Thompson (2015, p. 15) himself explicitly contrasts lucid dreaming, or knowing that you are dreaming while you are dreaming, with lucid dreamless sleep. Given this suggestion, a good place to begin the project of broadening the investigation of dreamless sleep experience beyond expert meditators is to consider reports from experienced lucid dreamers.

5 Candidates for pure subjective temporality during sleep

5.1 From lucid dreaming to lucid dreamless sleep?

Lucidity is commonly defined as awareness that one is dreaming while one is dreaming (for ex-

cellent reviews, see Voss & Hobson 2015; Dresler et al. *in press*). Often, this is associated with an ability to control not just one's own actions in the dream, but also the course of the dream, the actions of non-self dream characters, etc. In particular, lucid dreamers can signal that they have now become lucid by making prearranged patterns of eye movements, such as looking right – left – right – left within their dream. These gaze shifts correspond to the movements of their physical eyes and can be identified on the electrooculogram. This technique of signal-verified lucid dreaming enables researchers to identify the precise period of sleep during which certain actions were performed during a lucid dream and potentially to identify their electrophysiological and neural correlates (Dresler et al. 2011, 2012). Lucidity can occur spontaneously, but a number of methods for inducing lucidity are discussed in the literature (Stumbrys et al. 2012). There have even been suggestions and attempts to experimentally induce dream lucidity through electrical stimulation (Noreika et al. 2010a; Voss et al. 2014; Voss & Hobson 2015). While still in its early stages, this work clearly shows that lucidity is a robust phenomenon; and combined with the ability to control the dream as it unfolds, it makes laboratory studies of lucid dreaming compelling.

One reason for being interested in lucid dreams within the present context are reports of lucid dreams describing a loss of phenomenal embodiment, or even a dissolution of the self (see Windt 2015, chap.s 7, 11 for discussion). Some of these appear to fulfill the requirements for minimal phenomenal selfhood described earlier: in so-called imageless lucid dreams (Magallón 1991; Bogzaran 2003; Hurd 2008), self-identification may be relative to a disembodied point in space and can arise independently of bodily sensations and even of visual imagery (see also LaBerge & DeGracia 2000). While most of these reports, so far, are anecdotal, it is tempting to think that lucid dreams could be used to systematically investigate the transition from minimal phenomenal selfhood to more complex forms of self-experience involving the experience of being a thinking self and em-

bodied agent. Importantly, according to some of these reports, even this basic sense of self-identification and location within a larger spatial expanse can be lost. I would like to suggest that such cases may involve a shift from a simple form of lucid dreaming involving minimal phenomenal selfhood to lucid dreamless sleep experience. Here is a single example:

I am suspended in space—dream space, I think. There is nothing here, just millions of greyish dots and I am one of the dots, there’s no dream-body anymore, I’m just a dot [of] pure consciousness suspended. A feeling of great peace comes over me and a sense of gentle, infinite expansion. It’s as if everything and nothing are the same thing and there is a sense of effortless belonging. As the sense of expansion increases I am no longer a single dot of consciousness; all the dots are me and I am them. There’s no “I” or “them.” We are one. There’s just a blissful sense of timelessness and oneness and a merging with the light. After an indefinable length of time, I start to feel the weight of my body in bed, and settle back into it, tingling all over. (Clare Johnson, unpublished dream report, March 19, 1995)

If we take the report at face value, it describes a gradual transition from minimal phenomenal selfhood, characterized by phenomenally disembodied spatiotemporal self-location, to selfless experience. This transition is accompanied by a sense of spatial expansion, in the course of which the sense of the self as distinct from the environment is lost. To the extent that there still is a sense of spatial self-location, this no longer involves the experience of being located relative to something else. There is also a change in the temporal structure of experience, almost as if the experiential present, the phenomenal *now*, had been stretched indefinitely. The period following the dissolution of the self is still experienced as having duration, but this duration is indefinable and no longer structured around any events.²³ Following Metzinger

(2013), we might want to describe this as involving a transition from a minimal unit of identification, in which an unextended point in space is described as the locus of the self, to a maximal unit of identification. In such cases of “pure consciousness”, he suggests, the unit of identification is

the most general phenomenal property available for identification at all: Philosophers might call it the global “unity of consciousness”, or phenomenality per se, or awareness as such, namely the singular, integrated, all-pervading quality of consciousness characterizing the current totality of experiential contents, as it is given in every single moment of experience. (Metzinger 2013, p. 5)

I would like to suggest that we can now be more precise. The moment at which self-location dissolves—or at which minimal phenomenal selfhood is replaced with the maximum unit of identification—involves a transition to the type of pure subjective temporality that earlier, I suggested might be the phenomenal mark of dreamless sleep experience. As lucid dreaming gives way to lucid dreamless sleep experience, minimal phenomenal selfhood shades into pure phenomenality, in which phenomenal experience is characterized only by its temporal structure. I find it telling that according to Johnson’s report, this latter part of the episode appears to strain the limits of reportability, and also that despite its indefiniteness, the experience is described as blissful; again, this is exactly what the Indian focus on the experience of having slept peacefully would lead us to expect.

Clearly, this single dream report presents anecdotal evidence at best; still, I would like to suggest that a first step towards extending the investigation of dreamless sleep experience beyond experienced meditators might be to investigate imageless lucid dreams in experienced lucid dreamers. What makes me cautiously optimistic is that lucidity is often described as a very unstable phenomenon, as involving a balancing act

²³ A similar link between the dissolution of the self and the experience of timelessness, or of an indefinite duration, may exist in deep meditative states (Berkovich-Ohana et al. 2013), but also, for instance, in drug-induced altered states of consciousness (Wittmann in press).

between maintaining lucid insight (rather than slipping back into a nonlucid dream or awakening) and remaining engaged enough in the ongoing dream to prevent it from dissolving completely (Brooks & Vogelsson 2000). Lucid dreamers often describe that imagery can take on a faded, washed out quality, or that lucidity is followed by a period of darkness or, alternatively, of light; indeed, this may be why such reports often slip into mystical language to describe such experiences. Here, I want only to suggest that in such cases, the unwanted fading of lucid dream imagery may actually be an opportunity for experimentally investigating the transition to dreamless sleep experience.²⁴

Before moving on, I want to suggest that the comparison between lucid dreaming and lucid dreamless sleep is also interesting for another reason. This is that as is the case for nonlucid dreams, there continue to be a number of conceptual uncertainties about how to define lucid dreaming and whether to describe it as a genuine sleep phenomenon or as a hybrid state between REM sleep and wakefulness (Voss et al. 2009; for a discussion of lucidity and insight from a philosophical perspective, see Kühle 2015; see Voss 2015 for a critical reply). Also, while some authors consider any dream involving insight into the fact that one is now dreaming as lucid, others reserve the term lucidity for cases in which there is a marked increase in the overall vividness of multimodal imagery as well as a shift towards wake-like cognitive activity, including the ability to engage in rational thought, full recall of waking life, and insight into the fact that none of the events occurring within the dream have any real-world consequences (for a first attempt to test these different conceptions of lucidity experimentally, see Voss et al. 2013).

On the conception that I favor, lucidity is not necessarily accompanied by an all-pervading change in the phenomenal character of the dream; rather, lucid dreams are gradually distinguished from nonlucid ones along a number

of dimensions (Windt & Metzinger 2007; Nor-eika et al. 2010a; Voss et al. 2013). While laboratory studies, because of their reliance on signal-verified lucid dreams, necessarily focus on lucid dreams involving at least some form of control, the conceptually mediated insight into the fact that one is now dreaming is orthogonal to the other experiential qualities of dreaming. Insight is also necessary to score a given report as describing a lucid dream—but aside from this methodological fact, the ability to conceptualize one’s ongoing experience as a dream—to have the thought “I am now dreaming”—can coexist alongside the types of vivid, often bizarre and emotionally charged imagery and erratic reasoning that characterize a majority of nonlucid dreams as well. Lucidity can be the outcome of a conscious inference (of the type “this cannot be happening, so I must be dreaming”), but often appears to be driven by a sudden feeling, sometimes described by saying that the dream suddenly took on a dreamlike feel or a hyperreal character (see Windt 2015, chap. 9 for details and further references). Perhaps, this precursor to full, conceptually mediated lucidity is similar to the type of nonconceptual awareness that is thought to accompany lucid dreamless sleep experience as well. This suggests two further questions. The first is whether nonlucid forms of dreamless sleep experience exist as well. The second is whether in dreamless sleep experience, anything analogous to prelucid dreams exists. I discuss these in turn.

5.2 From white dreams to nonlucid dreamless sleep experience?

Again, we can approach the project of identifying candidates for nonlucid dreamless sleep experience by asking whether instances of minimal phenomenal selfhood exist in nonlucid dreams. If so, we could once more expect these to occur in the vicinity of minimal phenomenal experience during dreamless sleep.

A possible candidate for such a state are so-called white dream reports, in which subjects describe the impression of having experienced a dream but are unable to describe it in any detail. It seems plausible that a subgroup of white

²⁴ Similarly, in the tradition of dream and sleep yoga, dream lucidity is sometimes described as a preliminary stage of becoming aware of sleep; again, realizing that one is dreaming precedes the dissolution of dream imagery while maintaining awareness of dreamless sleep. See for instance Wangyal & Dahlby (1998).

dream reports can be explained by forgetting. Especially where the subject describes the distinct feeling of having had a complex dream but being unable to remember it in any detail, this would seem to be the most plausible interpretation. There is some reason for thinking, however, that this may not be the case for all reports of white dreaming. In at least some cases, the impression of having had some kind of experience prior to awakening, coupled with an inability to describe any particular aspects of the experience, such as any specific forms of imagery or narrative contents, might not be an artifact of forgetting, but might reflect the structure of the experience itself. At least a subset of white dreams might involve a sense of spatiotemporal self-location, or minimal phenomenal selfhood, arising in an otherwise imageless nonlucid dream. And if this were supported by future studies, then it might even make sense to ask whether perhaps, a further subgroup of white dreams could more properly be described as involving nonlucid dreamless sleep experience. In the current framework, these latter types of white dreams would not count as proper dreams at all: they would be instances of pure subjective temporality arising independently of the spatial aspects of self-location and self-identification. They would involve a form of minimal phenomenal experience that could no longer be described as minimal phenomenal selfhood, and thus as a dream. Perhaps, we occasionally really do retain some awareness, after awakening, of phenomenal experience having persisted during sleep. And perhaps, unable to remember any specific details, we then assimilate them to more familiar types of experiences, labeling them as white dreams.

Again, all of this is still extremely speculative and everything I have said so far about white dreams should be read, at best, as a careful prediction of what we might say in light of future findings. In particular, I do not mean to suggest that white dream reports, or a subgroup thereof, can already be regarded as examples of dreamless sleep experience: I only mean to propose that they are an initially promising target for future research on dreamless sleep experience. Still, these considerations fit in nicely with

the finding that white dreams are particularly frequent during slow-wave sleep. According to one study, awakenings from stages 2 and 3 NREM sleep were followed by roughly equal rates of dream reports, white dream reports, and reports of nondreaming (Noreika et al. 2009). Their occurrence in the vicinity of reports of dreaming and of nondreaming might indicate that white dream reports describe a transitional state between the two. Moreover, even dream reports obtained following awakenings from these sleep stages were often static, describing experiences lacking narrative progression as well as movement sensations (Noreika et al. 2009, 2010b). Participants sometimes described the sense of being present in a static scene, as in quietly sitting on a bench, with nothing else happening (Valdas Noreika, personal communication; see also Noreika 2014, p. 52). Even in the absence of narrative progression, there was still a sense of duration, and according to subjective estimates, these simple dreams lasted between thirty seconds and one minute.

An interesting possibility could be to investigate the wording of white dream reports in more detail. To my knowledge, this has not yet been done. Maybe there are indeed subtle differences in the wording of such reports, and perhaps these would enable researchers to distinguish cases in which there is the impression of having forgotten a complex dream from ones describing imageless and perhaps even selfless and objectless episodes of phenomenal experience. Again, it might be possible to increase the expressive granularity of reports with the help of training or specific questionnaires, thus rendering subtle phenomenological differences visible that would be otherwise overlooked. A possible finding could be that some of these experiences involve a continued sense of presence and self-location in an abstract, amodally experienced spatial expanse, whereas in others, even this basic sense of self is lost and only the feeling of duration, or of an indefinite temporal expanse, is present.

A particularly promising way to do this would be to use a serial awakenings paradigm, in which participants are awakened multiple

times throughout the night at intervals of 15-30 minutes, thus maximizing the number of reports that can be collected throughout the night (Noreika et al. 2009; Siclari et al. 2014; Siclari et al. 2013). Questions focusing on the temporal aspects of experience could then be used to identify those periods, if any, in which dreamless sleep experience is most likely to occur. For instance, Siclari et al. (2013) asked their participants to estimate how long they had been having continuous experiences before being awakened, but also how long their most recent experience had lasted, how far back in time they could recall any narrative events, and how rich and complex the experience was. They found that during stages N2 and N3, estimates for duration, recall back in time and richness were low. Still, these results could be influenced, in part, by the fact that the interview questions focused on the objects of consciousness and on narrative events. If the questions were reworded in such a way as to cover dreamless sleep experience, the patterns of responses might change. Even so, it is interesting to note that during sleep onset, there was a dissociation between these measures, with participants estimating a long duration of the last conscious experience, but a low richness and ability to recall back in time. At least, this suggests that the estimated duration of conscious sleep states does not always map cleanly onto the ability to recall specific contents. For now, I want only to suggest that a similar strategy could interestingly be applied to the investigation of dreamless sleep experience as well.

This is also attractive in view of the goals of this line of research. Note that Siclari et al. (2014) explicitly use the serial awakenings paradigm to contrast the presence and absence of conscious experience independently of task performance and within the same sleep stage (for a similar suggestion, see Noreika et al. 2009; Noreika 2015), the ultimate aim being to identify the task- and state-independent neural correlates of conscious experience. For this project, dreamless sleep experience, as a candidate for minimal phenomenal experience during sleep, is clearly a relevant target phenomenon.

5.3 From subjective insomnia to unwitting expertise of dreamless sleep experience?

The final example that I wish to discuss is sleep misperception in subjective (or paradoxical, as it is also sometimes called) insomnia. The term objective insomnia, reserved for patients suffering from actual sleep loss as conventionally measured, is sometimes contrasted with subjective insomnia, which refers to subjects who systematically underestimate the time they actually spend asleep (Harvey & Tang 2012; Perlis et al. 1997). This mismatch between subjective sleep perception and objective measures of sleep sometimes leads to a trivialization of subjective insomnia—and the suggestion that their diagnosis as insomniacs is somehow not “real” can be experienced as infuriating by those afflicted by it (Greene 2008). Subjective insomnia is clearly not an imaginary problem, but a cause of real suffering. In fact, patients with subjective insomnia may experience more severe impairments in cognitive functioning than insomnia patients who do not underestimate the amount of sleep they are getting. Furthermore, worrying about getting enough asleep may precede actual sleep loss, and patients who underestimate the time they spend asleep may still be suffering from a real sleep deficit as well (Harvey 2002; Harvey & Tang 2012). The distinction between subjective and objective insomnia has also been questioned, as sleep-state misperception may be prevalent in different subtypes of insomnia. As Harvey & Tang (2012) put it, “many patients with insomnia perceive sleep as wake, systematically overestimate the time they take to get to sleep (SOL) and underestimate the time they sleep in total (TST).” This further highlights the urgency of sleep-state misperception existing alongside actual sleep loss in insomnia.

In the context of the present discussion, the example of sleep-state misperception in subjective insomnia may seem to be a counterexample to, rather than a candidate for, dreamless sleep experience. Thompson (2015, p. 5) considers sleep-state misperception as a possible objection to his view: sleep-state misperception

of the type seen in insomnia challenges the reliability of subjective reports of sleep, thus providing a counterexample to his claim that at other times, reports of dreamless sleep experience and of having slept peacefully are veridical memory reports. He then argues that the mere possibility of there being veridical reports of dreamless sleep experience is enough to disprove the default view. He also proposes that in experienced meditators, “we should observe a stronger correlation between subjective reports of phenomenal qualities of sleep and various objective measures of brain activity” (p. 16). The fact that at other times, subjective evaluations of sleep can go wrong does not contradict this view, but merely shows that the investigation of dreamless sleep experience is best restricted to certain subject groups.

Here, I want to suggest that an alternative interpretation of sleep-state misperception is possible. In this alternative view, patients with subjective insomnia are in fact unwitting experts of various kinds of sleep experience. It is merely in conceptualizing their sleep states as occurring in wakefulness that they go wrong. Yet, this is compatible with saying that during sleep, they maintain prereflective awareness of their ongoing sleep state; in fact, it might be their continued perception of sleep that leads them to mischaracterize it as a state of wakefulness, rather than as sleep. Their expertise, consequently, is of a somewhat paradoxical nature: they have a high-degree of familiarity with their sleep, they observe and perhaps even compulsively attend to it—but they don’t recognize or conceptualize it *as* sleep.

Note that this description fits in well with the distinction, introduced at the end of section 5.1, between different readings of the term lucidity. There, I argued that prereflective awareness of the fact that one is now dreaming often precedes the conceptually mediated insight that characterizes full-blown lucidity. Importantly, these two factors may even be dissociable: a fleeting awareness of the dreamlike nature of one’s current state can be misinterpreted, on the level of conscious, conceptually mediated thought, as indicating that one is awake. In such prelucid dreams, the erroneous conclusion

that one is certainly awake may be prompted by the same type of change in experiential character that in other cases drives the cognitive realization that this is a dream (see also Windt 2015, chap. 9).²⁵

Similarly, the idea is that sleep-state misperception arises when patients misinterpret mental activity and phenomenal experience that in fact occurs in sleep as occurring in wakefulness. Indeed, Mercer et al. (2002) found that when they were awakened 5 minutes after the onset of stage 2 sleep or REM sleep, insomnia patients were more likely than good sleepers to say they had been awake. One possibility is that these patients generally have a heightened awareness of sleep-related experiences; another is that increased attention to and concern about the amount of sleep they are getting may increase their sensitivity to such sleep-related experiences, as well as the likelihood of misdescribing them as occurring in wakefulness.

Interestingly, it does not seem that subjective insomnia simply results from a general deficit in the ability to estimate time (Tang & Harvey 2005). Instead, subjective insomnia appears to be associated with selective attention to and increased monitoring of external cues (such as the time of day or the alarm clock), but also of thoughts and bodily sensations that are taken, by the subject, to be inconsistent with sleep. As Mercer et al. (2002, p. 565) put it, “insomniacs’ reduced sleep-wake discriminability may be caused by either a greater amount of mentation during sleep, mentation that more

²⁵ This is also why such examples of prelucid dreams or of sleep-state misperception do not threaten the transparency of retrospective reports. In the present framework, reports are transparent with respect to the occurrence and phenomenal character of experience only; but we should not expect them to accurately reflect the sleep state in which the respective experiences occurred (or indeed whether they occurred in sleep at all), just as we should not expect them to accurately identify the underlying changes in neural activation patterns. Perhaps training, as Thompson (2015) suggests, can indeed improve the match between subjective experience reports and objective measures of sleep states or of brain activation; but this is in no way guaranteed. Or perhaps, objective measures of sleep should be informed by the conditions under which different subject groups experience themselves as being asleep. A mismatch between subjective and objective measures need not indicate a flaw in subjective reports; it might also indicate that objective sleep measures are poorly suited to capture what normal, healthy subjects mean when they say they have been asleep. Indeed, this latter suggestion is in keeping with Thompson’s proposal of a phenomenologically enriched taxonomy of sleep states.

closely resembles awake mentation, or a misattribution of normal nocturnal mentation as wakeful cognitive activity.” Enhanced memory processing may also play a role (Perlis et al. 1997), as might enhanced physiological and cortical arousal. Intriguingly, insomnia patients show heightened beta and gamma EEG activity during sleep onset, but also during NREM sleep; and in one study, this activity was negatively associated with their ability to correctly perceive that they had been asleep (Perlis et al. 2001). Again, this could be an indication of continued awareness during sleep. Subjective insomniacs may be witnessing sleep whilst failing, unlike the expert meditators described by Thompson (2015, see especially p. 16), to realize what it is they are witnessing.

As is the case for white dreams, I am not suggesting that sleep-state misperception in insomnia be equated with dreamless experience, or indeed that any simple explanation is available. Clearly, a wide range of conscious mental activity occurring in sleep might be perceived as occurring in wakefulness, and much of this might be quite different from the specific type of dreamless sleep experience I am interested in here. And equally clearly, sleep-state misperception in insomnia is a far cry from the peaceful type of sleep experience describe in the Indian debate. In her book-length treatment of insomnia, in which she synthesizes research findings with her own personal experience of insomnia, Gayle Greene (2008) describes her reaction to being told, after a sleepless night in the sleep laboratory, that she has in fact been asleep:

So that’s why nobody had come in with a sleeping pill—the EEG said I was asleep. But I was not asleep. I was truly awake. What in the world was it recording? I may have been in a state of deep relaxation, semi-meditative, I usually am when I lie there, and I may have dropped off, but I was aware of all those thoughts, the feel and look of the room, the long drawn-out boredom of lying there without a book to listen to—it felt like consciousness to me. How could I be aware of all that if I hadn’t been awake? (Greene 2008, p. 254)

When asked, however, if she had been aware of the technician coming into her room, she was not (Greene 2008, p. 253).

Here, I want only to make room for the idea that a subgroup of instances of sleep-state misperception might be more properly described as resulting from an awareness of what is in fact sleep, but then is erroneously categorized as belonging to wakefulness. And at least a portion of this awareness of sleep might consist of dreamless sleep experience, or the persistence of temporal experience devoid of further intentional content or any specific objects of awareness during sleep. Moreover, this may well be the dreamless-sleep analogue of pre-lucid dreaming, where heightened awareness of one’s ongoing state leads to its erroneous characterization as wakeful activity on the level of conceptually mediated thought.

Finally, sleep-state misperception of this type may not be unique to insomnia, but may be prevalent in the general population. In a paper aptly titled “The perceptual uncertainty of having sleep”, Sewitch (1984) describes the outcome of an experiment investigating the ability of healthy subjects to correctly say whether they have been asleep, as determined by objective markers such as EEG measures. She found that out of 210 awakenings from Stage 2 sleep, 116 were judged to be periods of wakefulness; for REM sleep awakenings, the number was lower, with 45 out of 165 awakenings being judged to have been preceded by a period of wakefulness. The surprising conclusion is that even ordinary sleepers quite dramatically underestimate the amount of time they have been asleep (see also Webb 1975). Other studies point in a different direction. There is some evidence that whereas insomnia patients underestimate their total sleep time, healthy subjects overestimate how long they have been asleep (Means et al. 2003; Pinto Jr. et al. 2009). Clearly, more research is needed. But either way, it would seem that our confidence in our ability to tell whether and how long we have been asleep or awake is overrated. And perhaps, at least part of this confusion stems from the fact that the default view is deeply engrained not just in cognitive neuroscience, but also in

folk-psychology: We expect sleep to be a state of unconsciousness, and so when we recall mental activity that is distinct from dreaming, we mistakenly think we must have been awake.

There is, however, an even deeper conceptual point. The mismatch between subjective and objective (behavioral or polysomnographic) markers of sleep should alert us to the fact that conventional definitions of sleep, and attempts to operationalize them scientifically, for instance in the form of sleep-stage scoring systems, may be oversimplified. The borders between sleep and wakefulness themselves may be fluid. This brings us back to Thompson's proposal that a more fine-grained and phenomenologically informed taxonomy of sleep states is needed. This is emphatically illustrated by the following quotation from one of the participants in Sewitch's study. This participant had subjective insomnia and claimed to have been awake following 22 out of 23 Stage 2 NREM sleep awakenings.

Also, there is for me a state which may be technically sleep to you, but is wakefulness to me and, uhh—it's an intermediate state—it's very hard to define, uhh—but I definitely felt that it's there—and uhh—uhh none of the questions precisely examined this situation. (Sewitch 1984, p. 257)

As Thompson suggests, dismantling the default view may be as simple as asking the right kinds of questions.

5.4 Conclusions

I began this commentary by formulating a number of related challenges to Thompson's analysis of dreamless sleep experience. The first two of these centered on the status of reports of dreamless sleep experience. In order to place the scientific investigation of dreamless sleep experience on solid methodological grounding, it is not enough to establish the logical possibility of veridical reports of dreamless sleep experience; rather, some rationale for distinguishing veridical reports from nonveridical ones is needed. Also, in order for such reports to be in-

dicative not just of the occurrence of dreamless sleep experience, but also of its distribution and quantity across sleep, one will have to assume such experiences to be reportable. This means that positive experience reports and reports of an absence of experience, when gathered under the same reporting conditions and unless there is any empirical evidence of disturbing factors, will have to be considered as equally trustworthy. I responded to these dual challenges by pointing out that the methodological background assumptions upon which scientific dream research has long relied, at least implicitly, directly speak to both issues: Dream reports, at least when gathered under (sufficiently) ideal reporting conditions, are indeed assumed to be trustworthy sources of evidence with respect to the occurrence and phenomenal character of experience during sleep (I called this the transparency assumption), and dreams are also assumed to be assumed to be reportable experiences (I called this the reportability assumption). Elsewhere (Windt 2013, 2015), I have argued that both assumptions are theoretically justified because they best explain dream reporting behavior. Here, I only defended the more limited claim that scientific dream research already offers the methodological resources to turn the study of dreamless sleep experience into a scientific research program. This shifts the burden of proof: in order to meaningfully challenge the report-based investigation of dreamless sleep experience, the methodological background assumptions of scientific dream research will have to be challenged as well.

An important upshot was that the default view is inconsistent with scientific dream research. Due to its methodological background assumptions, scientific dream research is committed to the view that if experiences fitting the profile of dreamless sleep experience are, at least occasionally and under sufficiently ideal conditions (for instance immediately after awakening), reported to occur in sleep, then dreamless sleep experience exists. The default view, understood as an *a priori* and conceptually motivated rejection of dreamless sleep experience, is flawed. I then argued that by taking the analogy between contemporary philosoph-

ical and scientific work on dream reports and the Indian debate seriously, valuable lessons can be learned in the other direction as well. In particular, Thompson's reconstruction and critique of the Nyāya syllogism suggests that certain skeptical objections to the trustworthiness of dream reports run into the same problems, resulting either in circularity or an infinite regress.

The second and third parts of my commentary were dedicated to the third challenge to Thompson's view. This was that even if dreamless sleep experience exists, and even if reports of dreamless sleep experience are taken to reflect this fact, its occurrence in experienced meditators is too remote to warrant the large-scale revision of sleep-state taxonomy proposed by Thompson. I attempted to meet this challenge, first, by first sketching the outlines of a conceptual framework for describing dreamless sleep experience. In this framework, dreamless sleep experience is characterized by pure subjective temporality, or the experience of duration and of an extended presence (a stretched phenomenal *now*) arising independently of any further intentional contents, objects of awareness, or modality-specific imagery. This model extends existing work on dreams, where I argue that the simplest forms of dreaming are examples of minimal phenomenal selfhood, or self-location in a spatiotemporal reference frame (Windt 2013, 2015). In dreamless sleep experience, even this minimal form of self-experience is lost; pure subjective temporality during dreamless sleep experience is a candidate for minimal phenomenal experience, or the simplest form of phenomenal consciousness.

In the final part of the commentary, I discussed what I take to be the most plausible candidates for dreamless sleep experience in this sense: these are lucid dreamless sleep, white dreams, and sleep-state misperception as most prominently seen in subjective insomnia. I also proposed that these states can be meaningfully compared to the transition from nonlucid to pre-lucid and fully lucid dreams. Here, my aim was to show that dreamless sleep experience is not a remote possibility, but might plausibly turn out to be a common characteristic of sleep.²⁶

²⁶ Clearly, this is just the very beginning of the conversation on how to refine sleep-state taxonomy. Ultimately, the investigation of dream-

Importantly, I am not claiming that the proposed conceptual model is the final word on dreamless sleep experience; it is only a very first attempt to delineate the borders of the target phenomenon. The model is clearly open to further conceptual refinement, and I would like it understood mainly as an invitation to do so. What I would hope, however, is that the model might facilitate this process by guiding and informing future research. Similarly, the empirical candidates for dreamless sleep experience that I propose should not be taken to be exhaustive, and their plausibility will depend on future research findings. For now, I hope, however, that they lend further support and urgency to Thompson's case for dreamless sleep experience.

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less sleep experience, and the addition of dreamless sleep experience to the conceptual tool kit used for the description of sleep and wakefulness, may prove to be no more than a first step in this direction. And while the reconstruction of the Indian debate and its contrast with contemporary views of sleep is a rich and valuable project, important but easily forgotten lessons might be found closer to home as well. The monophasic sleep pattern currently investigated in Western sleep laboratories and taken to be the biological norm may be only a few generations old (cf. Greene 2008, pp. 238-240) and is likely an artifact of a profound change in sleep behavior brought on, to a considerable extent, by electrical lighting. In preindustrial times, sleep was biphasic—two periods of sleep, called the first and the second sleep, were structured around a period of wakefulness that was made up of quiet rest, perhaps even resembling certain meditative states and often involving the contemplation of dreams (Ekirch 2001; Ekirch 2006). Research suggests that under appropriate conditions—in an environment without artificial, electrical lighting and without various nighttime activities that become possible in such an environment, that compete for our attention and increase the pressure for and attraction of staying awake rather than going to bed—we naturally return to this biphasic sleep pattern (Wehr 1992). It does not seem unreasonable to think that the transition to a monophasic sleep pattern, alongside factors such as increased electrical lighting, traffic noise, and time constraints—will have changed not just the structure of sleep, but our experience of sleep as well. With less and less time allotted to sleep, the temptation to simply black out during sleep (or to view sleep as involving such a blackout) may have increased; yet, current sleep behavior in rich, Western societies may be a highly artificial and learned behavior. If we want a taxonomy of sleep states to reflect universal features of sleep, rather than our culturally specific, contemporary sleep habits, we would do well to remember this.

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