Bridging the Objective/Subjective Divide

Towards a Meta-Perspective of Science and Experience

Jonathan Schooler

In this paper I use the thesis that perspective shifting can fundamentally alter how we evaluate evidence as the backdrop for exploring the perennial challenge of bridging the divide between the subjective first-person perspective of experience, and the objective third-person perspective of science. I begin by suggesting that reversible images provide a metaphor for conceptualizing how the very same situation can be understood from two very different perspectives that appear to produce seemingly irreconcilable accounts of their contents. However, when one recognizes that both views are different vantages on some deeper structure, a meta-perspective can emerge that potentially offers a vantage by which the opposing perspectives can be reconciled. Building on this notion of a meta-perspective, I outline a framework for conceptualizing how science can draw on individuals' first-person experience in order to explicate those experiences within the necessarily third-person perspective of science. I then show how this approach can illuminate one of the most private yet ubiquitous aspects of mental life: mind-wandering. Finally and most speculatively, I attempt to tackle the enduring ontological tensions that emerge from the disparities between the first- versus third-person perspectives. Specifically, I suggest that the present prevailing third-person perspective of material reductionism fails to adequately account for the first-person experience of subjectivity, the flow of time, and the present. While I argue that these differences are an intrinsic property of each perspective, and thus irreconcilable from the vantage of either, I raise the possibility of a meta-perspective in which these clashes might be better accommodated. Toward this end, I speculatively suggest that experience, the flow of time, and the unique quality of "now" might be accommodated by the postulation of a subjective dimension or dimensions of time.

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1 Introduction

I am the proud owner of a philosopher's stone. Although it does not hold any of the mysterious powers (e.g., turning lead to gold, providing endless youth) that the alchemists attributed to its namesake, I nevertheless feel its title fitting, as it offers some rather deep insights into the importance of perspective in defining what seems true. What distinguishes my stone from an ordinary river rock is that it has engraved upon it the statement "Nothing is written in stone." In pondering its irony, I've come to realize that my philosopher's stone can be viewed in at least three ways, each leading to a different accounting of its merit. From one vantage the statement on the stone is self-evidently false, as clearly revealed by where it is carved.

From another it is demonstrably true, as the word "nothing" is written in stone right there. Finally, the fact that the presentation of the stone's message simultaneously reveals it to be both true and not true enables the stone to clarify the paradoxical essence of its meaning. Nothing is definitive because a change in perspective may shift what is seen as factual. However, the stone further illustrates that when one recognizes how the perspectives that one takes influence the conclusions that one draws, one gains a larger meta-perspective that can accommodate them both.

Figure 1: From one perspective, as evident from the place onto which it is carved, "Nothing is Written in Stone" is a contradictory statement. However, from another perspective, "Nothing" is in fact written in stone, making the statement true. Thus, "Nothing is Written in Stone" illustrates that when one recognizes how the perspectives that one takes influence the conclusions that one draws, one gains a larger meta-perspective that can accommodate them both.
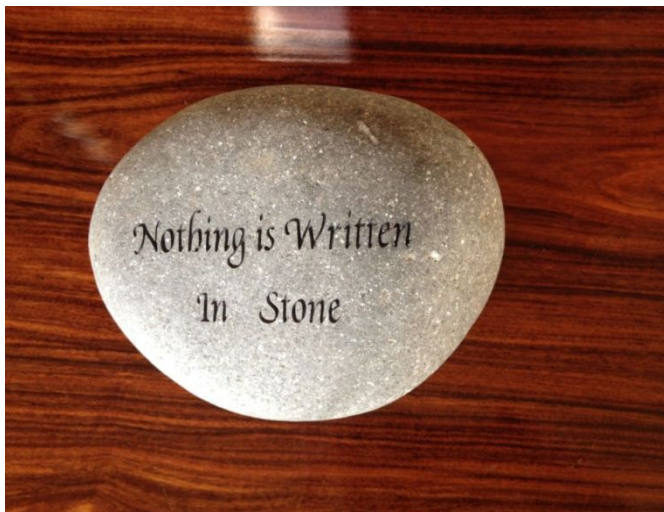
Although it is relatively straightforward to describe the manner in which my philosopher's stone conveys how shifting perspective can alter what is seen as true, such descriptions do not do justice to the impact the stone has when one actually encounters it. The stone not only conveys its message, it embodies it. Its message thus speaks not only to one's capacities of logic but also viscerally, physically, through one's senses. Indeed this difference between the third-person *account* of something and the first-person *experience* of it is perhaps the ultimate ex-

ample of the manner in which perspective can alter how we understand the world.

In this paper I attempt to nudge the field towards a rapprochement between the subjective first-person perspective of experience and the objective third-person perspective of science. My efforts are divided into three somewhat distinct sections; all united by the goal of illustrating how the divide between the subjective and objective might begin to be bridged by a broader perspective that acknowledges that while neither can be reduced to the other, they may be alternative vantages of a larger meta-perspective.

In the first section, I use the analogy of reversible images to emphasize the importance of perspective shifting in recognizing that views that seem one way from one perspective may seem quite different from another. However, when one recognizes that both views are different vantages on some deeper structure, a meta-perspective can emerge that potentially offers a vantage by which the opposing perspectives can be reconciled. I propose that the relationship between the first-person perspective of subjective experience and the third-person perspective of objective science can be conceptualized in this manner, and that at least some of the heated debate between scholars on this topic may stem from their exclusively favoring one vantage over the other.

In the second section, I illustrate how the third-person perspective of science can both draw on and elucidate first-person experiences, and in particular the ubiquitous internal state of mind-wandering. I argue that although people's self-reports of private internal experiences such as mind-wandering necessarily rely on a re-representation of the experience to themselves (meta-awareness), we can nevertheless draw inferences about their underlying experience by examining the relationship between self-reports and physiological and behavioral measures. Triangulation between these measures has highlighted both the strengths and limitations of people's meta-awareness of their drifting minds: although people frequently fail to notice that their minds are wandering, when queried they are quite accurate at reporting whether

or not their minds were on task. This analysis thus reveals the value of using empirical third-person science to clarify the nature of first-person experience.

In the final section I consider how first-person experience may inform our understanding of objective reality. Current views of science offer no way of accounting for the existence of subjective experience, the flow of time, or the privileged present, leading mainstream science to marginalize these essential elements of consciousness as irrelevant or illusory. However, from my vantage these aspects of existence are at least as certain as physical reality itself. It seems nonsensical to characterize experience as an illusion, because even an illusory experience (i.e., where the contents have no bearing on physical reality) is still an experience. Moreover, experience exclusively resides in an ever-changing present. A characterization of reality that has no place for subjective experience, the flow of time, or importance of the present seems devoid of the core aspects of my existence. In keeping with others who have speculated that theories of physical reality will need to be expanded to accommodate subjective experience, I conjecture that consciousness may correspond to movement in an additional subjective dimension (or dimensions) of time. Although this hypothesis is highly speculative, it provides an example of the kind of meta-perspective that may be necessary to successfully accommodate subjective and objective views.

Clearly I have my work cut out for me. However, before embarking on the more ambitious aspects of this journey, let us first step back and consider the nature of perspective and the impact that it can have on understanding.

2 Applying perspective shifts to conceptualizing human experience from the first– versus third–person perspective

The striking parallels between perceptual and conceptual perspective shifts exemplify the embodiment of mental capacities in physical experience (Schubert & Semin 2009). Colloquially, when we talk about dramatic shifts in concep-

tual understanding, we routinely use perceptual metaphors (Schooler et al. 1994). We speak of "thinking out of the box," or of "stepping back and looking at the bigger picture." Even the term that we use for gaining a fresh perspective on an old problem, i.e., "insight," directly alludes to the parallels between perceptual and conceptual perspective shifting. It is no coincidence that the Gestalt psychologists who pioneered research on visual perspective shifting (Wagemans et al. 2012) also were the first to investigate the processes of conceptual insight (Duncker 1945). And indeed, research in our lab (Schooler & Melcher 1995) reveals a strong correlation between people's ability to make perceptual insights (e.g., recognizing out-of-focus pictures) and conceptual insights (e.g., solving insight word problems). Thus, in order to explore how perspective may constrain our conceptual understandings, it is helpful to start by briefly considering the ways in which perspective can influence perceptual experiences. As will be argued, the manner in which alternative first-person perceptual perspectives constrain our experiences, provides a compelling metaphor for the broader contrast between first- and third-person perspectives that individuals face in reconciling their personal subjective experiences with objective reality.

One of the greatest challenges of visual perspective is recognizing how fluid it really is. Typically, when we view an object or a scene, we apprehend it from a particular vantage and rarely consider the possibility that it may be seen in a different way. If and when a shift occurs, the experience is typically characterized by a marked surprise that the very same view could afford such a different understanding. The Gestalt reversible figures are a quintessential example of images that startle us with their alternative perspectives. At first when we encounter them we often perceive them from only one perspective; that is, although there are several possible interpretations of the image, we assign one set of perceptual properties to the elements of the image (front or back, figure or ground), and one conceptual interpretation of the object (e.g., duck or rabbit, young woman or old hag).

When presented with an image of a duck/rabbit as a duck, those unfamiliar with the image may initially see only a duck. However, if alerted to the possibility of another embedded image, suddenly a rabbit may virtually pop out. Other classic examples of reversible images include: a Necker cube facing one way or another, a vase or a pair of faces, a young woman or an old hag. A particularly compelling recent addition is the spinning dancer illusion, where a perceptual shift not only changes one's perspective of her orientation but also the direction in which she appears to be spinning.

Figure 2: The duck-rabbit illusion is a classic example of a perspective-dependent reversible image. When presented as a duck, those unfamiliar with the image may initially see only a duck. However, if alerted to the possibility of another embedded image, suddenly a rabbit may pop out. McManus, I. C., Freegard, M., Moore, J., & Rawles, R. (2010). Science in the making: Right hand, left hand. II: The duck–rabbit figure. *Laterality, 15*, 167.
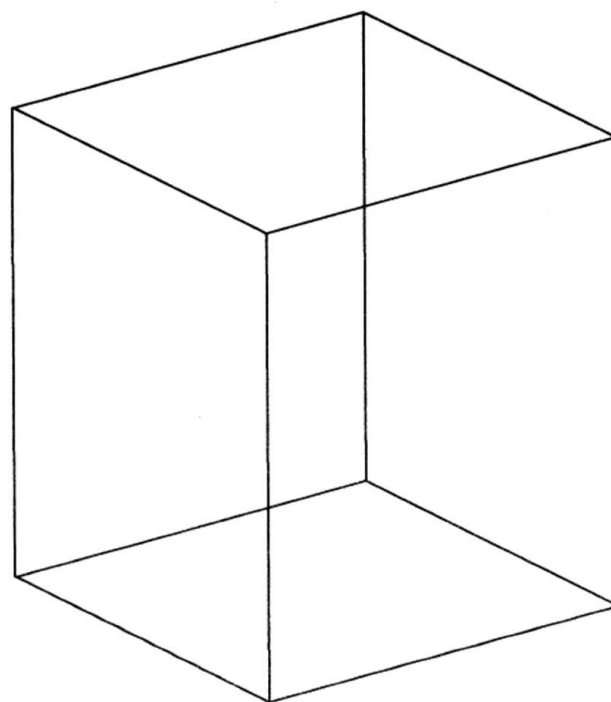

Figure 3: The Necker cube is a reversible image that, depending on the perspective taken by the observer, appears to be facing one way or another. Shifting one's perspective allows the observer to view the cube either from slightly above or slightly below. Necker, L.A. (1832). Observations on some remarkable optical phenomenon seen in Switzerland; and on an optical phenomenon which occurs on viewing a figure of a crystal or geometrical solid. *London and Edinburgh Philosophical Magazine and Journal of Science*, 1 (5), 329–337.

There are several notable aspects of all the aforementioned visual perspective shifting examples. First, before one knows that there are multiple interpretations, it is common to only perceive one or the other. Second, once one is aware of both perspectives, one can experience an oscillation between the two, shifting from one perspective to the other, and back again. Third, at any one moment in time, it is impossible to simultaneously see both interpretations. The Necker cube is either seen facing one way or the other; the spinning dancer only rotates in one direction at a time. Finally, although one can only perceive one interpretation at a time, one can nevertheless know that multiple perspectives exist, and this knowledge provides a *meta-perspective*, whereby we appreciate that what we

perceive one way at one moment can be perceived in a very different way in the next.
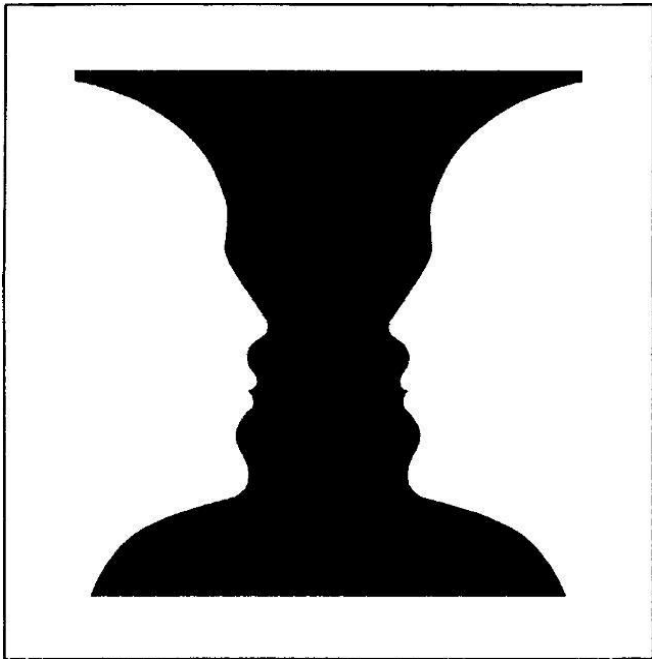

Figure 4: Rubin's vase (sometimes referred to as "The Two Face, One Vase Illusion") depicts the silhouette of a vase in black and the profiles of two inward-looking faces in white. The figure-ground distinction made by the brain during visual perception determines which image is seen. Ittelson, W. H. (1969). *Visual Space Perception*, Springer Publishing Company, LOCCCN 60-15818

A particularly remarkable class of perceptual shift that enables us to switch to a meta-perspective comes from "Magic Eye" stereograms that can reveal a full holographic three-dimensional realm that is not initially perceptible at all. These stereograms entail images that first are viewed as a two-dimensional pattern. However, if one stares at the image long enough in just the right way (this requires a little eye crossing) and believes that it is possible to actually see into it, an entirely different and fully three-dimensional image emerges. What is so striking about these "Magic Eye" stereograms is that the embedded three-dimensional images have absolutely no resemblance to the two-dimensional images from which they emerge. There is of course a sophisticated algorithm (based on principles of stereopsis) that enables the three-dimensional perception to arise from the two-dimensional

image, but the experiences of the two images are wholly of a different sort. Those who have not gotten into a Magic Eye image can have no idea what the underlying image looks like, and even if they are shown what the form is, they cannot appreciate what it is like to actually witness the two-dimensional page miraculously open up into a three-dimensional world that is somehow residing within it. However, those who have experienced this transformation gain a wholly different appreciation for the image, recognizing that it affords two entirely different vantages, even while appreciating that only one can be apprehended at any particular time.[1]

The lessons learned from perceptual perspective shifting are relevant to the long-standing tension between conceptualizing human experience from the first- versus third-person perspective. Not unlike the shifting perspectives of a reversible image, the field of psychology has vacillated back and forth between focusing on people's self-reported internal experiences (the first-person perspective) and their observable behaviors (the third-person perspective). Moreover, just as the spinning dancer can move in one direction for a while, then flip back and forth in direction, and then carry on in the opposite direction, the field has had periods of relative steady focus on one or the other vantage and other periods in which the vantage was more variable.

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1 A possible objection to the Magic Eye stereogram as an illustration of a shifting perspective is that it can be enabled merely by a musculature action (the crossing of the eyes). One reviewer suggested that the new representation that emerges from these images may be no "more interesting than the muscular action of opening a closed eye which also allows the appearance of a suddenly unseen picture." While a worthwhile observation, I do not think it challenges the relevance of the example. First, closing one's eyes is not a different vantage of an image; it is a lack of a vantage at all. Second, like other reversible images whose shifting interpretation can be enhanced by movement of the eyes, the muscular adaptations required for seeing the alternate image of a Magic Eye stereogram is a necessary but not sufficient condition for its reinterpretation. This is illustrated by the fact that many people, despite all efforts of eye crossing, are incapable of entering them and that those who do have the good fortune to be of being able to experience them typically must engage in sustained cognitive effort to unpack the image once they begin to get into them. The central point of the Magic Eye example is that it illustrates how changing vantages on what one is looking at can profoundly influence what one believes to be true about it. The fact that this changing vantage may require a little eye crossing does not, in my view, lessen this observation.

some researchers (notably the Gestalt psychologists and other researchers in the domain of human perception, e.g., Katz 1925/1989) continued to maintain a concern with inner experience, for a significant period of time the behaviorist reign caused a shift toward disregarding people's first-person perspectives. Internal experience was a taboo topic. In short, psychology switched to a fixed third-person perspective. Then, with the rise of information processing and the cognitive era, the field again began to vacillate back and forth between considering people's internal experiences and focusing on their behavior.
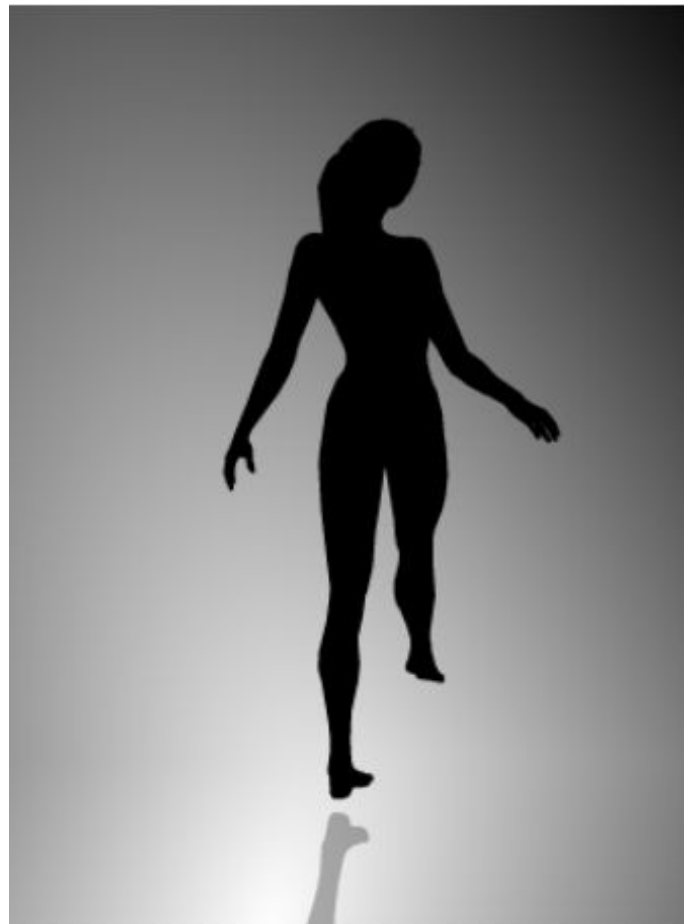

Figure 5: The young girl-old woman illusion (otherwise known as "My Wife and My Mother-in-Law") is a reversible image in which the viewer may either observe a young girl with her head turned to the right or an old woman with a large nose and protruding chin, depending on one's perspective. Wright, E. (1992) The original of E. G. Boring's Young Girl/Mother-in-Law drawing and its relation to the pattern of a joke. *Perception, 21*, 273–275.

The inception of psychology was marked by a concern with the inner experience of the individual (Schultz & Schultz 1992). Introspection was the tool of choice, and research entailed asking participants to scrutinize the components of their experiences. In short, psychology began with a fixed first-person perspective. In fact, it was during this time that psychology created some of its most robust laws of psychophysics demonstrating strikingly rigorous relationships between changes in various perceptual estimates (e.g., perceived brightness, weight, volume) and changes in the physical stimuli themselves (for a history, see Murray 1993). Then, concerns about the value of introspection arose, and researchers began to vacillate regarding the value of introspection relative to more "objective" third-person perspectives. Although

Figure 6: The spinning dancer illusion, or silhouette illusion, depicts a woman spinning in a circle. The direction of the dancer's spinning (clockwise or counterclockwise) is dependent on the perspective taken by the observer. Kayahara, Nobuyuki (2003). Silhouette Illusion. *ProCreo*. Retrieved from http://www.procreo.jp/labo/labo13.html

While psychology again finds itself in an age of flipping perspectives about first- versus

third-person accounts, much consternation still arises from this fact. Science in general (Wilber 1998) and psychology in particular (Wallace 2000) still find it challenging to fully integrate subjective experience into their accounts. Just as it is impossible to see a Necker cube simultaneously facing in its alternative directions, so too psychology has struggled to reconcile its vacillation between first- and third-person perspectives. On the one hand, ignoring the inner realm of experience seems to leave out much of "what it is like" to be human (Nagel 1974). On the other hand, researchers are rightly concerned about the validity and meaning of people's first-person reports (Wilson 2003). With no alternative window into people's minds, how can we know that their reports accurately correspond to their inner experience? After all, science necessarily relies on mutually agreed-upon observations. So how can we evaluate the first-person perspective that by its very nature eludes such consensus? The challenge is how to translate these first-person experiences into third-person data that can be scientifically investigated. The most straightforward answer of course is simply to ask people about their experience; their observable verbal statements thus become the third- person window onto their first-person experiences. But here we run up against the challenge that caused psychology to abandon the first-person perspective in the first place: How do we know if self-reports line up with first-person experiences without some independent measure of people's internal states (Bayne this collection)?

Fortunately, self-reports are not the only third-person window into people's inner experience. We can also examine other behaviors as well as measure physiological and brain activity in order to make reasoned inferences about what individuals are genuinely experiencing. In this manner, we can begin to discern when people are accurately characterizing their internal experience, and when they may be overlooking or distorting key aspects. The approach that I am advocating here is very much in keeping with Dennett's notion of heterophenomenology (2003) that takes at its starting point the premise that people's self-reports do not neces-

sarily reflect what they are actually experiencing but rather "*what the subject believes to be true about his or her conscious experience*" (Dennett 2003, p. 2). Although such an approach refrains from necessarily taking people's first-person reports on face value, it does not abandon the prospect of making inferences about what people are actually experiencing.[2] Rather it posits that we must evaluate people's self-reports in light of other third-person measures. As Dennett (1993) puts it:

> My suggestion, then, is that if we were to find real goings-on in people's brains that had enough of the 'defining' properties of the items that populate their heterophenomenological worlds, we could reasonably propose that we had discovered what they were really talking about—even if they initially resisted the identifications. And if we discovered that the real goings-on bore only a minor resemblance to the heterophenomenological items, we could reasonably declare that people were just mistaken in the beliefs they expressed, in spite of their sincerity. (p. 95)

As will be argued there are at least some situations in which external observers may have better knowledge of a person's internal state than does the person in question. Moreover, there are some mental states (e.g., mind-wandering) for which the crucial bottleneck in people's introspective awareness stems not from their capacity to classify the experience, but rather from the fact that people only intermittently take stock of what is going on in their own minds.

In the following section, I review some of the insights about first-person experience that can be gained when it is assessed from a third-

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2 In the past (Schooler & Schreiber 2004) I characterized Dennett as dismissing the notion of underlying experience altogether, noting that he has written "Nobody is conscious... we are all zombies" (Dennett 1993, p. 406). Although I still find his views on this issue somewhat slippery, I now believe that he endorses the existence of genuine phenomenal experience that can be validated with third- person evidence. For example Dennett (2003) argues that evidence about briefly presented stimuli could help to inform subjects about their actual conscious experience observing "Subjects would learn for the first time that they were, or were not, conscious of these stimuli" (p. 9).

person perspective. By adopting a "trust but verify" approach to first-person reports, we not only gain a more objective understanding of subjective states, but also potentially glean a more astute perspective of our own experience.

Figure 7: "Magic Eye" stereograms can reveal a holographic three dimensional realm that is not initially perceptible at all. Consisting of abstract visual patterns constructed from an algorithm based on the principles of stereopsis, "Magic Eye" illusions require the viewer to blur their vision for a period of time, thereby revealing a three-dimensional imprint once perspective has shifted. Image provided by eyetricks.com Additional examples can be found at http://www.magiceye.com/3dfun/stwkdisp.shtml.

3 Gaining a third–person perspective on people's first–person experience

On some occasions we simply have experiences, but at other times we reflect on those experiences; that is, we intermittently take stock of our ongoing experience and re-represent it to ourselves. This distinction between having an experience (experiential consciousness) and explicitly re-representing it to ourselves (meta-awareness) is illustrated by the example of mind-wandering while reading (Schooler 2002). All of us have had the experience of reading along and suddenly realizing that, despite our best intentions, our eyes have been moving across the page but our minds have been entirely elsewhere. Indeed this has likely happened

to a goodly proportion of the readers whom have made it this far. The immediate question that this common experience raises is: why do we continue to simultaneously read and mind-wander even though we know that it is impossible to fully do both at the same time? The answer I suggest, and I'll offer more evidence for this contention shortly, is that we routinely lose track of the contents of our own minds. People continue mind-wandering while reading because once they begin to mind-wander they often temporarily fail to notice (i.e., become meta-aware of) the fact that their minds are thinking about something unrelated to the text.
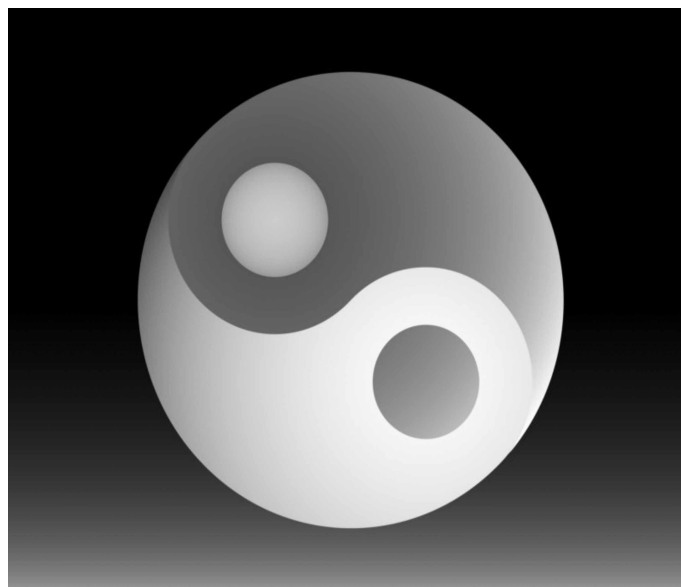

Figure 8: The three-dimensional image is a three dimensional yin-yang which the original Magic Eye image would not have revealed without a shift in perspective. The embedded three dimensional image has absolutely no resemblance to the two dimensional image from which it emerges. Image provided by eyetricks.com.

The notion that people routinely shift in perspective (from simply experiencing to attempting to re-represent their experience to themselves) provides the foundation for a framework for scientifically investigating first-person experience. Specifically, the distinction between experiential consciousness and meta-awareness raises the prospect of two types of dissociations between these vantages that are empirically tractable (Schooler 2002). *Temporal dissociations of meta-awareness* involve situ-

ations in which individuals engage in an experience without explicitly realizing that they are doing so. The example of temporarily failing to notice that one is mind-wandering is an example of a temporal dissociation. *Translation dissociations of meta-awareness* occur when one distorts or otherwise mischaracterizes their experience to themselves. Shouting "I am not angry" at the top of one's lungs is an example of this latter dissociation. In the following discussion I briefly outline the empirical approach for exploring these two types of dissociations.

3.1 Temporal dissociations of meta–awareness

Although failing to notice that one is mind-wandering is a particularly apt example of a temporal dissociation of meta-awareness, there are numerous other examples of experiences that can temporarily go without being explicitly noticed, including unnoticed emotions (Lambie & Marcel 2002; Schooler & Mauss 2010) suppressed thoughts (Baird et al. 2013), and various mindless behaviors (Schooler et al. in press). Temporal dissociations of meta-awareness readily lend themselves to empirical investigation. Two approaches have proven effective in delineating situations in which people temporarily fail to notice a particular mental state: self-catching versus probe-catching and retrospective measures (Schooler et al. 2011).

The self-catch/probe-catch methodology pits two common self-report techniques against one another. Participants are asked to indicate every time they notice a particular mental state (e.g., mind-wandering). If an individual reports that they have just noticed themselves engaging in that mental state, then this is by definition a demonstration that the mental state has reached meta-awareness. Thus, self-caught episodes provide a straightforward measure of mental states of which individuals have become meta-aware. However, within this methodology, participants also periodically receive experience-sampling probes (Hurlburt & Heavey 2001) in which they are asked whether, at that particular time, they had been engaging in that mental state. If people are caught engaging in the state

before they notice it themselves (via self-catching), this provides a metric of episodes of that state that have eluded meta-awareness. As will be detailed later, this approach has proven effective in documenting temporal dissociations of a variety of different mental states including both mind-wandering (Schooler et al. 2004; Sayette et al. 2009; Sayette et al. 2010) and unwanted thoughts (Baird et al. 2013).

A second approach for identifying temporal dissociations of meta-awareness is to rely exclusively on experience sampling probes (i.e., probe-catching) but to additionally query people when they are caught in a particular state (e.g., mind-wandering) regarding whether or not they had been previously aware of that fact. Again, as will be seen, this strategy routinely reveals that people can be caught engaging in mental activities that they were previously experiencing but were not explicitly aware of. Intriguingly, the findings with this measure of temporal dissociation align with those revealed by the self-caught/probe-caught methodology to reveal consistent systematic differences between mental states associated with meta-awareness and those that lack it.

3.2 Translation dissociations of meta–awareness

Translation dissociations correspond to situations in which, while in the process of re-representation, one omits, distorts, or otherwise misrepresents one's mental state to oneself and/or others. The basic strategy for assessing translation dissociations is to examine the correspondence between individuals' self-reports of their mental states and indirect measures that might reasonably be expected to correspond to that state (Schooler & Schreiber 2004). If the correspondence is high, there is good reason to think that individuals are accurately reporting their internal state. If the correspondence is low, one needs to at least be suspicious that people are mischaracterizing their mental state.

Emotions are likely to be a particularly common source of translation dissociations. For example, when individuals report experiencing anxiety, a host of physiological measures (includ-

ing heart rate and galvanic skin response) typically become elevated (Marks 1987). Such correspondence gives us confidence that people are accurately characterizing their internal state; in other words, there is no translation dissociation. However, there is a class of individuals, referred to as repressors, who show the standard physiological changes when put in situations that would cause most people to experience anxiety, but who fail to report any change in anxiety (Asendorpf & Scherer 1983). In these cases, it seems reasonable to speculate that the repressors are misrepresenting their internal experience to themselves; they are experiencing anxiety but not acknowledging it (Lambie & Marcel 2002; Schooler et al. in press). As another example, consider that when males experience sexual arousal they typically show changes in their penile tumescence (a technical way of saying they become erect). Intriguingly, men who reported disgust for homosexual activity were shown to actually exhibit greater increases in penile tumescence when witnessing males engaging in sex, than men who did not report aversive feelings toward homosexuality (Adams et al. 1996). One reasonable account of these findings is that these so-called homophobics experience a translation dissociation, such that they are unable to acknowledge the arousal that they feel towards men, and instead misattribute the experience to a feeling of disdain.

A final example of translation dissociations involves situations in which individuals analyze why they feel the way they do about an affective experience. For example, in one study (Wilson et al. 1993), participants viewed various art posters and then both rated the posters and selected one to take home with them. Prior to engaging in this assessment, some participants were further asked to analyze why they felt the way they did about the posters, whereas others were not. When contacted several weeks later, people who had attempted to reflect on the basis of their preferences were less satisfied with their choice and were less likely to have hung the poster on their wall than those who had not analyzed their reasons. The disruptive effects of analyzing reasons, which have been conceptually replicated in a variety of contexts (Wilson & Schooler 1991), suggest that sometimes self-

reflection may be a source of translation dissociations. That is, in the process of trying to understand why people feel the way they do, they may construct a faulty meta-conscious representation and thereby lose touch with their feelings.

3.3 Investigating temporal and translation dissociations of meta–awareness in the context of mind–wandering

In recent years, a growing body of research has addressed the nature of mind-wandering as it pertains to the occurrence of temporal and translation dissociations of meta-awareness. This research suggests that mind-wandering is highly susceptible to temporal dissociations of meta-awareness; that is, individuals routinely fail to notice that their minds are wandering despite the considerable disruption to performance that such unnoticed lapses often incur. This claim is supported by various strands of evidence revealing the frequency with which participants are routinely "caught" mind-wandering before they notice it themselves. In contrast, mind-wandering appears to be relatively resistant to translation dissociations of meta-awareness. Although individuals regularly fail to notice when their minds are wandering, when meta-awareness is directed toward the current state of thought, they are generally quite accurate in characterizing whether or not their minds were on-task. This latter claim is supported by numerous demonstrations of systematic differences in performance and neurocognitive activity as a function of individuals' self-classifications of their mental state as on-task versus mind-wandering.

3.3.1 On the veracity of self–reports of mind–wandering: How susceptible is mind–wandering to translation dissociations?

A fundamental challenge to the investigation of mind-wandering is its necessary reliance on self-report. Mind-wandering is, by its very nature, defined in terms of internal mental states. Given psychology's long suspicions about introspective evidence (Nisbett & Wilson 1977), this reliance

on self-reports likely contributed to why, until recently, consideration of this important topic was largely limited to a few stalwart researchers (Antrobus 1999; Klinger 1999; Singer 1988; Giambra 1995). However, accumulating evidence suggests that when individuals are directly queried regarding whether they are mind-wandering, their self-reports accurately reflect their internal mental state. Evidence for this claim is largely based on the logic of triangulation (Schooler & Schreiber 2004). Accordingly, if self-reports of mind-wandering consistently co-vary with behavior and neurocognitive activity in a manner that might reasonably be expected to be impacted by mind-wandering, then we can have increased confidence that such introspective evidence accurately reflects the underlying mental state. In the following review, I detail at some length numerous findings in support of this relationship from a host of paradigms in which potential behavioral or physiological proxies of mind-wandering are related to individuals' responses to randomly timed queries regarding whether they were just mind-wandering. This review provides a review of the extensive literature on mind-wandering and evidence for the general contentions that: 1) the concordance between behavioral and physiological measures and self-report data indicate that people's self-reports of mind-wandering correspond to actual instances of this mental state; and 2) while people are routinely able to recognize mind-wandering after the fact, they often fail to notice it while it is occurring. Readers willing to take my word on these two points may want to scan or skip this section and jump ahead to its *Summary* (on page 16) or to the *Implications of this approach for the more general enterprise of the science of first-person perspective* (on page 18) if the general topic of mind-wandering is not of primary interest.

3.3.1.1   Behavioral measures

Reading comprehension

Although long overlooked as a source of reading comprehension failure, Schooler et al. (2004) found a strong correlation between the frequency of mind-wandering reports in response to experience sampling probes and comprehension accuracy. Subsequent work demonstrated that mind-wandering specifically disrupts the development of a detailed situational model Smallwood et al. 2008).

Another way in which the absence of reading comprehension following mind-wandering has been documented is through the examination of people's capacity to detect when the text becomes gibberish. In one study (Zedelius et al. 2014) participants were asked to read simple children's texts and report every time they noticed that the sentences no longer made any sense (some of the sentences were constructed so that the nouns of the sentences were rearranged in a nonsensical manner, e.g., "This sense makes no sentence"). The results revealed that participants sometimes continued reading for a number of sentences before noticing that the text had become gibberish. Moreover, participants who received thought probes after several sentences of gibberish were more than twice as likely to report mind-wandering without meta-awareness, relative to those who were probed at random times.

Eye–movements

If individuals' self-reported mind-wandering episodes during reading correspond to genuine mental lapses, then we might also reasonably expect to see differences between the patterns of gaze durations following periods in which individuals report reading attentively versus mind-wandering. These predictions were confirmed in an experiment in which subjects read the entirety of Jane Austen's *Sense and Sensibility* while their eye movements were recorded (Reichle et al. 2010). Relative to eye movements obtained during intervals of normal reading, the fixations measured during intervals that preceded reports of mindless reading were both longer in duration and less modulated by variables that are known to influence fixation durations (e.g., word frequency, Rayner 1998). These results suggest that the fairly tight coupling between the mind and eye during normal reading (Reichle 2006) becomes disengaged during self-reported mind-wandering.

Sustained Attention to Response Task (SART)

Another paradigm that has proven effective in documenting the validity of mind-wandering reports is the SART task. The SART is a simple go/no-go task in which participants are asked to refrain from responding to an infrequent no-go target (Manly et al. 1999; Robertson et al. 1997). Studies have documented that the brief lapses associated with this task share important features associated with reports of off-task thought. For example, individual difference measures such as cognitive failures (Smallwood et al. 2004), depression (Carriere et al. 2008; Farrin et al. 2003; Smallwood et al. 2007), and poor executive control (McVay & Kane 2009) have been associated both with greater mind-wandering reports and more errors on the SART. Similarly, both off-task reports and errors in this task share similar information processing features in terms of measures such as reaction time (RT) and evoked response potentials (ERPs; Smallwood et al. 2008, 2004, 2007).

3.3.1.2 Neurocognitive measures

Evoked Response Potential

When the brain faces situations in which it toggles between alternative perspectives, it routinely temporarily inhibits one perspective in favor of the other. This dampening of the non-dominant perspective is shown in reversible figures, where brain activation of one interpretation is inhibited while the other is consciously experienced (Tong et al. 2006). This same process of dampening the nondominant vantage also appears to operate when people favor their internal train of thought over external events. Accordingly, reports of mind-wandering should be associated with a dampening of attention to external stimuli. Indirect support for this "decoupling hypothesis" comes from studies demonstrating that participants are more prone to errors during periods associated with self-reported attentional drifts (e.g., Carriere et al. 2008; Smallwood et al. 2004; Weissman et al. 2006) and that they are less likely to recollect

external events during these periods (Smallwood et al. 2003, 2007, 2004).

More direct support for a relationship between self-reports of mind-wandering and dampened external processing comes from several ERP studies. In one study (Smallwood et al. 2008), participants intermittently received experience sampling probes while performing a simple target discrimination task. Analysis of the ERP responses to the targets revealed that the amplitude of the P3 ERP component elicited by the targets was significantly reduced for targets associated with "off-task" relative to "on-task" reports. Given that the P3 component reflects the degree to which external events are cognitively analyzed (e.g., Donchin & Coles 1988), these initial data support the proposal that mind-wandering reports are associated with an attenuation in stimulus processing at relatively late, post-perceptual processing stages.

A more recent ERP study examined whether mind-wandering might also attenuate sensory-level cortical processing (Kam et al. 2011). Participants again performed a simple discrimination task (at fixation) while being prompted at random intervals to report on their attentional state, but this time we also included task irrelevant probes in the visual periphery. The results revealed that the initial sensory-evoked response to probes was significantly attenuated prior to reports of "off-task" attentional states, as measured via the visual P1 ERP component. A second experiment that included irrelevant auditory probes similarly revealed that sensory-level auditory processing in the cortex is also dampened during self-reported "off-task" states, as measured via the auditory N1 ERP component. Another recent study from our lab (Baird et al. 2014) replicated the finding that mind-wandering reduced the P1 ERP, and further revealed that mind-wandering was associated with decreased phase-locking of electroencephalograph (EEG) neural oscillatory activity to sensory stimuli, suggesting that mind-wandering disrupts the temporal fidelity with which the brain responds to a stimulus.

Taken together, the collective ERP and EEG evidence demonstrates that self-reports of mind-wandering correspond to attenuated sens-

ory processing and cognitive appraisals of external stimuli. This finding further confirms the validity of self-reports of mind-wandering and suggests that a central feature of the mind-wandering state is an attenuation of the processing of external stimuli.

Functional magnetic resonance imaging (fMRI)

One of the challenges facing the burgeoning discipline of cognitive neuroscience is making sense of the observation that several brain areas, including the posterior parietal cortex and the precuneus, the medial prefrontal cortex, and the medial temporal lobe (which are collectively known as the default mode network (DMN), Raichle et al. 2001), all exhibit high levels of activity when participants have no external task to perform. One candidate process that the DMN could serve is the generation of the stimulus-independent thoughts that occur during the mind-wandering state, a hypothesis that is supported by a growing body of evidence. For example, McGuire et al. (1996) used the technique of retrospective thought sampling to demonstrate that reports of mind-wandering were associated with activity in the medial prefrontal cortex. More recently, several studies have documented that situations associated with greater mind-wandering reports (as assessed outside of the scanner) also lead to greater activity in many of the key elements of the DMN (Mason et al. 2007; McKiernan et al. 2006).

While activity in the DMN is correlated with high probability of retrospective reported mind-wandering, it was originally unclear whether particular episodes of self-reported mind-wandering are linked to recruitment of the DMN. To assess whether this was the case, we conducted a study in which experience sampling was combined with fMRI to assess the neural activity that occurred during particular episodes of mind-wandering (Christoff et al. 2009). This study revealed that, in addition to the activation of several core structures in the DMN, areas normally observed in controlled processing (including the dorsolateral prefrontal cortex and the dorsal

anterior cingulate) were also engaged during self-reported off-task thought. This pattern of brain activation suggests that executive and default network resources are jointly recruited during episodes of mind-wandering. One possible account explaining this joint activation is that executive network resources play a role in transforming the self-referential content supported by the DMN into the internal train of thought that we experience when the mind wanders. Further support for this hypothesis is provided by evidence that the ability to engage in autobiographical planning (such as "how do I get out of debt?") requires cooperation between the DMN and a system involving attentional control (Spreng et al. 2010).

Christoff et al. (2009) also compared the pattern of activations associated with introspective reports of mind-wandering, on the one hand and the pattern of activations associated with behavioral errors, on the other hand. Although a variety of factors are known to contribute to behavioral errors during the SART, mind-wandering is believed to be one important source of such errors. Consistent with this view, SART errors (Figure 9) and the introspective reports of mind-wandering (Figure 10) were associated with similar patterns of brain recruitment, providing further validation for the use of introspective experience sampling reports for the study of mind-wandering.
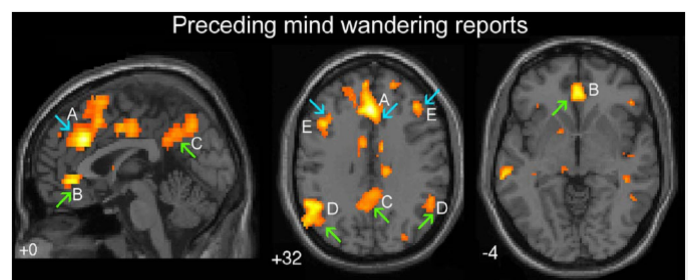

Figure 9: Activations preceding reports of mind wandering (off-task versus on-task). Upward green arrows: default network regions; downward blue arrows: executive network regions. Regions of activation included (A) Dorsal ACC (BA32); (B) Ventral ACC (BA 24/32); (C) Precuneus (BA7); (D) Left temporoparietal junction (BA 39); (E) Bilateral DLPFC (BA 9). Height threshold P<0.005, extent threshold k>5 voxels (from Christoff et al. 2009).
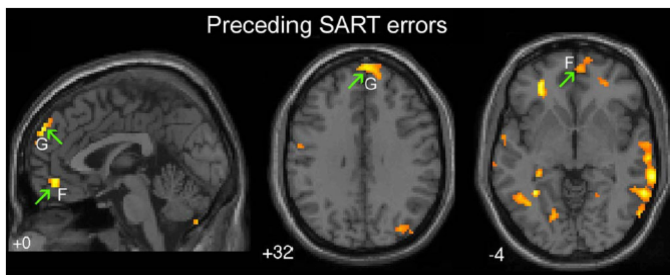
Figure 10: Activations preceding SART errors (interval prior to incorrect versus correct targets). Upward green arrows: default network regions; downward blue arrows: executive network regions. Regions of activation included: (F) Ventromedial PFC (BA10/11); (G) Dorsomedial PFC (BA9). Height threshold P<0.005, extent threshold k>5 voxels (from Christoff et al. 2009).

3.3.2 The intermittent meta–awareness of mind–wandering: How susceptible is mind–wandering to temporal dissociations?

Although when queried individuals are quite reliable in their capacity to self-report whether or not they were mind-wandering, a variety of strands of evidence suggest that people routinely fail to spontaneously notice when mind-wandering takes place. Two paradigms, reviewed earlier, have documented the intermittent meta-awareness of mind-wandering.

3.3.2.1 Self–caught/probe–caught methodology

One approach for documenting mind-wandering in the absence of meta-awareness is combining self-catching and experience sampling measures into a single paradigm. Recall that the self-catching measure asks participants to press a response key every time they notice for themselves that they have been mind-wandering. This measure provides a straightforward assessment of the mind-wandering episodes that have reached meta-awareness. The experience sampling measure, on the other hand, randomly probes people regarding whether they were at that particular moment mind-wandering. When used in conjunction with the self-caught measure, experience sampling can catch people mind-wandering before they notice it themselves.

A number of studies have effectively used the self-caught/probe-caught methodology to illuminate the relationship between mind-wandering and meta-awareness. This approach was initially used to examine mind-wandering while reading (Schooler et al. 2004) and revealed that whereas participants regularly caught themselves mind-wandering, they nevertheless were often caught mind-wandering by the probes. Strikingly, and in support of a fundamental difference between mind-wandering episodes that are accompanied by meta-awareness and those that are not, there was a strong correlation between probe-caught mind-wandering and comprehension performance but no such relationship between self-caught mind-wandering and comprehension.

Additional studies have examined the impact of two mind-altering experiences hypothesized to undermine individuals' meta-awareness: alcohol intoxication and cigarette craving. In one study (Sayette et al. 2009), social drinkers consumed a moderate dose of alcohol or a placebo beverage and then performed a reading task (implementing a self-caught/probe-caught mind-wandering assessment methodology). Compared with those who drank the placebo, participants who drank alcohol were more likely to report that they were "zoning out" when probed. After accounting for this increase in mind-wandering, alcohol also lowered the probability of catching oneself zoning out (i.e., self-catching). These data suggest that alcohol increases mind-wandering while simultaneously reducing the likelihood of noticing one's mind-wandering.

In another study (Sayette et al. 2010), smokers, who were either nicotine-deprived (crave condition) or non-deprived (low-crave condition), performed the same mind-wandering task used in Sayette et al. (2009). Smokers in the cigarette-crave condition were significantly more likely than the low-craving smokers to acknowledge that their mind was wandering when they were probed. When this more-than-threefold increase in zoning out was accounted for, craving also lowered the probability of catching oneself mind-wandering. Similar to the alcohol consumption findings, it appears that ci-

garette craving simultaneously increases mental lapses while reducing the metacognitive capacity to notice them.

3.3.2.2 Retrospective classification of mind–wandering episodes

A second methodology that has been used to examine fluctuations in meta-awareness of mind-wandering entails combining the experiential sampling methodology with a judgment of participants' immediately prior state of awareness. Recall that, in the experience sampling procedure, participants are intermittently queried regarding whether or not they were mind-wandering; in this combined approach, if they report mind-wandering to the probe, then they are also asked to indicate if they were aware that they were mind-wandering. In response to such queries, participants routinely indicate that they had been unaware of their mind-wandering up until the time of the probe. Moreover, when participants classify mind-wandering episodes as unaware, their performance and neurocognitive activity systematically differ from when they report having realized they were mind-wandering.

Consistent with findings using the self-caught/probe-caught methodology, retrospective classifications of unaware mind-wandering episodes (termed zoning out) and aware episodes (termed tuning out), indicate that the former are more associated with comprehension failures than the latter (Smallwood et al. 2008). By contrast, reports of zoning out seem to be most closely linked to failures in response inhibition (Smallwood et al. 2008, 2007) and to poor mental models during reading (Smallwood et al. 2008). Together these results suggest that while maintaining streams of stimulus-independent thought interfere with the integrity of external attention, the absence of awareness of mind-wandering is especially damaging to task performance.

Neurocognitive measures also reveal differences in the degree of activation between mind-wandering episodes that have been classified as aware versus unaware. In the combined experience sampling/fMRI study conducted by Christoff et al. (2009), mind-wandering with awareness activated similar brain regions to those observed during mind-wandering without awareness. These brain regions, however, were more strongly activated when mind-wandering occurred without awareness (see Figure 11). The anterior prefrontal cortex (BA10) was one of the brain regions significantly more strongly recruited during unaware episodes of mind-wandering. Notably, anterior prefrontal cortex (PFC) recruitment has been directly linked to engagement of cognitive meta-awareness (McCaig et al. 2011). The observation that this same brain region became specifically more recruited during unaware episodes of mind-wandering may seem surprising at first. However, the anterior PFC may be involved in mind-wandering through its role in the maintenance of thought. As discussed further below, its recruitment during mind-wandering in the absence of awareness may make it more difficult for meta-awareness to be implemented.
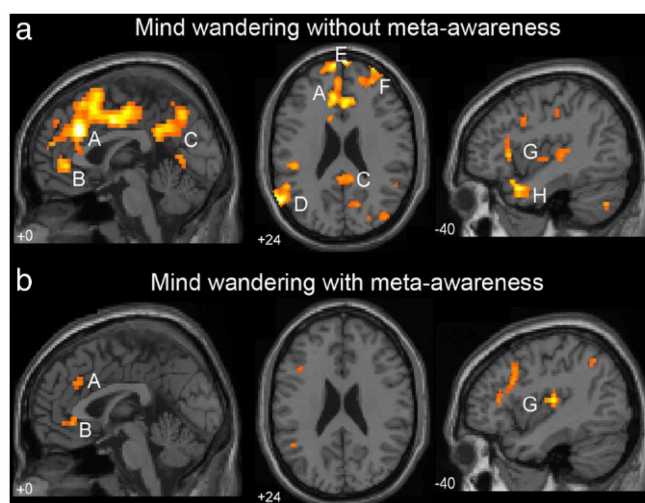

Figure 11: Mind-wandering in the (a) absence and (b) presence of meta-awareness. (a) Regions of activation associated with mind-wandering in the absence of awareness (off-task unaware versus on-task): (A) Dorsal ACC (BA32); (B) Ventral ACC (BA32); (C) Precuneus (BA7); (D) Posterior Temporoparietal Cortex (BA39); (E) Dorsal Rostromedial Prefrontal Cortex (BA10); (F) Right Rostrolateral Prefrontal Cortex (BA10); (G) Posterior & Anterior Insula; (H) Bilateral Temporopolar Cortex; (b) Similar regions were activated during mind-wandering with awareness (off-task aware versus on-task comparison) but to a lesser degree, including: (A) Dorsal ACC (BA32); (B) Ventral ACC (BA24/32); (G) Posterior & Anterior Insula. Height threshold P<0.005, extent threshold k>5 voxels (from Christoff et al. 2009).

3.3.3 Summary

In sum, the investigation of mind-wandering from the vantage of the distinction between having an experience (experiential consciousness) and explicitly realizing that one is having an experience (meta-awareness) has provided a fertile ground for developing a third-person understanding of first-person experience. This research has begun to chart the stream of consciousness, demonstrating that individuals regularly vacillate between the outer realm of perception and the inner realm of thoughts and feelings. This fluctuation routinely evades explicit meta-awareness, enabling people's minds to move on to a new topic without explicitly realizing this fact. Nevertheless, when directly queried, people are remarkably capable of introspecting and noticing whether or not they were mind-wandering. The fluctuation of perspectives on the mind that this approach affords raises numerous questions. Here, I address three: 1) If people are so competent at recognizing that they are mind-wandering when queried, then why do they find it so difficult to notice this fact on their own? 2) Are there ways of enhancing the capacity to catch one's mind in flight? 3) What are the implications of this approach for the more general enterprise of the science of first-person perspective? I consider these questions in turn.

3.3.3.1   Why is mind–wandering so easy to report but so difficult to catch?

The observation that meta-awareness is so effective at discerning mind-wandering when queried about it, yet so poor at catching it on its own, raises the natural question of why this discrepancy exists. Two potentially interrelated explanations may contribute to this striking discrepancy.

Like mind-wandering, meta-awareness appears to be associated with rhythms of attentional flux (Schooler et al. 2011). Sometimes we are explicitly aware of our mental states, and other times we are not. Such vacillations in meta-awareness could readily contribute to individuals' frequent tendency to overlook episodes of mind-wandering, as this mental state may only be notable when the explicit spotlight of attention is metaphorically turned on itself. Indeed the tendency to only notice mind-wandering after the fact may similarly apply to other mental states that routinely curtail the occurrence of meta-awareness. Like mind-wandering, other subjective states such as sleep, anesthesia, dreaming, and flow states are typically not noticed while they are occurring, but are readily acknowledged after the fact. Sleep (in the absence of dreaming) and anesthesia are typically lacking conscious experience entirely and so clearly are not candidates for meta-awareness. The mental states associated with gradually drifting off to sleep and dreaming do have phenomenal content but typically lack meta-awareness. This is why people routinely don't notice that they are falling asleep (a grave danger for driving) or dreaming (except in the case of lucid dreaming, LaBerge 1980). Another example is that of flow states (Csikszentmihalyi 1988), during which people engage in highly demanding tasks at close to their optimum level of performance. In such cases, people lack the additional resources to take stock of their experience, which may be why meta-awareness of a flow state often leads to its sadly premature termination. Nevertheless, as in the other cases, after a flow state has ended, individuals are quite able to acknowledge its occurrence. In all of these cases, the common denominator may be that these various states (for one reason or another) curtail the occurrence of meta-awareness, and thus are only noticed after the fact once the opportunity for meta-awareness reoccurs.

One reason why mind-wandering may undermine meta-awareness may stem from its reliance on the very same brain regions that may be necessary for noticing its occurrence. A striking aspect of the brain regions associated with mind-wandering is that they involve many of the systems that might be expected to contribute to the monitoring of the state. For example, elements of the medial prefrontal cortex are recruited both during mind-wandering and in tasks that require theory of mind (Gallagher & Frith 2003). As mental state attribution involves the application of meta-cognitive pro-

cesses to information of a stimulus-independent nature (e.g., inferences about the mental state of another individual), the engagement of these brain regions during mind-wandering could prohibit their utility in the service of catching the wandering mind. Similarly, in the combined fMRI/experience sampling study conducted by Christoff et al. (2009), periods of mind-wandering engaged regions such as the dorsal ACC, involved in error-detection and conflict monitoring, and the anterior PFC, involved in cognitive meta-awareness. If mind-wandering engages both meta-cognition and error-detection systems in the service of generating a coherent stream of stimulus-independent thought, the fact that these systems are already engaged may make them less capable of detecting a mind-wandering episode. The observation that mind-wandering and meta-cognitive processes both engage the same systems does not necessarily establish a causal relationship between these two. Nevertheless, it remains an intriguing speculation that our persistent failure to catch ourselves mind-wandering may occur because mind-wandering hijacks the precise meta-cognitive brain regions that are necessary for noticing it. Future research might profitably explore this hypothesis by examining whether mind-wandering episodes that are experimentally induced to emphasize meta-cognitive reflection are particularly likely to evade detection.

3.3.3.2 Are there ways of enhancing people's awareness of their mind–wandering?

One of the clear findings of research on mind-wandering is that it can be extremely disruptive to performance. Reading (Smallwood et al. 2008), working memory (McVay & Kane 2009), vigilance (Cheyne et al. 2009), and general intellectual functioning (Mrazek et al. 2012) can be seriously disrupted by mind-wandering, especially when it occurs without awareness (Smallwood et al. 2008). This raises the natural question of whether enhancing people's meta-awareness of their minds can help to curtail the disruptive consequences of mind-wandering.

Of course, just because episodes of mind-wandering routinely end with a moment of meta-awareness ("shoot, I drifted off again") does not mean that the meta-awareness necessarily was responsible for its ending (Schooler et al. 2011). Meta-awareness could be a consequence rather than the source of the termination of a mind-wandering episode. According to this view, the intuition that meta-awareness terminates mind-wandering episodes is another example of an over-reach of the attribution of deliberate intention (Metzinger 2013). While this remains a viable possibility, it is also the case that mindfulness techniques aimed at enhancing awareness of one's internal states can curtail the negative effects of mind-wandering.

In one study (Mrazek et al. 2013), participants were randomly assigned to one of two interventions that they were told were expected to enhance their performance: two weeks of training either in mindfulness meditation, or in good nutrition practices. Both interventions involved similar time commitments, expectations, and homework (either daily mediation or a nutrition journal). Before and after the intervention, participants were given both reading comprehension and working memory tasks, and their mind-wandering during each was assessed. Compared to the nutrition control, the mindfulness intervention significantly reduced mind-wandering, improved performance on both tasks, and these benefits were mediated by the reduction in mind-wandering for those who were high in mind-wandering to begin with. These findings dovetail with other recent studies indicating that the general tendency for mindfulness (being present in the moment) is negatively correlated with mind-wandering (Mrazek et al. 2012), and that even a simple mindfulness exercise conducted with non-meditators (focusing on one's breath for eight minutes) can temporarily reduce mind-wandering (Mrazek et al. 2012).

Although research on the impact of mindfulness training in dampening mind-wandering is consistent with the notion that part of its efficacy is due to enhancing meta-awareness, there is one finding that does not completely square with this account. Specifically, Mrazek et al. (2012) found that mindfulness training re-

duced people's tendency to spontaneously notice mind-wandering episodes. However, this reduction in self-caught mind-wandering could have occurred because the mindfulness practice enhanced people's awareness of the focus of their attention, thereby preventing them from initiating mind-wandering episodes in the first place. Consistent with this speculation, another recent study (Baird et al. in press) demonstrated that a similar mindfulness program can enhance at least one meta-cognitive skill, namely, the ability to assess the accuracy of memory recognition judgments. Although more research is clearly needed, it remains quite plausible that one mechanism by which mindfulness training reduces mind-wandering is by increasing people's meta-awareness of when their minds are beginning to wander.

3.3.3.3 What are the implications of this approach for the more general enterprise of the science of first–*person* perspective?

The program of research outlined above demonstrates the insights into first person experience that can be gleaned by assessing it from a third-person perspective. In many respects, the approach described here exemplifies the program of heterophenomenology that Dennett advocates. We are systematically assessing people's reports about their conscious experiences while explicitly acknowledging that those reports correspond to people's beliefs about their experience (i.e., their meta-awareness) and not necessarily their actual experience. However, by using various reasonable markers of people's internal states we have been able to examine the conditions under which people's reports are more or less likely to be aligned with their experience. In this regard, we find that when people are explicitly asked whether they were just mind-wandering, their self-reports align with a host of behavioral and physiological measures that should co-vary with mind-wandering. These findings suggest that people are quite accurate in retrospectively assessing whether or not they were just mind-wandering. In other words, by triangulating between people's retrospective self-reports of mind-wandering (following experience sampling cues) and both behavioral and physiological measures, we have identified situations in which all evidence suggests that people's opinions about the content of their private experience is generally quite accurate.

At the same time, by introducing the self-caught procedure in combination with retrospective assessments of people's awareness of prior states of mind-wandering, we have also documented critical lacunae in people's knowledge of their mental states. Specifically we find that people routinely fail to spontaneously notice when their minds have wandered. When tasked with reporting mind-wandering whenever they become aware of it, people routinely demonstrate behavior indicative of mind-wandering while failing to report it. If they are probed during periods in which these measures suggest they are mind-wandering, they routinely indicate that they now realize that they were mind-wandering, but they had not noticed this state until the time of the probe. We are thus also able to identify situations in which all evidence suggests people are routinely lacking in their current knowledge of their ongoing mental state.

By triangulating between people's first-person reports and multiple other third-person measures we have begun to reveal the relationship between people's beliefs about their experience and empirical indices of their underlying mental states (for related approaches, see Hurlburt & Heavey 2001; Jack & Roepstorff 2002; Lambie & Marcel 2002; Lutz & Thompson 2003). Moreover, the theory of the intermittent and imperfect nature of meta-awareness as a re-representation of experience (Schooler & Schreiber 2004; Schooler 2002; Schooler et al. 2015) provides a scaffold for conceptualizing the situations in which beliefs and underlying experience converge and diverge. Of course, one could always counter that we cannot be sure that the variety of behavioral and physiological measures that correlate with self-reported mental states such as mind-wandering are necessarily indicative of those states. Perhaps there is some third variable that is responsible for both mind-wandering and the host of measures that

we find to be correlated with people's self-reporting of it. But it seems a stretch to suggest that this entirely unknown third variable could account for why, when people say they were mind-wandering, their performance on primary tasks is impaired, their eye movements become less sensitive to what they are looking at, their physiological measures indicate a dampening of attention to external processes, and their brain activation corresponds to that which occurs when they are unoccupied. In short, a strong case can be made for the value of using empirical third-person science to inform not only our understanding of people's beliefs about their experience, but also to discern when those beliefs are likely to be accurate and when they may be inaccurate or incomplete.

It seems likely that those with strong allegiances to either an exclusively first- or third-person account of experience will balk at the notion that third-person empirical indices can be used to corroborate people's first-person accounts. Traditional phenomenologists (e.g., Husserl 1963) may contend that first-person experience is privileged and so, when discrepancies arise between it and third-person data, that the former should invariably be favored. Those with a behaviorist bent may argue that making claims about underlying subjective states remains a dead end because ultimately they can never truly be verified. Personally I find myself sympathetic to both of the vantages; however, I argue that the striking disparity of these views, both from each other and from the one promoted here, stems from the incongruence that naturally arises from shifting perspectives.

From the vantage of one perspective of a Necker cube, the alternative perspective makes little sense. When the spinning dancer is moving in one direction, it is hard to imagine how she could possibly shift directions. Those who have never entered the third dimension of a Magic Eye image could reasonably doubt that such a perspective could possibly exist. But once one realizes that there are distinctly different perspectives to be had on a situation, and that these alternative perspectives each offer their own valuable vantage, then that knowledge can be held even as one remains incapable of experiencing both at the same time. I believe this is the case with interpreting scientific third-person accounts of first-person experience. If one is capable of recognizing both the strengths and limitations of each perspective, then they can use each to inform the other. If, however, they solely look at a problem from one or the other perspective, then this may lead to a logically consistent view, but one that omits an important vantage. I turn now to a consideration of this larger issue: namely, conceptualizing a meta-perspective that can accommodate the vacillating manner in which first-person experience is both that which we know best and understand least.

4 Toward a meta–perspective for considering the metaphysics of first– versus third–person perspective

It is my contention that debates about how to reconcile the first- and third-person perspective on reality arise in part from the distinct vantages that different scholars take on the issue. The problem in a nutshell is that while the prevailing third-person perspective of science (material reductionism) does an admirable job of accounting for all aspects of reality that are revealed from its vantage, it robustly fails to accommodate several self-evident aspects of existence that are uniquely apparent from a first-person perspective. If one simply dismisses those aspects of the first-person perspective that are incongruent with the third-person perspective, (as most scientists and many philosophers do), then there is no problem. However, here I will argue that there exist self-evident observations derived from the first-person perspective that are as compelling as any objective fact. Such observations should not be simply dismissed as irrelevant or illusory but rather suggest the need of serious revision to current accounts of physical reality (for related arguments see Chalmers 2002; Nagel 2012). In the following section, I first review the material reductionist account suggested by the prevailing third-person perspective view. I then consider several elements of existence revealed by a first-person perspective that seem to have no place

in this account, most notably subjective experience, the flow of time, and the distinctiveness of the present. Finally, I offer some speculative remarks about the nature of a meta-perspective that might be able to accommodate both vantages.

4.1 Ontological third–person perspective—Material reductionism

When reality is conceived of strictly from the vantage of a third-person perspective, it quite naturally leads to the premise of material reductionism, namely that everything including the arising of subjective experience can be accommodated on the basis of physical principles that do not themselves make any appeal to consciousness. This account is arguably the prevailing view among both scientists (e.g., Crick 1994; Bloom 2009; Graziano 2013) and philosophers (e.g., Dennett 1993; Churchland 1989; Metzinger 2004). Its strength comes from its remarkable record of success. Having abandoned the superstitions and spiritual whimsies of the past, hard-nosed science has an amazing track record for explaining everything it has been directed toward with purely physical constructs. Aspects of reality that were once thought to be beyond the ken of the third-person perspective of science, for example the notion of some sort of mystical force of life, élan vital, have been reduced to rigorous formalisms (e.g., DNA code). Admittedly, we do not currently have a full accounting of how it is that we experience a first-person perspective on reality, but given science's track record, it is presumed to be merely a matter of time before these experiences are explained with precisely the same type of accounts that have been used so successfully to explain so much so far (Churchland 1989). People may feel as if they have some type of privileged perspective, as if the view from within their own minds could never be reduced to and explained by the machinations of atoms, but this is just shortsightedness, perhaps fueled by some evolutionary advantage to view mind and matter as different (Bloom 2009).

There is much to be said for material reductionism, as it draws on the very assumptions that have led to the remarkable progress of science. To appeal to the existence of some other distinct realm of reality beyond the objectively physical smacks of ghosts and fairy dust (e.g., Jackson 1982). To date, while the previous analysis has revealed the marked advances to our understanding that emerge when we consider people's first-person perspectives, no *explanation* in science has required abandoning an exclusive reliance on mutually verifiable third-person observations. In other words, although I will soon suggest cases that may challenge this tradition, to date there are no third-person accounts of physical phenomena that have been undermined solely because they conflict with first-person experience. Given the track record of third-person accounts, it may seem hard to justify why one scientific question (the arising of conscious experience) should challenge an ontological perspective that is not problematic for anything else.

4.2 Ontological first–person perspective— What material reductionism leaves out

Although material reductionism provides an outstanding vantage for accounting for the physical world, it comes up wanting when the mind is inspected from a first-person perspective. The essential challenge is that even if a materialistic explanation is able to account for how the mind functions, this does not explain how it is that there is a subjective experience associated with it, or why that experience is as it is. As Jackson (1982) puts it:

> Tell me everything physical there is to tell about what is going on in a living brain, the kind of states, their functional role, their relation to what goes on at other times and in other brains, and so on and so forth, and be I as clever as can be in fitting it all together, you won't have told me about the hurtfulness of pains, the itchiness of itches, pangs of jealousy, or about the characteristic experience of tasting a lemon, smelling a rose, hearing a loud noise or seeing the sky. (p. 127)

Jackson introduces the canonical example of Mary the color scientist to illustrate this point. Imagine that Mary is a color scientist who has been brought up in a black and white room and has never experienced red; nevertheless, she knows all there is to know about the physical processes relevant to color vision. Jackson's point is that if she later experiences red firsthand, she will learn a new fact (the experience of red) that all of her physical knowledge was insufficient to provide. Complete physical knowledge about a subjective experience is insufficient to entirely know all there is to know about that experience. One has to actually have the first-person experience to fully understand it.

A second criticism of material reductionism involves its inability to explain the arising of conscious experience. It is quite straightforward to imagine how physical processes could account for the structure and function of the mind in much the same way that they can explain the structure of computer hardware and the functions of computer software. But such an account would not explain how subjectivity itself arises or what it is like from the vantage of the experiencer. Similarly, even if we were to create a computer that perfectly emulated a conscious being, we could not know whether it was genuinely conscious, and if it were, "what it is like to be" (Nagel 1974) a computer.

The inherent difficulty of conceptualizing how material objects enjoy subjective experience is further illustrated by a third criticism of material reductionism, namely that it is possible to conceive of a system that has all of the physical characteristics of a conscious being, but nevertheless lacks consciousness. Philosophical zombies (Chalmers 1995) are hypothetical human beings who have no internal experience but are otherwise identical to normal people in all other physical measurements and behaviors (including claiming that they are conscious). Although there is no way of demonstrating that such creatures could ever exist, there is also no way of demonstrating that they couldn't. Finding the neural correlates of consciousness helps not an iota, as even a zombie who reported consciousness in certain brain states would still not be actually enjoying a genuine experiential state. If zombies that are physically indistinguishable from experiencing humans could in principle exist, then there is nothing inherent in what is known about physical systems that speaks to the arising of consciousness. This presents a major problem to the prevailing material reductionist view because it offers no way to distinguish between philosophical zombies and the non-zombies.

The essential problem of the exclusively third-person perspective of material reductionism is that it is forced to ignore all aspects of experience that cannot be reduced to a third-person perspective. A thought experiment may help to provide a further "intuition pump" (Dennett 2014) for illustrating just how special that extra something might be. Consider the following science fiction variant on the classic Faustian bargain (Goethe 1867). One day, to your amazement, a flying saucer lands in front of you and a member of a clearly more advanced species emerges and says that he/she (it's unclear) has been enjoying our debates about the mind-body problem, which his/her civilization has solved. If philosophical zombies are logically[3] possible, you can be turned into one. He/she offers you all the gold you can imagine (they've also mastered alchemy) if you are willing to accept the risk of becoming a zombie. If a zombie is a logical possibility, you will be transformed into one. From everyone else's perspective (i.e., the third-person perspective), you will be exactly as you were before (just much richer). However, you will not actually have any experience at all; you will simply seem to others as if you do. Would you take the bargain? Hard-nosed material reductionists say they would (D. Dennett, personal communication, 7/15/2014; M. Graziano, 6/10/2014, personal communication), but many of the rest of us might not. What is the value of untold wealth, if there is no inner experience by which it can be enjoyed?

The *Zombie Faustian Bargain* serves as a useful intuition pump for illustrating the im-

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3 Let's just assume, for the sake of argument, that the aliens had solved the tricky issue of moving from logical to nomological possibility, that is that if it is possible for a philosophical zombie to exist in any conceivable universe, that it would be possible for you to become one.

portance of the extra something that is left out of the third-person material reductionist perspective. Nevertheless, it is clearly a fanciful proposition and material reductionists might reasonably argue that there is not much to worry about if the only cost to adopting their view is not knowing how to respond to such an unlikely scenario. However, there are numerous other examples closer to home where the limits of a third-person accounting of consciousness become relevant. Issues surrounding the nature and existence of consciousness in other species, fetuses, and computers all revolve around inferences about first-person experiences that gravely exceed all known or conceived ways of reconciliation.

A less obvious domain for a clash between the current prevailing third-person perspective of science and first-person experiences arises in, of all places, physics. Although there has been some speculation, now largely disregarded by the mainstream, that consciousness could have something to do with the collapse of the wave function in quantum physics (Wigner & Margenau 1967), in general, consciousness is assumed to have little relevance to physics. However, there are two current assumptions in physics that seem to squarely contradict first-person experience. Specifically, physicists believe that the flow of time is an illusion and that there is nothing special about the present. Before considering why these claims are so problematic for the existence of subjective experience, let us first consider why physics makes this claim.

4.3 Why physicists dismiss the flow of time and the privileged present

In considering the nature of time, physicists often "spatialize" it. In other words, they attempt to place it on a similar footing to the traditional three dimensions of space (see Figure 10). Though differing from spatial dimensions in important respects (Einstein 2001), the notion of time as similar to a spatial dimension is a key feature of the prevailing Einstein/Minkowski interpretation of special relativity theory. Space and time are combined in this theory into one concept: space-time. The spatialization of time

allows the depiction of a "block universe" in which the traditional spatial dimensions are reduced (for purposes of visual illustration) to two dimensions from three, and time is added as a third dimension. Such a depiction can be thought of as a space-time "loaf of bread," where each narrow cross- section of the loaf ("slice") constitutes a moment in time of the entire universe. According to the block universe view (widely held by today's physicists), all slices—past, present, and future—already exist. This arises from the relativity of simultaneity, which means that "now" is different for different observers. It is simply that each individual observer is privy to only one moment (slice) at a time. From the vantage of a block universe, the only thing that seems to actually move in time is consciousness itself (i.e., the observer). This means that from the vantage of the prevailing view of physics, the flow of time is not a part of objective reality but simply an artifact of subjective experience. As Stanford physicist Linde (2004) notes: "Thus we see that without introducing an observer, we have a dead universe that does not evolve in time" (p. 25). What is more, once we conceive of the temporal dimension as the equivalent of another spatial dimension, then there are not enough degrees of freedom for the observer to move in time; that is, movement requires a rate in time, but time in the block universe is already represented as a spatial dimension, and thus cannot also be used as the metric that establishes the rate of movement through time. As the physicist Paul Davies (2002) puts it:

> Nothing other than a conscious observer registers the flow of time. A clock measures durations between events much as a measuring tape measures distance between places; it does not measure the 'speed' with which one moment succeeds another. Therefore it appears that the flow is subjective, not objective. (p. 36)

The upshot of this reasoning is that the flow of time is an illusion, an artifact of consciousness. Again, as Davies (2002) puts it: "From the fixed past to the tangible present to the undecided

future, it feels as though time flows inexorably on. But that is an illusion" (p. 32).
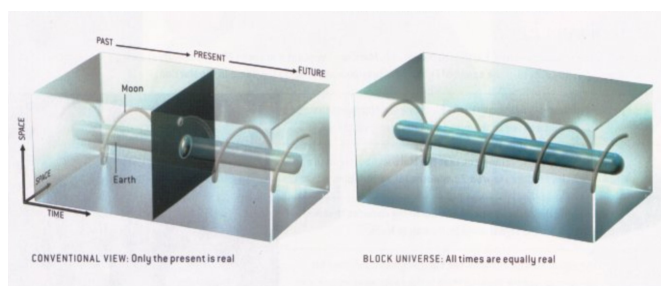

Figure 12: Although the conventional view derived from experience is that the present is real and moves through time, current views in physics say this is erroneous. According to the standard block universe view in physics, all moments—past, present, and future—are equally real. The flow of time and the privileged present are seen as illusions of consciousness (from Davies 2002).

The characterization of reality as a block universe, with the flow of time as an illusion of consciousness, also leads to the conclusion that the privileged present is an illusion. One of the most pronounced aspects of consciousness is its extension in time. Consciousness extends in time and thereby gains the "now" in which it resides. First-person observers may remember the past or imagine the future (as often happens during mind-wandering) but ultimately mental time travel always takes place in the present. The observer perpetually and exclusively resides in the present. In this sense, it seems intuitively self-evident that the "now" is privileged. But not so from the current vantage of the block universe in physics, where the present is treated exactly the same as the past and the future. As Einstein himself observed, "The past, present and future are only illusions, even if stubborn ones" (quoted in Hoffmann & Dukas 1972, p. 258). Again, the problem is that the only thing that defines the present from the vantage of a block universe is that it is where the observer perceives itself to be at any particular moment in time. But from the vantage of a block universe, all moments of time exist simultaneously.

The notions that the flow of time and the privileged present are merely illusions of consciousness are less problematic from a third-per-

son perspective than the first-person perspective. If there is no ultimate reality to subjectivity, then there is no problem making claims that are directly in opposition to subjective experience. At a recent public lecture, I asked the noted physicist Brian Greene how he reconciled physics' static view of nature with the self-evidently dynamic experience of consciousness. His reply was that he "sees a psychiatrist," that consciousness is capable of all sorts of illusions, and that the flow of time is just another example of the artifacts of consciousness.

While as detailed in the earlier section of this paper, I am the first to concede that our first-person reports can be fallible, as consciousness is capable of all sorts of illusions, it is hard for me to conceive of how consciousness could create an illusion of the flow of time, or the privileged present. There are several reasons why I am skeptical of this claim. First, just as matter must have extension in space in order to exist, so too it seems that consciousness must have extension in time. If consciousness had no "thickness" in time, then I simply do not understand how it could exist any more than an object could exist without some extension in space. Time is the dimension in which consciousness extends. Although the objective duration of the specious present (James 1918) may be rather modest (Pöppel 1997) without at least some extension in time I do not see how there can be any consciousness at all. Second, my experience is defined in terms of the flow of time and a privileged present; the stream of my consciousness is essentially a succession of "nows," with the present always entailing the bridge between the past now and the future now. In a nutshell, from my first-person perspective I find the reality of the flow of time and the privileged present as compelling as the existence of physical reality itself (which also could in principle be an illusion, Descartes 1641/1996).

4.4 Reconciling first– and third–person perspectives of reality

Those who subscribe to a strict material reductionist perspective insist that when first-person experience suggests characteristics of reality

that are not readily handled by a third-person account, that those aspects must be rejected. From a strict materialist perspective, the seemingly privileged knowledge afforded by subjective experience, the flow of time, and the unique significance of the present all must be disregarded as illusions of consciousness. But herein lies the rub. The third-person perspective on reality is adequate as long as it provides constructs that correspond to the core aspects of the first-person perspective. However, when that perspective requires me to abandon absolutely fundamental aspects of my experience, then I am forced to question the assumptions that impose that requirement.

Whether we acknowledge it or not, all of us must discern for ourselves what aspects of existence to take as axiomatic. By definition, axioms cannot be empirically proven or logically deduced, rather they are self-evident truths that must be taken as givens. Perhaps the most fundamental of all such axioms is that physical reality exists; i.e., that I am not residing in a solipsistic mirage. Ultimately, while I grant the ontological reality of the physical world, in an important sense I am less epistemologically certain of it than I am of partaking in subjective experience. Ultimately, the only thing that I can know with absolute confidence is that I am currently enjoying a first-person experience (Descartes 1996). Physical reality could be a dream, I could be a brain in a vat or the matrix, indeed even my past could be an illusion, but there is simply no question but that I am currently having an experience. It might be an illusory experience[4], but even an illusory experience is still experienced. Thus, although it is conceivable that physical reality could be an illusion, it is inconceivable (at least to me) that the occurrence of my subjective experience could be entirely baseless. This leads me to conclude that the existence of subjective experience and all premises that necessarily underpin its existence must be treated on equal ontological grounds to that of physical reality. Accordingly, if we grant subjective experience an ontological status equivalent to that of

objective reality then we must seriously question any characterization of objective reality that challenges the essential qualities of subjective reality. While much of our subjective experience may be an illusion, it is very difficult to see how the privileged vantage of subjective experience, the flow of time, or the unique status of the present could be such. To quote the philosopher David Ray Griffin (2007): "The reality of time is a more fundamental and stubborn fact than the alleged facts on which its denial is based" (p. 119).

A variety of approaches has been offered to accommodate the seeming limitations of a purely physical accounting of consciousness. Idealism (Berkeley 1878; Goswami 1993; Hoffman 2008) responds to the seemingly superior ontological status of subjective experience (i.e., its existence is more certain than an inferred external reality) by suggesting that if one must be reduced to the other, then it should be physical reality that is seen to be an outgrowth of subjectivity, rather than the other way round (as the material reductionists contend). Although difficult to refute, idealism (at least in the macro sense of conscious beings creating reality with consciousness) appears to discount the independent existence of a natural world, and thus seems at odds with a scientific vantage.

Another approach for reconciling the seemingly incommensurate existence of the subjective and objective is to pose that they both exist as two interacting yet distinct realms. This approach (substance dualism) was favored by Descartes, but it has a serious logical deficiency (at least as originally formulated): if two realms are truly incommensurate and distinct, then there seems to be no way for them to interact. To posit a "ghost in the machine" (Ryle 2009) is to assume that the ghost can affect the machine, which means that they share some common ground and therefore are not entirely distinct realms. This difficulty has proven a major problem for substance dualism (Armstrong 1999), although see Chalmers (2002) for arguments as to why the challenge of understanding the causal nexus between the mental and physical is not unlike similar issues of causality observed within the physical realm.

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[4] An illusory experience being defined as an experience that does not correspond to actual reality, such as a hallucination. Note that a philosophical zombie does not have an illusory experience of being conscious, it has no experience at all.

In my view, the seeming impasse between the third- and first-person perspectives of reality strongly suggests the existence of some other meta-perspective that can accommodate them both. Like the reversible images that can initially invoke one of two entirely opposed interpretations, but that can subsequently be reconciled from a vantage that recognizes the reality of both, (even if they cannot be both apprehended simultaneously) so too it seems there must be some meta-perspective for reconciling first- and third-person vantages on reality. In other words, it seems likely that there exists a higher order outlook that simultaneously acknowledges the manner in which neither perspective can simply be reduced to the other, yet still offers a mode of resolution. It is clearly easier to recognize the need for a meta-perspective than to identify precisely what such a view might be. Nevertheless, it seems a goal well worth pursuing.

Over the years, a number of scholars have tried their hand at envisioning a vantage that neither tries to reduce the subjective to the physical, nor the physical to the subjective, but rather conceives of some common ground or property that may be reflective of both. This approach, often referred to as neutral monism (Chalmers 2002; Feigl 1958; James 1904; Russell 1927), though with close affinities to dual aspect theories (e.g., Jackson 1982; Nagel 1986; Spinoza 1677/1985; Velmans 2009), attempts to identify a neutral realm of existence that can be alternately characterized as mental, physical, or neither.

The ever-changing present represents a core element of the common ground between subjectivity and objectivity that is invoked in several accountings of neutral monism. For William James, the neutral realm was the present:

> The instant field of the present is at all times what I call the 'pure' experience. It is only virtually or potentially either object or subject as yet. For the time being, it is plain, unqualified actuality, or existence, a simple that. (1904, p. 23)

For Bertrand Russell, the neutral realm was the event: "Everything in the world is composed of

'events.'... An 'event,' as I understand it ... is something occupying a small finite amount of space-time." For Alfred North Whitehead (1929), the present also served as the nexus of conjunction between the objective and the subjective. In Whitehead's panpsychic characterization of reality, the interface between first- and third-person perspectives occurs in the "creative advance" of the present in which time marches forward in a continual alternation among all elements of reality between subjective and objective states (for further discussions of Whitehead's account, see Griffin 2007; Hunt 2011).

Information represents a second element that unites several efforts to find the neutral realm from which both subjectivity and objectivity arise. As Chalmers (1996) observes:

> Perhaps, then, the intrinsic nature required to ground the information states is closely related to the intrinsic nature present in phenomenology. Perhaps one is even constitutive of the other. That way, we get away with a cheap and elegant ontology, and solve the two problems in a single blow. (pp. 304–305)

Sayre (1976) similarly argues that "the concept of information provides a primitive for the analysis of both the physical and the mental." The notion that information somehow serves as the interface between the subjective and the objective is also a central component of Tononi's (2008) recent suggestion that consciousness arises when matter produces "integrated information," which is defined as "the amount of information generated by a complex of elements, above and beyond the information generated by its parts" (p. 216). The basic idea is that complex systems that integrate information, even potentially non-nonbiological ones, will experience some minimal amount of consciousness: something it is like to be that system (see also Koch 2012, 2013).

In sum, although there is considerable variability in the manner in which scholars have conceptualized the common ground of reality from which both the objective and subjective emerge, two common elements are 1) that the

interface occurs within the ongoing march of the present, and 2) that it is constituted within the shared informational properties entailed in both objective and subjective states. A final shared aspect of many of these approaches is that subjectivity represents a fundamental attribute of the universe that either permeates all aspects of matter (panpsychism), or exists as a potentiality of matter that emerges when certain conditions are met (protopanpsychism; Chalmers 2002). Drawing on these general observations, I turn now to offering my own highly speculative conjectures regarding a meta-perspective on reality that may provide the shared foundation for first- and third-person perspectives.

4.5 The possibility of a subjective dimension of reality

Many scholars who posit that subjectivity is an essential aspect of reality argue that ultimately physics may need to be expanded to include constructs corresponding to subjective states. As the philosopher David Chalmers (1995) observed:

> I propose that conscious experience be considered a fundamental feature, irreducible to anything more basic. … In the 19th century it turned out that electromagnetic phenomena could not be explained in terms of previously known principles. As a consequence, scientists introduced electromagnetic charge as a new fundamental entity and studied the associated fundamental laws. Similar reasoning should be applied to consciousness. If existing fundamental theories cannot encompass it, then something new is required. (p. 96)

Eminent physicist Andrei Linde (1990) has also speculated that consciousness may some day be recognized as part of our understanding of physics:

> Could it be that consciousness is an equally important part of the consistent picture of our world, despite the fact that so far one could safely ignore it in the description of

the well-studied physical processes? Will it not turn out, with the further development of science, that the study of the universe and the study of consciousness are inseparably linked, and that ultimate progress in the one will be impossible without progress in the other? (p. 27)

The critical question, of course, is: What in the physical universe might correspond to the arising of consciousness?

To recap, the physical realm as currently construed offers no place for subjective experience, the flow of time, or the uniqueness of the present. In order to bridge the gap between physical reality and subjectivity, scholars have posited the existence of a neutral realm that gives rise to both. Though varied in their emphasis, two elements have emerged as likely components of this neutral ground: the evolving present and information. Together these considerations suggest that a conjoined first-person/third-person meta-perspective will likely conceptualize subjectivity, the present, and the flow of time within an architecture that closely links information to an ever-changing now. Toward this end I offer the following conjecture: *consciousness arises via the changing informational states associated with an observer's movement through objective time relative to a currently unacknowledged dimension or dimensions of subjective time.*

Although speculative and highly underspecified, the above account has intuitive appeal. The sense of moving through time from one informational state to the next is clearly central to experience. Indeed it could well be said that it is the defining aspect of our existence. It is difficult to conceive of experience without invoking movement in time and change in informational state. Recall however that the current block universe portrayal of time provides no way to conceptualize moving through time, as movement in time would require change in time at a rate that could never be specified. As the Physicist Paul Davies observes:

> But what meaning can be attached to the movement of time itself? Relative to what does it move? Whereas other types of motion relate one physical process to another, the

putative flow of time relates time to itself. Posing the simple question 'How fast does time pass?' exposes the absurdity of the very idea. The trivial answer 'One second per second' tells us nothing at all. (2002, p. 8)

Thus to move in time requires movement in relationship to some dimension other than time itself. The postulation of an additional temporal dimension allows observers to change information states in objective time relative to subjective time. Indeed, it seems possible (and perhaps even a mathematical necessity) that in order to extend in and move through space-time (i.e., the block universe), there needs to be at least one additional dimension to provide the degree of freedom necessary to enable such movement (Schooler et al. 2011). In other words, if we accept the block universe model[5] of reality, then in order to move through objective time, we have to move relative to something, and that something cannot itself be time because all time exists simultaneously in the block universe. A seemingly reasonable solution is to posit an additional dimension (or dimensions) of time. Although the postulation of additional dimensions of reality should not be taken lightly, it is not without precedent. In physics, string theory has postulated seven additional spatial dimensions beyond the three dimensions of space and one dimension of time that are customarily acknowledged (Greene 2004). If there can be multiple dimensions of space, then might there not also be additional dimensions of time? Indeed, some physicists have argued that an additional dimension of time might be very useful for conceptualizing various issues in physics (Bars et al. 1998). If the postulation of an additional dimension (or dimensions) of subjective time could also resolve the paradox of time and provide a realm for subjectivity, then surely that would also warrant its consideration as a possibility.

I am not the first to suggest that the failure of objective time (as it is currently conceptualized) to afford the flow of time or inner experience may require the postulation of an additional

subjective dimension (or dimensions) in which the observer moves relative to physical space-time (e.g., Smythies 2003). Noting the inability of current theories of physics to account for the flow of time or the existence of subjective experience, physicist Linde speculates that dimensions of consciousness may be required to provide the necessary degrees of freedom. Linde (2004) observes:

> Is it possible that consciousness, like space-time, has its own intrinsic degrees of freedom, and that neglecting these will lead to a description of the universe that is fundamentally incomplete? What if our perceptions are as real (or maybe, in a certain sense, are even more real) than material objects? What if my red, my blue, my pain, are really existing objects, not merely reflections of the really existing material world? Is it possible to introduce a 'space of elements of consciousness'….? (p. 451)

I remain agnostic regarding precisely how many additional dimensions may be required in order to provide the degrees of freedom necessary for time to flow and consciousness to have extensions in the present. Indeed, I am not even committed to the notion that such a realm must necessarily be thought of as possessing all of the mathematical formalities of spatial dimensions. My point is simply that the current material reductionist model of reality has left no room for time to flow or now to exist. It is as if physics has built a pendulum clock but left no space for the pendulum to swing. In statistics, there always must be one more degree of freedom than the total number of subjects and conditions so as to leave the freedom for variables to vary. I believe that such degrees of freedom are similarly required to enable experience to flow through time.

A dynamic depiction of the value of adding a second temporal dimension is illustrated in the following three examples depicting a simple event of bottles breaking. The first (Figure 13; see video clip in its description) depicts the event as it would unfold from the first-person perspective, a dramatic shattering of initially intact colored bottles. The second example (Figure 14) transforms this event into a

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[5] Another possible way of reconciling the challenges of the flow of time and the present is to discard the notion of the block universe. While this vantage is the prevailing view in physics (Greene 2004), some have suggested that it needs revising (Hunt 2014; Smolin 2013).

block universe depiction in which objective time is spatialized, and each slice corresponds to a separate moment of the event. Notice that in the block universe representation there is no motion (and hence no video clip), and no singular frame (i.e., slice) corresponds to "now." However, in the third example (Figure 15; see video clip in its description), an additional temporal dimension is introduced so that the observer can move through the block universe. Frame by frame a moving "now" marches through the block universe. By adding a second temporal dimension to the block universe, the dynamical experience of events unfolding is once again achieved.

A spatialized depiction of the notion of observers moving through subjective time relative to physical space and objective time is presented in Figures 16–18. As previously, noted, in the standard presentation of the block universe the three dimensions of space are, for graphical depiction, reduced down two dimensions (Figure 16). Here, in order to provide room to depict an additional dimension, physical space is further reduced to one dimension (Figure 17). Within this characterization, it is possible to see how the introduction of an additional dimension of subjective time (Figure 18) provides the necessary degree of freedom to enable an observer to move through time, as they can now move through physical time via a succession of moments in subjective time.

Figure 13: An event of breaking vases as it would be experienced from a first-person perspective. See http://open-mind.net/videomaterials/schooler_bootle_loaf5.mp4/view.
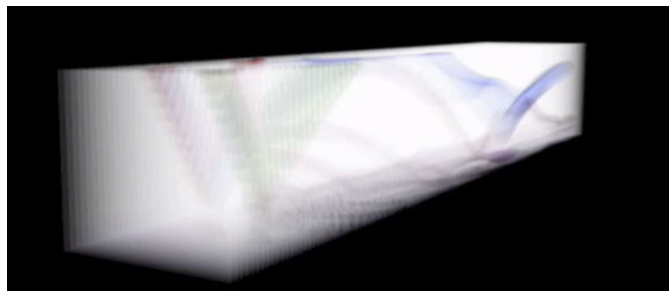

Figure 14: The breaking vases event is depicted as a block universe, with the temporal dimension spatialized, and each moment corresponding to a separate "slice." Notice that there is no way to depict "now" and no way to move through it.
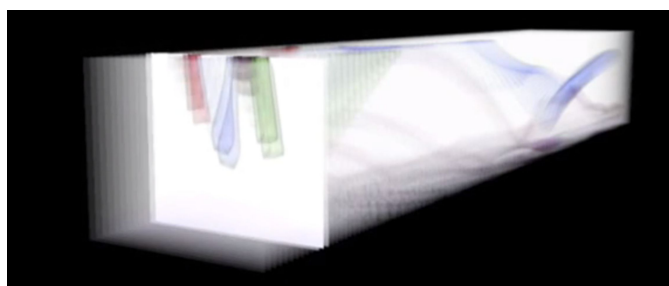

Figure 15: The breaking vases event is again depicted as a block universe, with the addition of a second temporal dimension. The moving present is represented as successive illuminated slices that progress from moment to moment through the block universe. Notice that witnessing movement through the block universe requires an additional dimension of time as the standard dimension of objective time is already dedicated to spatializing the block universe. See http://open-mind.net/videomaterials/schooler-bottles-loaf-1.mp4/view.

An interesting implication of this characterization is that observers can vary in the granularity (i.e., extent) of their moments. Notice how in Figure 17, the observer with the smaller spatial extent also occupies smaller successive moments in time.[6] Intriguingly, there is evidence to support this view: recent findings suggest that smaller vertebrates may have a different "temporal grain size" relative to larger verteb-

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6 Although subjective agents may move in subjective time relative to objective time in varying sized steps, it does not appear that there is necessarily a single temporal grain size for the processing of all sensory stimuli. Specifically, Pöppel (1997) finds that the duration of what constitutes a single moment (as assessed by temporal discrimination of successive sensory events) varies between sensory modalities. This observation seems potentially consistent with the suggestion that even within a single individual there may be multiple distinct conscious systems (Schooler et al. 2011; Zeki 2003) corresponding to different sensory levels and systems.

rates. Specifically, Healy et al. (2013) report a negative correlation between vertebrate size and the highest rate at which they can detect the flickering of a light (the flicker fusion rate). From the vantage of the current discussion, these findings suggest that the consciousness of smaller animals may move through subjective time relative to physical time at a faster rate than larger animals. This may be why it is so hard to swat a fly: from its vantage, we are moving in slow motion.
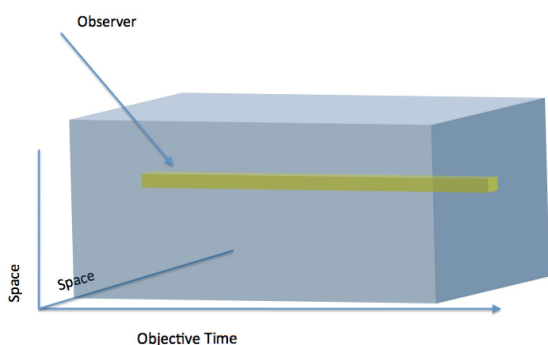

Figure 16: The observer depicted in the standard block universe with two dimensions of space. In the standard block universe, the observer is static and exists simultaneously in all locations. There is an insufficient number of degrees of freedom for the existence of a genuine now or movement in time.
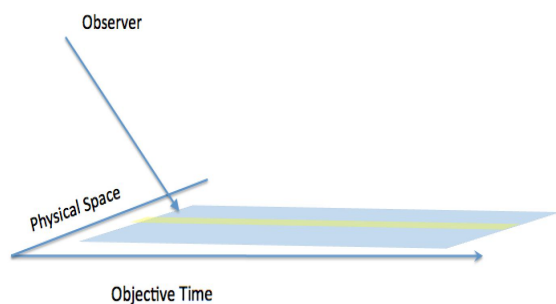
Figure 17: The observer depicted in a standard block universe with one dimension of space. As with the standard convention of depicting the block universe in two spatial dimensions instead of three, the reduction to one spatial dimension is useful for illustrative purposes.

A critical question that arises in postulating an additional subjective dimension (or dimensions) of time is: what are the properties of this dimension? I have left the answer to this question intentionally vague as I believe under-

specification leaves greater room to flesh out the rudimentary idea in various possible ways. With that said, it seems plausible that the subjective temporal dimension(s) could correspond to subjective informational states in the same way that objective informational states correspond to different moments of objective time. As noted, subjective informational states are aligned with but not identical to objective informational states (recall Mary, the color scientist). Moreover, current theories of neutral monism posit information as being one of the core potential interfaces between the objective and the subjective. Thus, characterizing subjective time as corresponding to distinct subjective informational states that are aligned with but not identical to objective informational states seems a promising characterization of the nexus between the objective and the subjective.
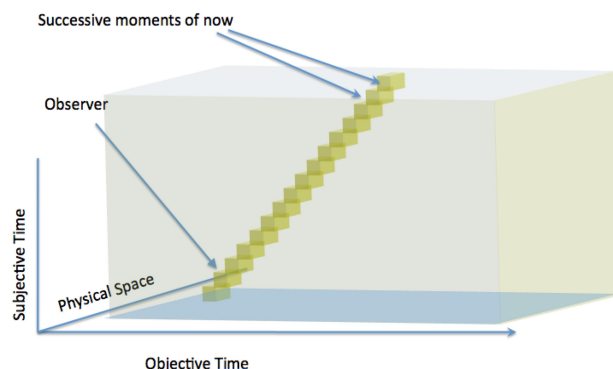

Figure 18: The observer depicted moving through a dynamic block universe with one dimension of physical space and the introduction of an additional subjective temporal dimension. In this model, there are a sufficient number of degrees of freedom to enable the observer to move in objective time relative to subjective time. The present can also be depicted as a series of moments extending in subjective time, objective time, and physical space.

A further potential benefit of the conjecture that experience emerges from movement in a subjective temporal dimension relative to objective time is that it provides a potential way of conceptualizing the nature of experience in the universe. Many scholars throughout history, and particularly those sympathetic to neutral monism, have articulated some type of panpsychic vision of nature, where all elements of

matter are seen as partaking in some rudimentary experience or proto-experience. Advocates of some version of panpsychism include Spinoza (1677/1985), Leibniz (1989), James (1909), Bergson (1896/1912), and Whitehead (1929). More recent adopters of this view include Hameroff & Powell (2009), Chalmers (1995), Hunt (2011, 2014), Koch 2013, Schooler et al. (2011), Skrbina (2005), and Strawson (2008). The notion that the flow of time emerges by virtue of movement in a subjective temporal dimension relative to an objective one provides a potential way of conceptualizing how all of matter may partake in experience at varying levels of complexity. Accordingly, if experience emerges by movement through a dimension of subjective time relative to objective time, then it seems quite plausible that elements associated with all of matter may be on a shared trajectory through these two (or more) temporal dimensions, and thus may be enjoying some form of experience. In other words, if consciousness emerges from something as potentially ubiquitous as movement through an additional time dimension, then it seems plausible that all matter could enjoy some modicum of experience.
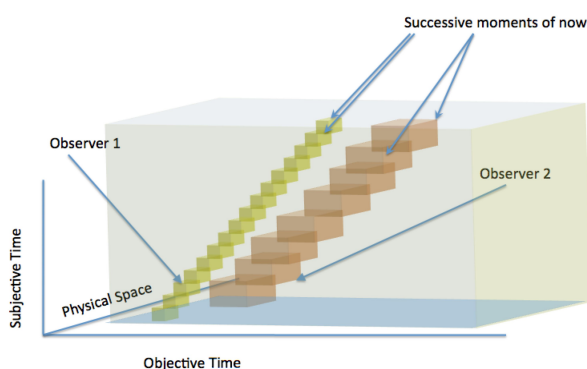

Figure 19: Two observers depicted moving through a dynamic block universe. Notice how this account enables varying temporal grain sizes between observers.

Although the present view provides a way of conceptualizing how matter might partake in at least some rudimentary form of experience, it need not suggest that all objects—collections of matter—are themselves sentient beings. To use Nagel's (1974) terminology, there need be nothing "that it is like to be" a rock, for example.

Rather, the claim is that at some level, the constituent elements of a rock (and all other material objects) partake in at least some very rudimentary kind of experience, what the physicist/philosopher Alfred North Whitehead (1929) referred to as "actual entities". In other words, according to the panpsychic tradition, matter is constituted of collections of individual elements each of which partake in some minimal experience. The subjective state of these individual experiential elements (or "actual entities") is presumed to be extremely simple, and for the most part, when they combine, it is assumed that they form "mere aggregates" that do not entail a higher-order experience. However, under some circumstances, and in particular when present in certain organic structures, these simple actual entities may combine to form higher-order actual entities corresponding to the conscious agents that we typically acknowledge as such.

The notion of observers moving through objective time relative to a subjective temporal dimension may offer a possible direction toward solving the perennial "combination problem" of panpsychism, namely discerning how rudimentary proto-experiences of individual elements can combine to form the larger higher-order experiences that we enjoy (Hunt 2011). Accordingly, it seems possible that experience may correspond to oscillations in objective time relative to subjective time. As depicted in Figures 18 and 19, I have speculated that observers may move in subjective time relative to objective time in discrete steps. The precise timing of these steps from one moment to the next could potentially provide the foundation for a unified experience among elements (i.e., an approach to the combination problem). When elements oscillate in synchrony (i.e., when they all jump from one moment in subjective time to the next), this may produce a unity of conscious experience. Nervous systems may provide an organizational structure that enables material elements to oscillate in synchrony and thereby produce larger, more organized fields of subjective experience. In this sense, the combination problem may be addressed by, and our holistic experience may result from, the common wavelength of oscilla-

tion through objective time relative to subjective time that constituent elements of a singular experience partake in. Put colloquially, each of us may have our own unique wavelength moving through subjective time relative to objective time.

Importantly, these speculations are presented as an example of the kind of meta-perspective that might enable an acknowledgement of the reality of both first- and third-person vantages. This is far from a formal model, and leaves much unspecified. For example, although I believe it could be possible to formalize the relationship between subjective time and informational states, this remains a major conjecture. Other elements of the framework, such as the notion that observers move in discrete steps in subjective and objective time, and that the pattern of oscillation may provide a way of addressing the "combination problem," also are merely conjectures. I suspect that there are potentially a great variety of ways of conceptualizing how observers might move in a dimension of subjective time relative to objective time. My goal in attempting a rudimentary depiction of this notion is simply to fuel the conversation.[7]

Even if scientists resist the suggestion of an additional temporal dimension of reality, characterizing how experience can reside in a physical world will require explicating how observers move in physical time relative to changes in subjectively apprehended information. In other words, to be an observer in reality is arguably to reside in a now that corresponds

to a "location" within continually changing information states. Thus, conceptualizing the experience of the observer requires understanding how that observer moves between informational states over time. Given that the present prevailing view of physics does not afford the degrees of freedom to actually move in time, understanding how an observer changes informational states relative to time seems to require at a minimum the postulation of a virtual dimension of subjective time. Whether that dimension is given ontological status as a genuine aspect of reality depends on one's perspective, but that of course is precisely the point.

For those who are willing to entertain the possibility of the kind of meta-perspective that I am envisioning, there are a number of possible ways forward. Perhaps, and most dramatically, it seems plausible that the existence of an additional temporal dimension may have empirical consequences. Although received with understandable skepticism, evidence continues to accumulate for precognition (i.e., that the mind is sensitive to events that have not yet occurred). There is a long tradition of research in this area (Honorton & Ferrari 1989). For example, Bem (2011) recently published a series of nine studies in a highly respected journal that seem to suggest evidence of genuine precognition and a subsequent meta-analysis of 90 additional findings appear to further substantiate these findings (Bem et al. 2014). Not surprisingly, these claims have been met with considerable skepticism (e.g., Ritchie et al. 2012; Wagenmakers et al. 2011). Given their profound challenge to our current scientific understanding of reality, claims of this sort will require studies that offer highly tangible evidence that cannot be attributed to artifact or statistical anomaly, e.g., taking advantage of people's alleged precognitive capacities to make consistent future predictions of real world events, such as the future outcome of roulette wheel spins or the stock market (Franklin et al. in press). Nevertheless, the demonstration of robust findings of precognition might provide the type of data that could inform theories of how consciousness interfaces with time in a manner not currently considered in modern science.

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[7] Several years ago, I presented the idea that consciousness entails movement through a subjective dimension of time using the depiction in Figure 15 and illustrated at the site: http://open-mind.net/videomaterials/schooler-bottles-loaf-1.mp4/view. One of the attendees, Robert Forman (see his description of the event, Forman 2008), suggested that although he was intrigued by my depiction, that it did not square with his intuitions. In my model, the block universe is fixed and consciousness marches through it. He suggested that his intuition was the opposite: namely that the field of the observer remains fixed and time passes by, or changes within it. This alternative vantage in which time evolves through a fixed observer seems a worthy alternative perspective for conceptualizing the ever -changing now that may be closer to approximating several other neutral monist vantages (e.g., Whitehead 1929, and Hunt 2014). While I think this alternative viewpoint is worthy of consideration, I also think it is likely that the two vantages are logically equivalent—it is simply a question of which one is taken as the fixed frame of reference. Nevertheless the manner in which we construe the movement of time relative to the individual may have important psychological consequences (Casasanto & Boroditsky 2008).

Other approaches for fleshing out the kind of meta-perspective suggested here may include quantitative reconceptualization of existing findings. Although quantum theory is one of the most precisely predictive theories ever conceived, its explanation remains a mystery. In particular, the manner in which measurement seems to affect outcomes, and the theoretical relationship between measurement, consciousness, and the collapse of the wave function are not at all understood (Chalmers 2002). It seems possible that the postulation of an additional subjective dimension of time might lead to alternative ways of conceptualizing current formalism.[8] Indeed it seems possible that once psychological constructs (such as a dimension of subjective time) are integrated with physical principles, that new psycho/physical laws of nature may emerge (Chalmers 2002; J. N. Schooler 2010). Alternatively, the notion that subjective experience emerges from movement through another dimension of time may resist empirical documentation, but may nevertheless remain a conjecture that appeals to some intuitions but not others.

Even if ultimately there is no conclusive ways of determining whether there exists an ad-

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[8] Although not a mathematician it seems plausible to me that existing mathematical formalisms might be adopted to accommodate some of the present conjectures. Most speculatively, a quantitative characterization of additional dimensions of time might correspond in some manner to the many worlds account of quantum mechanics (Everett 1957) that postulates that every potential alternative outcome of quantum events entails a different branching parallel universe. It strikes me as possible that these so called "many worlds" could correspond to different coordinates in additional temporal dimensions. From this vantage, the block universe might be better conceived of as a block multiverse, with innumerable distinct temporal projections. Several multi-dimensional theories of objective time might (e.g., Bars et al. 1998; Craig & Weinstein 2008) also be relevant. Also potentially pertinent are various existing quantitative efforts to reconcile experience and physical matter. For example, the magnitude of a conscious observer's extension in subjective time might correspond to Tononi's (2008) quantitative assessment of Φ (pronounced "fi") which he characterizes as corresponding to the amount of integrated information that a conscious observer apprehends at any particular moment. Other potentially relevant formal approaches for reconciling consciousness with physical matter include: Hameroff & Penrose's (2014) efforts to explain how consciousness may "consists of a sequence of discrete events, each being a moment of 'objective reduction' (OR) of a quantum state" (p. 73), and Tegmark's (2014) suggestion that "consciousness can be understood as a state of matter, 'perceptronium', with distinctive information processing abilities" (p. 1). The relevance of these various approaches is highly speculative, and indeed given their disparities it is unlikely that they could be mutually accommodated. My point in mentioning them is simply to point the way towards some more formal approaches that might hold potential for advancing this discussion.

ditional subjective dimension of time this does not mean that the consideration or rejection of this view should be arbitrary. There are many judgments in life that rely on leanings that are not purely objective in nature. From ethics to art we routinely favor some views over others for reasons besides purely objective facts. Indeed the adoption or rejection of views close to those under discussion here are often based on subjective considerations. For example some physicists embrace string theory because of the elegance of its mathematics, whereas others reject it because there is no physical evidence to support it. Similarly there is great debate on how far down the phylogenetic scale we should postulate the existence of consciousness. Most of us have an opinion on this matter, but it remains entirely unclear whether there will ever be a purely objective way to resolve it. In the absence of objective evidence, our positions on these issues are far from arbitrary, rather they are based on the same sorts of sensibilities and intuitions that underpin many of our most heartfelt convictions.

In a final further effort to appeal to readers' intuitions, let me introduce one last metaphor for the meta-perspective I am striving for: consider the allegorical tale of *Flatland*, written by Edwin Abbott (1885) more than a century ago. Flatland depicts a two-dimensional world that is visited by a three-dimensional being (a sphere). The sphere takes a citizen of Flatland (a square) on a journey through the third dimension, offering the square a vantage on his reality that he never had before. The story of Flatland offers a number of useful lessons for the present discussion. First, it provides a powerful metaphor for thinking about the existence of additional dimensions of reality. Long preceding relativity theory, which treats time like a fourth dimension, or string theory, which currently posits the existence of up to seven additional spatial dimensions (Greene 2004), Abbott's tale introduces us to the concept of higher-order dimensions. Flatland describes how additional dimensions can be both embedded in and yet simultaneously transcend what we know. The parallels to consciousness are also striking: when the square is taken through the

third dimension, he suddenly sees inside the objects of Flatland. Like consciousness, movement in an additional dimension in Flatland enables the perception of an inside where none could otherwise be possible. Like consciousness's relationship to reality, an additional dimension intersects with the lower dimensions and yet is distinct from them. And like the recognition of an additional dimension in Flatland, positing consciousness as moving through objective time relative to a dimension (or dimensions) of subjective time provides an example of a meta-perspective that potentially offers observers a new way of conceptualizing their relationship with physical reality. Although I make no claims as to having fleshed out this meta-perspective, it is my hope that my arguments have persuaded at least some readers that it is a vantage worth considering.

5 Summary and final conclusions

In this paper I used the thesis that perspective shifting can fundamentally alter how we conceive and evaluate evidence as the backdrop for exploring one of the most perennial and challenging of all perspectives shifts: namely, between the subjective first-person perspective that provides each of us with a unique window onto reality, and the objective third-person perspective that serves as the consensual foundation for science. My arguments were divided into three sections, which though admittedly distinct in their focus, all converge in attempting to elucidate a rapprochement between the subjective and objective perspectives on human experience.

In the first section I introduced the notion of perspective shifting in the context of classic reversible images. Here I argued that reversible images provide a context for conceptualizing how the very same situation can be understood from two very different perspectives that appear to produce seemingly irreconcilable accounts of their contents. However, once this juxtaposition is recognized, a meta-perspective emerges that enables the appreciation of both perspectives even if they cannot be apprehended simultaneously. The perspective shifting and meta-perspective that arise from reversible images

provide a metaphor for conceptualizing the tension between the first- and third-person perspective for understanding human experience. Both researcher and the field of science itself have been divided on whether to take perspectives on human nature that emphasize inner experience or external behaviors. While historically this has been a debate on which researchers have been forced to take sides, I argue that we should strive towards a meta-perspective in which the two vantages can inform one another.

In the second section I sought to show how the third-person perspective of objective science can elucidate our understanding of first-person experience. Towards this end, I introduced the distinction between having an experience (experiential consciousness) and one's explicit understanding of that experience (meta-awareness). Historically when researchers have sought to understand people's actual experience they have relied on people's self-reports about what they believe they were experiencing. This has led some to argue that it is impossible to gain insight into underlying experience. However, I argue that through triangulation between self-reports and behavioral and physiological measures, it is possible to make reasoned inferences about people's actual experience; identifying both situations in which meta-awareness overlooks experience (temporal dissociations of meta-awareness) and cases in which it distorts them (translations dissociations of meta-awareness). This framework was fleshed out within an extensive review of research on mind-wandering that, because of its inherently private nature, provides an ideal testing ground for developing a third-person science of first-person experience. By assessing the relationship between people's behavioral and physiological measures and self-report this review concludes that while people's self-reports of mind-wandering routinely correspond to genuinely experienced instances of this mental state, they nevertheless often fail to notice mind-wandering while it is occurring.

In the final and most speculative section of this paper, I turned the tables around. Instead of asking how third-person science clarifies first-person experience, I asked how first-person experience may inform third-person science. Here I ar-

gued that there are certain aspects of first-person experience that are so fundamental that they may reasonably serve as axioms of existence that any construal of physical reality must be able to accommodate. As detailed in the prior section it is clear that many aspects of experience may be illusory but several can reasonably be construed as unassailable, including: the occurrence of experience, the flow of time and the privileged present. Notably, current accounts of physical reality offer no way of accommodating these inherent aspects of first-person experience. This conflict between seemingly self-evident aspects of personal experience and current accounts of physical reality leads me to posit that, like the reversible images that can only be accommodated by recognizing a larger meta-perspective in which they both reside, so too there must exist some meta-perspective that can accommodate both objective scientific facts and personally experienced ones. Towards this end I introduced a highly speculative conjecture about the larger framework in which both objective and subjective perspectives might reside. Namely that consciousness involves a fundamental aspect of the universe that arises via the changing informational states associated with an observer's movement through objective time relative to a currently unacknowledged dimension or dimensions of subjective time. Although highly speculative, I offer this account as an example of the kind of meta-perspective that may simultaneously accommodate extant objective observations and certain aspects of subjective experience that I find as compelling as the existence of physical reality itself.

In my view, bridging the objective/subjective divide will require adopting a meta-perspective in which the two points of view are viewed as alternative vantages on an underpinning reality that corresponds to both but can be fully accommodated by neither alone. As I attempted to illustrate at the outset, it is quite possible to hold inaccurate or incomplete beliefs about one's experience, and third-person science can help to illuminate such errors. However, from my vantage there are certain elements of subjective experience that are as axiomatic as any aspect of the physical realm. Nevertheless, I recognize that not all will see it this way. Some will remain exclusively fixed to the third-person perspective of objective science, while others will conceive of reality exclusively from their own personal first-person point of view. In conceptualizing this breadth of perspectives, it is important to remain mindful of an essential insight of Bayes' theorem of probability. Bayes' theorem states that in calculating the probability of something one must integrate new evidence with one's *a priori* probabilities. From a Baysian perspective, for those who believe that something is impossible (i.e., infinitely unlikely) there is no amount of evidence or argument that should sway them. The ontological reality of first-person experience seems very much to fit in this category. My arguments on this point will likely remain wholly unpersuasive to those who cannot conceive of subjective experience as offering an epistemological authority that rivals science. However, for those open to the possibility that science will need to find a way to accommodate the reality of both the subjective and objective perspectives, I hope my discussion offers some glimmers as to what such a meta-perspective might be like.

Acknowledgements

References

Abbott, E. A. (1885). *Flatland: a Romance of Many Dimensions.* Boston, MA: Roberts Bothers.

Adams, H. E., Wright, L. W. & Lohr, B. A. (1996). Is homophobia associated with homosexual arousal? *Journal of Abnormal Psychology, 105* (3), 440-440. 10.1037/0021-843X.105.3.440

Antrobus, J. S. (1999). Toward a neurocognitive processing model of imaginal thought. *At play in the fields, of consciousness: Essays in honor of Jerome L. Singer* (pp. 1-28). Mahwah, NJ: Erlbaum.

Armstrong, D. M. (1999). *The mind-body problem: An opinionated introduction.* New York, NY: Perseus.

Asendorpf, J. B. & Scherer, K. R. (1983). The discrepant repressor: differentiation between low anxiety, high anxiety, and repression of anxiety by autonomic-facial-verbal patterns of behavior. *Journal of Personality and Social Psychology, 45* (6), 1334-1334. 10.1037//0022-3514.45.6.1334

Baird, B., Smallwood, J., Fishman, D. J., Mrazek, M. D. & Schooler, J. W. (2013). Unnoticed intrusions: Dissociations of meta-consciousness in thought suppression. *Consciousness and Cognition, 22* (3), 1003-1012. 10.1016/j.concog.2013.06.009

Baird, B., Smallwood, J., Lutz, A. & Schooler, J. W. (2014). The decoupled mind: Mind-wandering disrupts cortical phase-locking to perceptual events. *Journal of Cognitive Neuroscience, 26* (11), 2596-2607. 10.1162/jocn_a_00656

Baird, B., Mrazek, M. D., Philips, D. T. & Schooler, J. W. (in press). Domain-specific enhancement of meta-cognitive ability following meditation training. *Journal of Experimental Psychology.*

Bars, I., Deliduman, C. & Andreev, O. (1998). Gauged duality, conformal symmetry, and spacetime with two times. *Physical Review, D58* (066004). 10.1103/PhysRevD.58.066004

Bayne, T. (2015). Introspective insecurity. In T. Metzinger & J. M. Windt (Eds.) *Open MIND.* Frankfurt a. M., GER: MIND Group.

Bem, D. J. (2011). Feeling the future: Experimental evidence for anomalous retroactive influences on cognition and affect. *Journal of Personality and Social Psychology, 100* (3), 407-425. 10.1037/a0021524

Bem, D., Tressoldi, P. E., Rabeyron, T. & Duggan, M. (2014). *Feeling the future: A meta-analysis of 90 experiments on the anomalous anticipation of random future events.* Rochester, NY: Social Science Research Network.

Bergson, H. (1912). *Matter and memory (original work published 1896).* New York, NY: McMillan.

Berkeley, G. (1878). *A treatise concerning the principles of human knowledge.* Philadelplhia, PA: J.B. Lippincott & Company.

Bloom, P. (2009). *Descartes' baby: How the science of child development explains what makes us human.* New York, NY: Basic Books.

Carriere, J. S., Cheyne, J. A. & Smilek, D. (2008). Everyday attention lapses and memory failures: The affective consequences of mindlessness. *Consciousness and Cognition, 17* (3), 835-847. 10.1016/j.concog.2007.04.008

Casasanto, D. & Boroditsky, L. (2008). Time in the mind: Using space to think about time. *Cognition, 106* (2), 579-593. 10.1016/j.cognition.2007.03.004

Chalmers, D. J. (1995). The puzzle of conscious experience. *Scientific American, 273* (6), 80-86. 10.1038/scientificamerican0402-90sp

——— (1996). *The conscious mind: In search of a fundamental theory.* New York; NY: Oxford University Press.

——— (2002). Consciousness and its Place in nature. In D. Chalmers (Ed.) *Philosophy of mind: Classical and contemporary readings.* Oxford, UK: Oxford University Press.

Cheyne, A. J., Solman, G. J., Carriere, J. S. & Smilek, D. (2009). Anatomy of an error: A bidirectional state model of task engagement/disengagement and attention-related errors. *Cognition, 111* (1), 98-113. 10.1016/j.cognition.2008.12.009

Christoff, K., Gordon, A. M., Smallwood, J., Smith, R. & Schooler, J. W. (2009). Experience sampling during fMRI reveals default network and executive system contributions to mind wandering. *Proceedings of the National Academy of Sciences of the United States of America, 106* (21), 8719-8724. 10.1073/pnas.0900234106

Churchland, P. S. (1989). *Neurophilosophy: Toward a unified science of the mind-brain.* Cambridge, MA: MIT press.

Craig, W. & Weinstein, S. (2008). *On determinism and well-posedness in multiple time dimensions.* arXiv.org: 0812.0210.

Crick, F. (1994). *The astonishing hyptesis.* New York, NY: MacMillian.

Csikszentmihalyi, M. (1988). The flow experience and its significance for human psychology. In M. Csikszentmihalyi & I. S. Csikszentmihalyi (Eds.) *Optimal experience: Psychological studies of flow in consciousness* (pp. 15-35). Cambridge, UK: Cambridge University Press.

Davies, P. (2002). That mysterious flow. *Scientific American*, *287* (3), 40-47. 10.1038/scientificamerican0206-6sp

Dennett, D. C. (1993). *Consciousness explained.* London, UK: Penguin.

——— (2003). Who's on first? Heterophenomenology explained. *Journal of Consciousness Studies*, *10* (9), 19-30.

——— (2014). *Intuition pumps and other tools for thinking.* New York, NY: W.W. Norton & Company.

Descartes, R. (1996). *Descartes: Meditations on first philosophy: With selections from the objections and replies (original work from 1641).* Cambridge, UK: Cambridge University Press.

Donchin, E. & Coles, M. G. (1988). Is the P300 component a manifestation of context updating? *Behavioral and Brain Sciences*, *11* (03), 357-374. 10.1017/S0140525X00058027

Duncker, K. (1945). On problem solving. *Psychological Monographs*, *58* (5)

Einstein, A. (2001). *Relativity: The special and the general theory. (Reprint of 1920 translation by Robert W. Lawson ed.).* London: Routledge.

Everett, H. (1957). 'Relative State' formulation of quantum mechanics. *Reviews of Modern Physics*, *29*, 454-462.

Farrin, L., Hull, L., Unwin, C., Wykes, T. & David, A. (2003). Effects of depressed mood on objective and subjective measures of attention. *The Journal of Neuropsychiatry and Clinical Neurosciences*, *15* (1), 98-104. 10.1176/appi.neuropsych.15.1.98

Feigl, H. (1958). The 'mental' and the 'physical'. *Minnesota Studies in the Philosophy of Science*, *2*, 370-497.

Forman, R. K. (2008). A watershed event. *Journal of Consciousness Studies*, *15* (8), 110-115.

Franklin, M. S., Baumgart, S. L. & Schooler, J. W. (in press). Future directions in precognition research: More research can bridge the gap between skeptics and proponents. *Frontiers in Psychology: Perception Science.*

Gallagher, H. L. & Frith, C. D. (2003). Functional imaging of 'theory of mind'. *Trends in Cognitive Sciences*, *7* (2), 77-83. 10.1016/S1364-6613(02)00025-6

Giambra, L. M. (1995). A laboratory method for investigating influences on switching attention to task-unrelated imagery and thought. *Consciousness and Cognition*, *4* (1), 1-21. 10.1006/ccog.1995.1001

Goswami, A. (1993). *The self-aware universe: How consciousness creates the material world.* New York, NY: Putnam.

Graziano, M. S. (2013). *Consciousness and the social brain.* New York, NY: Oxford University Press.

Greene, B. (2004). *The fabric of the cosmos: Space, time, and the texture of reality.* New York, NY: A.A. Knopf.

Griffin, D. R. (2007). *Whitehead's radically different postmodern philosophy: An argument for its contemporary relevance.* Albany, NY: State University of New York Press.

Hameroff, S. & Penrose, R. (2014). Consciousness in the universe: A review of the 'Orch OR' theory. *Physics of Life Reviews*, *11*, 39-78. 10.1016/j.plrev.2013.08.002

Hameroff, S. & Powell, J. (2009). Embodied Prediction. In D. Skrbina (Ed.) *Mind that abides: Panpsychism in the new millennium.* Amsterdam, NL: Benjamins.

Healy, K., McNally, L., Ruxton, G. D., Cooper, N. & Jackson, A. L. (2013). Metabolic rate and body size are linked with perception of temporal information. *Animal Behaviour*, *86* (4), 685-696.

Hoffman, D. (2008). Conscious realism and the mind-body problem. *Mind and Matter*, *6* (1), 87-121.

Hoffmann, B. & Dukas, H. (1972). *Albert Einstein, creator and rebel.* New York, NY: Viking.

Honorton, C. & Ferrari, D. (1989). "Future telling": A meta-analysis of forced-choice precognition experiments, 1935–1987. *Journal of Parapsychology*, *53*, 281-308.

Hunt, T. (2011). Kicking the psychophysical laws into gear a new approach to the combination problem. *Journal of Consciousness Studies*, *18* (11-12), 96-134.

——— (2014). *Eco, Ego, Eros: Essays on Philosophy, Spirituality and Science.* Aramis Press: Santa Barbara, CA.

Hurlburt, R. T. & Heavey, C. L. (2001). Telling what we know: Describing inner experience. *Trends in Cognitive Sciences*, *5* (9), 400-403.

Husserl, E. (1963). *Ideas: A general introduction to pure phenomenology. Trans. W. R. Boyce Gibson.* Collier Books: New York, NY.

Jack, A. & Roepstorff, A. (2002). Introspection and cognitive brain mapping: From stimulus-response to script-report. *Trends in Cognitive Sciences*, *6* (8), 333-339. 10.1016/S1364-6613(02)01941-1

Jackson, F. (1982). Epiphenomenal qualia. *The Philosophical Quarterly*, *32* (127), 127-136.

James, W. (1904). A world of pure experience. *Journal of Philosophy, Psychology and Scientific Methods*, *1*, 477/533-491/543.

——— (1909). *A pluralistic universe.* New York, NY: Longmans, Green, and Company.

——— (1918). *The principles of psychology (Original work published 1890).* New York, NY: Henry Holt and Company.

Kam, J. W., Dao, E., Farley, J., Fitzpatrick, K., Small-wood, J., Schooler, J. W. & Handy, T. C. (2011). Slow fluctuations in attentional control of sensory cortex. *Journal of Cognitive Neuroscience*, *23* (2), 460-470. 10.1162/jocn.2010.21443

Katz, D. (1989). The world of touch (L. E. Krueger, Trans., orignial work from 1925). Hillsdale, NJ: Erlbaum.

Klinger, E. (1999). Thought flow: Properties and mechanisms underlying shifts in content. In J. A. Singer & P. Salovey (Eds.) *At play in the fields,of consciousness: Essays in honor of Jerome L. Singer* (pp. 29-50). Mahwah, NJ: Erlbaum.

Koch, C. (2012). *Consciousness: Confessions of a romantic reductionist.* Cambridge, MA: MIT Press.

——— (2013). Is consciousness universal? *Scientific American Mind*, *25* (1)

LaBerge, S. P. (1980). Lucid dreaming as a learnable skill: A case study. *Perceptual and Motor Skills*, *51* (3f), 1039-1042. 10.2466/pms.1980.51.3f.1039

Lambie, J. A. & Marcel, A. J. (2002). Consciousness and the varieties of emotion experience: A theoretical framework. *Psychological Review*, *109* (2), 219-259. 10.1037/0033-295X.109.2.219

Leibniz, G. (1989). Monadology. In R. Ariew & D. Garber (Eds.) *G. W. Leibniz: Philosophical essays*. Indianapolis, IN: Hackett Publishing Company.

Linde, A. D. (1990). *Particle physics and inflationary cosmology.* Chur, CH: Harwood Academic.

——— (2004). Inflation, quantum cosmology, and the anthropic principle. In J. D. Barrow, P. C.W. Davies & C. L. Harper (Eds.) *Science and ultimate reality: Quantum theory, cosmology, and complexity*. Cambridge, UK: Cambridge University Press.

Lutz, A. & Thompson, E. (2003). Neurophenomenology: Integrating subjective experience and brain dynamics in the neuroscience of consciousness. *Journal of Consciousness Studies*, *10* (9-10), 31-52.

Manly, T., Robertson, I. H., Galloway, M. & Hawkins, K. (1999). The absent mind: Further investigations of sustained attention to response. *Neuropsychologia*, *37* (6), 661-670. 10.1016/S0028-3932(98)00127-4

Marks, I. M. (1987). *Fears, phobias, and rituals: Panic, anxiety, and their disorders.* New York, NY: Oxford University Press.

Mason, M. F., Norton, M. I., Van Horn, J. D., Wegner, D. M., Grafton, S. T. & Macrae, C. N. (2007). Wandering minds: the default network and stimulus-independent thought. *Science*, *315* (5810), 393-395. 10.1126/science.1131295

McCaig, R. G., Dixon, M., Keramatian, K., Liu, I. & Christoff, K. (2011). Improved modulation of rostrolateral prefrontal cortex using real-time fMRI training and meta-cognitive awareness. *NeuroImage*, *55* (3), 1298-1305. 10.1016/j.neuroimage.2010.12.016

McGuire, P., Paulesu, E., Frackowiak, R. & Frith, C. (1996). Brain activity during stimulus independent thought. *Neuroreport*, *7* (13), 2095-2099. 10.1016/S0920-9964(97)82485-1

McKiernan, K. A., D'Angelo, B. R., Kaufman, J. N. & Binder, J. R. (2006). Interrupting the "stream of consciousness": An fMRI investigation. *NeuroImage*, *29* (4), 1185-1191. 10.1016/j.neuroimage.2005.09.030

McVay, J. C. & Kane, M. J. (2009). Conducting the train of thought: Working memory capacity, goal neglect, and mind wandering in an executive-control task. *Journal of Experimental Psychology. Learning, Memory,and Cognition*, *35* (1), 196-196. 10.1037/a0014104

Metzinger, T. (2004). *Being no one: The self-model theory of subjectivity.* Cambridge, MA: MIT Press.

——— (2013). The myth of cognitive agency: Subpersonal thinking as a cyclically recurring loss of mental autonomy. *Frontiers in Psychology*, *4* (931). 10.3389/fpsyg.2013.00931

Mrazek, M. D., Smallwood, J. & Schooler, J. W. (2012). Mindfulness and mind-wandering: Finding convergence through opposing constructs. *Emotion*, *12* (3), 442-442. 10.1037/a0026678

Mrazek, M. D., Smallwood, J., Franklin, M. S., Chin, J. M., Baird, B. & Schooler, J. W. (2012). The role of mind-wandering in measurements of general aptitude. *Journal of Experimental Psychology: General*, *141* (4), 788-788. 10.1037/a0027968

Mrazek, M. D., Franklin, M. S., Phillips, D. T., Baird, B. & Schooler, J. W. (2013). Mindfulness training improves working memory capacity and GRE performance while reducing mind wandering. *Psychological Science*, *24* (5), 776-781. 10.1177/0956797612459659

Murray, D. J. (1993). A perspective for viewing the history of psychophysics. *Behavioral and Brain Sciences*, *16* (1), 115-137. 10.1017/S0140525X00029277

Nagel, T. (1974). What is it like to be a bat? *The Philosophical Review*, *4*, 435-450.

——— (1986). *The view from nowhere.* Oxford, UK: Oxford University Press.

——— (2012). *Mind and cosmos: Why the materialist neo-Darwinian conception of nature is almost certainly false.* Oxford, UK: Oxford University Press.

Nisbett, R. E. & Wilson, T. D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review*, *84* (3), 231-259.

Pöppel, E. (1997). A hierarchical model of temporal perception. *Trends in Cognitive Sciences*, *1* (2), 56-61. 10.1016/S1364-6613(97)01008-5

Raichle, M. E., MacLeod, A. M., Snyder, A. Z., Powers, W. J., Gusnard, D. A. & Shulman, G. L. (2001). A default mode of brain function. *Proceedings of the National Academy of Sciences of the United States of America*, *98* (2), 676-682. 10.1073/pnas.98.2.676

Rayner, K. (1998). Eye movements in reading and information processing: 20 years of research. *Psychological Bulletin*, *124* (3), 372-372.

Reichle, E. D. (2006). Theories of the "eye-mind" link: Computational models of eye movement control during reading. *Cognitive Systems Research*, *7* (2-3). 10.1016/j.cogsys.2005.07.001

Reichle, E. D., Reineberg, A. E. & Schooler, J. W. (2010). Eye movements during mindless reading. *Psychological Science*, *21* (9), 1300-1310.

Ritchie, S. J., Wiseman, R. & French, C. C. (2012). Failing the future: Three unsuccessful attempts to replicate Bem's 'Retroactive facilitation of recall' effect. *PloS one*, *7* (3), e33423. 0.1371/journal.pone.0033423

Robertson, I. H., Manly, T., Andrade, J., Baddeley, B. T. & Yiend, J. (1997). Oops!: Performance correlates of everyday attentional failures in traumatic brain injured and normal subjects. *Neuropsychologia*, *35* (6), 747-758. 10.1016/S0028-3932(97)00015-8

Russell, B. (1927). *The analysis of matter.* London, UK: Kegan Paul.

Ryle, G. (2009). *The concept of mind.* London, UK: Routledge.

Sayette, M. A., Reichle, E. D. & Schooler, J. W. (2009). Lost in the sauce: The effects of alcohol on mind wandering. *Psychological Science*, *20* (6), 747-752. 10.1111/j.1467-9280.2009.02351.x

Sayette, M. A., Schooler, J. W. & Reichle, E. D. (2010). Out for a smoke the impact of cigarette craving on zoning out during reading. *Psychological Science*, *21* (1), 26-30. 10.1177/0956797609354059

Sayre, K. (1976). *Cybernetics and the philosophy of mind.* Atlantic Highlands, NJ: Humanities Press.

Schooler, J. W. (2002). Re-representing consciousness: Dissociations between experience and meta-consciousness. *Trends in Cognitive Sciences*, *6* (8), 339-344. 10.1016/S1364-6613(02)01949-6

——— (2010). *Mental inertia: Limited free will and determinism.* Santa Barbara: Paper submitted in fulfillment of UCSB Research Mentorship program, University of California.

Schooler, J. W., Fallshore, M. & Fiore, S. (1994). Epilogue: Putting insight into perspective. In R. J. Sternberg & J. E. Davidson (Eds.) *The Nature of Insight.* Cambridge, MA: MIT Press.

Schooler, J. W., Reichle, E. D. & Halpern, D. V. (2004). Zoning out while reading: Evidence for dissociations between experience and metaconsciousness. *Thinking and seeing: Visual metacognition in adults and children* (pp. 203-226). Cambridge, MA: MIT Press.

Schooler, J. W., Smallwood, J., Christoff, K., Handy, T. C., Reichle, E. D. & Sayette, M. A. (2011). Meta-awareness, perceptual decoupling and the wandering mind. *Trends in Cognitive Science*, *15* (7), 319-326. 10.1016/j.tics.2011.05.006

Schooler, J. W., Hunt, T. & Schooler, J. N. (2011). Reconsidering the metaphysics of science from the inside out. *Neuroscience, Consciousness and Spirituality* (pp. pp. 157-194). Berlin, GER: Springer.

Schooler, J. W., Mrazek, M. D., Baird, B. & Winkielman, P. (2015). Minding the mind: The value of distinguishing among unconscious, conscious, and metaconscious processes. *APA handbook of personality and social psychology, Vol. 1. Attitudes and social cognition* (pp. 179-202). APA handbooks in psychology.

Schooler, J. W., Mrazek, M. D., Baird, B. & Winkielman, P. (in press). Minding the mind: The value of distinguishing between unconscious, conscious, and meta-conscious processes. In P. Shaver & M. Mikulincer (Eds.) *APA Handbook of Personality and Social Psychology. Vol. 1: Attitudes and Social Cognition.* Washington, DC: APA Press.

Schooler, J. W. & Mauss, I. B. (2010). To be happy and to know it: The experience and meta-awareness of pleasure. *Pleasures of the brain* (pp. 244-254). New York, NY: Oxford University Press.

Schooler, J. W. & Melcher, J. (1995). The ineffability of insight. In S. M. Smith, T. B. Ward & R. A. Finke (Eds.) *The creative cognition approach* (pp. 97-134). Cambridge, MA: MIT Press.

Schooler, J. W. & Schreiber, C. A. (2004). Experience, meta-consciousness, and the paradox of introspection. *Journal of Consciousness Studies*, *11* (7), 17-39.

Schubert, T. W. & Semin, G. R. (2009). Embodiment as a unifying perspective for psychology. *European Journal of Social Psychology*, *39* (7), 1135-1141. 10.1002/wcs.55

Schultz, D. P. & Schultz, S. E. (1992). *A history of modern psychology.* New York, NY: Harcourt Brace.

Singer, J. L. (1988). Sampling ongoing consciousness and emotional experience: Implications for health. In M. J. Horowitz (Ed.) *Psychodynamics and Cognition*. Chicago, IL: University of Chicago Press.

Skrbina, D. (2005). *Panpsychism in the West*. Cambridge, MA: MIT Press.

Smallwood, J. M., Baracala, S. F., Lowe, M. & Obonsawin, M. (2003). Task unrelated thought whilst encoding information. *Consciousness and Cognition*, *12* (3), 452-484. 10.1016/S1053-8100(03)00018-7

Smallwood, J., Davies, J. B., Heim, D., Finnigan, F., Sudberry, M., O'Connor, R. & Obonsawin, M. (2004). Subjective experience and the attentional lapse: Task engagement and disengagement during sustained attention. *Consciousness and Cognition*, *13* (4), 657-690. 10.1016/j.concog.2004.06.003

Smallwood, J., O,ÄôConnor, R. C., Sudberry, M. V., Haskell, C. & Ballantyne, C. (2004). The consequences of encoding information on the maintenance of internally generated images and thoughts: The role of meaning complexes. *Consciousness and Cognition*, *13* (4), 789-820. 10.1016/j.concog.2004.07.004

Smallwood, J., Fishman, D. J. & Schooler, J. W. (2007). Counting the cost of an absent mind: Mind wandering as an underrecognized influence on educational performance. *Psychonomic Bulletin & Review*, *14* (2), 230-236. 10.3758/BF03194057

Smallwood, J., McSpadden, M. & Schooler, J. W. (2007). The lights are on but no one,Äôs home: Meta-awareness and the decoupling of attention when the mind wanders. *Psychonomic Bulletin & Review*, *14* (3), 527-533. 10.1016/j.tics.2011.05.006

Smallwood, J., O'Connor, R. C., Sudbery, M. V. & Obonsawin, M. (2007). Mind-wandering and dysphoria. *Cognition and Emotion*, *21* (4), 816-842. 10.1080/02699930600911531

Smallwood, J., McSpadden, M., Luus, B. & Schooler, J. (2008). Segmenting the stream of consciousness: The psychological correlates of temporal structures in the time series data of a continuous performance task. *Brain and Cognition*, *66* (1), 50-56. 10.1016/j.bandc.2007.05.004

Smallwood, J., McSpadden, M. & Schooler, J. W. (2008). When attention matters: The curious incident of the wandering mind. *Memory & Cognition*, *36* (6), 1144-1150. 10.3758/MC.36.6.1144

Smallwood, J., Beach, E., Schooler, J. W. & Handy, T. C. (2008). Going AWOL in the brain: Mind wandering reduces cortical analysis of external events. *Journal of Cognitive Neuroscience*, *20* (3), 458-469.

Smolin, L. (2013). *Time reborn: From the crisis in physics to the future of the universe*. Houghton Mifflin Harcourt: Boston, MA.

Smythies, J. (2003). Space, time and consciousness. *Journal of Consciousness Studies*, *10* (3), 47-56.

Spinoza, B. (1985). Ethics (Ed. & Trans., original work published 1677). In E. Curley (Ed.) *The collected works of Spinoza (Vol. I)*. Princeton, NJ: Princeton University Press.

Spreng, R. N., Stevens, W. D., Chamberlain, J. P., Gilmore, A. W. & Schacter, D. L. (2010). Default network activity, coupled with the frontoparietal control network, supports goal-directed cognition. *NeuroImage*, *53* (1), 303-317. 10.1016/j.neuroimage.2010.06.016

Strawson, G. (2008). *Real materialism and other essays*. Oxford, UK: Oxford University Press.

Tegmark, M. (2014). Consciousness as a state of matter. *arXiv:1401.1219v2*

Tong, F., Meng, M. & Blake, R. (2006). Neural bases of binocular rivalry. *Trends in Cognitive Sciences*, *10* (11), 502-511. 10.1016/j.tics.2006.09.003

Tononi, G. (2008). Consciousness as integrated information: A provisional manifesto. *The Biological Bulletin*, *215* (3), 216-242.

Velmans, M. (2009). *Understanding consciousness*. London, UK: Routledge.

von Goethe, J. W. (1867). *Faust: A dramatic poem*. London, UK: Hamilton, Adams, and Company.

Wagemans, J., Elder, J. H., Kubovy, M., Palmer, S. E., Peterson, M. A., Sing, M. & von der Heydt, R. (2012). A century of gestalt psychology in visual perception: I. Perceptual grouping and figure–ground organization. *Psychological Bulletin*, *138* (6), 1172-1172. 10.1037/a0029333

Wagenmakers, E. J., Wetzels, R., Borsboom, D. & van der Maas, H. L. J. (2011). Why psychologists must change the way they analyze their data: The case of psi. *Journal of Personality and Social Psychology*, *100* (3), 426-432. 10.1037/a0022790

Wallace, A. (2000). *The taboo of subjectivity: Toward a new science of consciousness*. Oxford, UK: Oxford University Press.

Weissman, D., Roberts, K., Visscher, K. & Woldorff, M. (2006). The neural bases of momentary lapses in attention. *Nature Neuroscience*, *9* (7), 971-978. 10.1038/nn1727

Whitehead, A. N. (1929). *Process and reality: An essay in cosmology*. Cambridge, UK: Cambridge University Press.

Wigner, E. & Margenau, H. (1967). Remarks on the mind body question, in symmetries and reflections, scientific essays. *American Journal of Physics*, *35* (12), 1169-1170.

Wilber, K. (1998). *The marriage of sense and soul: Integrating science and religion.* New York, NY: Broadway Books.

Wilson, T. D. (2003). Knowing when to ask: Introspection and the adaptive unconscious. *Journal of Consciousness Studies*, *10* (9), 131-140.

Wilson, T. D., Lisle, D. J., Schooler, J. W., Hodges, S. D., Klaaren, K. J. & LaFleur, S. J. (1993). Introspecting about reasons can reduce post-choice satisfaction. *Personality and Social Psychology Bulletin*, *19* (3), 331-331. 10.1177/0146167293193010

Wilson, T. D. & Schooler, J. W. (1991). Thinking too much: Introspection can reduce the quality of preferences and decisions. *Journal of Personality and Social Psychology*, *60* (2), 181-181. 10.1037//0022-3514.60.2.181

Zedelius, C. M., Franklin, M. S., Smallwood, J., McSpadden, M., Reichle, E. D. & Schooler, J. W. (2014). Unnoticed nonsense: Mind wandering can prevent people from realizing that they are reading gibberish (manuscript under review).

Zeki, S. (2003). The disunity of consciousness. *Trends in Cognitive Sciences*, *7* (5), 214-218. 10.1016/j.tics.2011.11.016

Bridging the Gap

A Commentary on Jonathan Schooler

Verena Gottschling

In my commentary on this rich paper, I will focus on the methodological approach proposed by Schooler. The main goal of this commentary is to introduce an improved and more detailed interpretation of Schooler's distinction between experiential consciousness and meta-awareness. I will address four issues. After summarizing Schooler's main ideas, I will discuss some general problems regarding the proposed distinction between experiential consciousness and meta-awareness. I will relate the distinction to the more general debate. I then discuss some conceptual claims to which Schooler seems to be committed to making, and show how they relate to one another. I point to some tension between them. As I will argue, the central issue has to do with the underspecified notion of "reflection". Different kinds of reflection are required for Schooler's "pure experience" and for meta-awareness. I will try to get a better grasp on the author's underlying position by discussing the main empirical evidence motivating the account, namely mind-wandering, in section two. I argue that the evidence does not support the distinction as introduced, but does give us some insight into the complexity of the required meta-cognitive processes. I will suggest some conceptual changes in the underlying framework, which I believe make the main project stronger and help to avoid some of the problems we have encountered. Specifically, I want to introduce a taxonomy of different kinds of reflection and show which kinds of reflections might required both for Schooler's "pure experience" and for his meta-awareness. In the third section, I turn to the author's main claim, which is the existence of a new meta-perspective. According to Schooler, this is the central proposal of his paper, and it follows from his initial perceptual-perspective-shifting analogy and the distinction he proposes. Schooler claims that the meta-perspective helps us to overcome the limitations of both perspectives: the first person perspective and the third person perspective. In effect, by introducing the meta-perspective we can bridge the gap between self-reported experiences and observable behavior, and get a completely new perspective on the mind–body problem. As I will argue, this ontological element is relatively independent of the rest of his methodological project. Moreover, it is an unnecessary strategic move.

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1 Introduction

Starting from perceptual perspective shifting, Schooler focuses on the gap between self-reported experiences (the first-person perspective) and observable behavior (the third-person perspective). So consciousness versus self-awareness of being in a certain state, and the relationship of both of these to observable behavior is at the heart of the project. The main goal of the target paper is to introduce a new methodology for studying conscious versus unconscious states and processes. Although this is a very rich paper, we are not given too much information about the conceptual framework and the way in which Schooler's proposal relates to the contemporary philosophical debate about consciousness, reportability, and accessibility. This aspect

will be my focus: the relationship between philosophical theories of consciousness and Schooler's account.

Schooler's (this collection) project uses the combined strategy of self-reports, observable behavior, and physiological measurements of the body: a "trust but verify" (p. 8) approach to reports of subjects' experience. He is interested in:

> the relationship between people's belief about their experience and empirical indices of their *underlying mental states*. [..] Moreover, the theory of the intermittent and imperfect *nature of meta-awareness as a re-representation of experience* [...] provides a scaffold for conceptualizing the situations in which *beliefs and underlying experience converge and diverge*. (p. 19, emphasis added)

Though it sounds at the beginning as if Schooler is making a claim about internal states in general in general, it quickly becomes clear that he indeed makes a claim about the personal-level, or conscious internal states. In so doing, he transitions from internal states to a certain kind of internal state—a conscious one. Later in the paper we find similar transitions: first we find a statement that can be interpreted as talking about all internal states, or verbally reportable knowledge of one's states, but then he immediately makes a statement about the underlying experience. For example, he informs us that in mind-wandering we can "identify situations in which all evidence suggests people are routinely lacking in their current *knowledge of their on-going mental states*" (Schooler this collection, p. 19, emphasis added). A little later we find a statement about experience, thus knowledge or beliefs about *conscious* states:

> In short, a strong case can be made for the value of using 3rd person science to inform not only our understanding of people's beliefs about their experience, but also to discern when those beliefs are likely to be accurate and when they may be inaccurate or incomplete. (Schooler this collection, p. 20, emphasis added)

A similar transition from a statement about internal states to a statement about conscious internal states, which as a result can be reported, can also found slightly earlier:

> by using various reasonable markers of people's internal states we have been able to examine the conditions under which people's reports are more or less likely to be aligned with their experience. (Schooler this collection, p. 19, emphasis added)

To summarize, it seems that "what is going on in someone's mind", in Schooler's terminology, refers to the conscious mind. His approach locates him in a group of thinkers[1] who challenge the notion of accurate reportability, or who challenge access as the main criterion for conscious experience. There is a very active contemporary dispute between defenders of what have been dubbed cognitive accounts of consciousness and proponents of non-cognitive accounts (Overgaard & Grünbaum 2011). Opponents of cognitive approaches associate consciousness with cognitive functions like controlled processing, working memory, selective attention, or some network of different cognitive processes.[2] Because of this association, these functions can be used to study consciousness from a third-person perspective. In contrast, non-cognitive approaches assume that consciousness cannot be operationalized in terms of cognitive function. Consequently, these accounts dissociate consciousness from cognitive capacities. Which leaves us (typically) with just subjective criteria as acceptable for studying consciousness. Obviously Schooler's account is an example of a cognitive approach. In my opinion, this general dispute cannot be resolved by empirical evidence because neither of these approaches can be empirically falsified, or at least the empirical evidence can in principle be explained both ways—in essence we have a clash of intuitions, and the evidence can be interpreted as supporting opposing views.[3] However, the approach one favors

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1 See for example Seth et al. (2005), who presented a proposal close in spirit.
2 See Overgaard & Grünbaum (2011); Block (2011); Cohen & Dennett (2011); Kouider et al. (2010).
3 See the debate about alternative explanations of the findings of atypical perceptual conditions (for example of the Sperling paradigm) in the references above.

will obviously determine one's criteria of consciousness, the experimental methodology used, and, consequently, one's findings. Nonetheless, I do not want to go too much into this very wide dispute, partly because I think it would be rather fruitless.[4] So for the purposes of this commentary, I will focus on issues *within* cognitive approaches alongside Schooler's cognitive account. But the objections against cognitive accounts of consciousness in general are issues that Schooler, given his introduction of a cognitive methodological approach for studying consciousness, potentially needs to address.

By using mind-wandering as his main example, Schooler then proposes a list of criteria that—so the idea goes—might help us to get a better grasp on the conscious experience, and not just conscious states to which we attend or states of which we are meta-aware. This underlying conceptual distinction turns out to be essential for Schooler's overall project.

One way of interpreting Schooler's account is to see it as a combination of a number of claims, which is evident in the quote above. He himself, right after introducing the distinction, argues that the two cases come apart in mindreading, and the fact that "people routinely shift perspective (from simply experiencing to attempting to re-represent their experience to themselves) provides the foundation for a framework of scientifically investigating first person perspective" (Schooler this collection, p. 9). The implicit *main argument of the paper* can be reconstructed in the following way:

(1) Schooler introduces a conceptual distinction between *experience* and *meta-qwareness* as a re-representation of experience.

(2) He then presents empirical evidence that this conceptual distinction corresponds to reality, in mind-wandering and other cases.

(3) He then uses this evidence to suggest a general list of testable features for those interested in the empirical investigation of conscious-

ness. The last issue is particularly important: in effect, Schooler suggests replacing the classical testable criterion for consciousness, (oral) reportability, or accessibility to introspection, by several criteria, which are testable and available from the third-person perspective.

(4) He claims that this gives us a principled new way of reconciling the tension between the first- and third-person perspective by introducing a higher meta-perspective, an ontological claim; in essence, this meta-perspective allows for a new strategy to solve the mind-body problem. We are promised the above-mentioned new "framework for scientifically investigating first-person experience" (Schooler (this collection, p. 9) resulting from the analogy of perspective shifting.

2 The revised view

There is much more in the target paper than I have mentioned here. For the purposes of this commentary, I will focus on four issues related to the general issue of consciousness, which then result in the presentation of a revised version of the author's account. Now that I have summarized what I take to be the author's most important ideas, I will discuss some general problems the underlying distinction seems to bring with it. This section receives my main attention. I will try to localize the distinction within theories of consciousness. I then discuss some underlying conceptual claims to which Schooler is committed to making, and show how they relate to one another. I will point out that there is serious tension between them. In the second section, I will discuss in more detail the main empirical evidence that motivates the account— mind-wandering—, and introduce the proposed criteria. My epistemic goals in the commentary are, first, to determine the exact relationship between the initial distinction, the evidence presented, and the proposed list of criteria. Second, to discuss of how we should evaluate certain criteria, and what they tell us about underlying concepts of meta-awareness, access, and reflection. Third, to gain some insight into the relationship between one's position regarding the mind–body problem and the suggestion

4 By this I mean that the evidence does not allow us to rule out the whole class of cognitive versus non-cognitive accounts. I think however, that certain accounts within theses classes are vulnerable to evidence; for example, explicit accessibility accounts (Prinz 2012) seem to have a lot less room to maneuver. But as a debate between cognitive versus non-cognitive accounts, the possibilities for interesting general insights seem limited.

the author draws from his perceptual perspect-ive shifting analogy. According to Schooler, this is the central proposal of his paper; he claims the existence of a new-meta-perspective, which helps to overcome the limitations of both per-spectives and thereby solves the mind–body problem. As I shall argue, this element is relat-ively independent from the rest of the project. Moreover, I think it weakens the main project.

As a positive contribution, I will suggest some conceptual changes of the underlying framework. The changes I will suggest include giving up some claims and revising others. I think these changes make the main project, which I take to be a methodological strategy for studying consciousness, stronger. They also help to avoid some problems we encountered in the discussion of the main argument. I also suggest a finer-grained specification of different kinds of reflection and taking stock. This will help to give us a better understanding of meta-cogni-tion in general as well as of consciousness and awareness of being in a certain state as distinct phenomena. I take this to be a driving idea in Schooler's initial distinction.

3 The category of "conscious but un–accessed" states

Traditionally, we find a distinction in the literat-ure between two categories: on the one hand con-scious experiences, states, and processes to which subjects have access, and on the other hand un-conscious processes to which they do not have ac-cess (Cohen & Dennett 2011). According to this general picture, access to these states and pro-cesses then includes in many cases accurate re-portability, which is the reason why reportability, or accessibility to introspection, is central to any judgment about conscious states. But access can also be understood more broadly: not all access is conscious itself, and not all access results in beha-vioral or verbal reportability.

In general, if we have a conscious state and a corresponding unconscious state, there are two possibilities for how the two can differ.[5]

The first option is that the representational content of a state determines the experience, at least in part, so that both states differ in con-tent. My conscious belief that my partner is cheating on me has a different representational content than the corresponding unconscious be-lief. These accounts are first-order accounts. The second option is that the states have identical representational content, but there is a difference in kind in the way in which they are embedded in the system—in philosophical jar-gon, the functional role that each state plays differs. According to this position, my conscious and unconscious suspicious beliefs that my part-ner is cheating on me are two states with the same content—expressed in the that-clause— but the conscious belief causes different internal states and different behavior to my unconscious belief. For example, in the conscious case, I will have the conscious thought that he is not treat-ing me respectfully, and I might verbally con-front him right away; in the second, unconscious case, neither of these activities will happen.

The first option is consistent with the standard view of what determines a difference in experience. However, it has a disadvantage: we cannot explain why the two states "corres-pond" unless there is some significant semantic overlap between them. The functional role view has the advantage that it can explain the simil-arity between the two states, but the disadvant-age that we need an explanation of what ex-actly it is that makes a state conscious, and we have to show *why* this difference results in a dif-ference in experience.

Schooler seems to opt for the content or rep-resentational view. Picking up Dennett's idea[6] that people can be inaccurate about their own mental going-ons and internal states, Schooler concludes that, at least in some situations, ex-ternal observers can have better insight into a subject's experience than the subject themselves (p. 8). However, as we saw in the quotes above, Schooler seems to interpret the internal states in question as conscious internal states.

This is consistent with the idea that the access to internal states changes the content of

5 Of course hybrids are possible, so we might have combinations of functional differences and differences in content. I take Tye (1995) to defend such an account.

6 See Schooler (this collection), p. 8.

the state, i.e., the content view: accessing a state changes the content of the state. Since the content determines the experience, the experience of a non-accessed and an accessed state differ. Understood this way, Schooler's criteria give us opportunities to know *better* than the subject himself what he consciously experiences. Access and the reports of subjects about their experience, and the experience itself can come apart. If this is right, it would be unexpected and not what the commonsense understanding of conscious states predicts. As for the first aspect, Schooler believes that mind-wandering gives us an empirical case, where accessing (in the sense of attending to) a process or state changes that very state.

3.1 The general distinction between conscious experience and meta–awareness

I will start with a discussion of the motivation for the distinction (see p. 3), and some general problems we seem to invite if we accept this distinction. Schooler, and with him others, presuppose that conscious experience and accessibility can come apart; moreover, there is an experience *before* it is accessed. In other words, we postulate a third category, besides conscious and unconscious states: there are now "conscious but not accessed" states. These thoughts seem to be in line with other considerations in this debate, which propose a new category of phenomenal consciousness with no access (Block 2011; Lamme 2003).

Schooler distinguishes between simply "having experiences", which he calls that *experiential consciousness*, and explicitly "taking stock" or re-representing this experience, which he calls *meta-awareness* or *meta-consciousness* (Schooler 2002, p. 339). Meta-consciousness then, is "defined as the intermittent explicit re-representation of the contents of consciousness" (2002, p. 339), while a later he says it is "knowing that one is having that experience" (2002, p. 339). So meta-awareness is about a certain kind of access.

Because we can clearly distinguish both, mind-wandering seems an excellent empirical candidate for the study of consciousness. At one point we notice our mind-wandering; but *what* we notice, the mind-wandering itself, occurs earlier. In the meta-aware case, we re-represent the former state; in order to do this, we access it by re-representing it, and we "take stock". Then the subject becomes meta-aware of the state, and we know that we are in this state, but this very process changes the content. Our experience of mind-wandering is different once we become meta-aware that we are mind-wandering.

But this seems conceptually puzzling. Access and (verbal) reportability are clearly not the same, such that missing (verbal) reportability cannot not be equated with general lack of access, especially at the subpersonal level. With knowledge, reflection, re-representation and meta-awareness, as well as meta-consciousness, we get additional and differing concepts. First, often "knowledge" is used as something that is itself conscious. Is the idea that we are aware only of the mind-wandering, or also of our knowledge that we are mind-wandering? The author alternates between both phrases. But both claims differ. I can be aware of an experience without being aware of my knowledge that I have this experience. The latter includes a meta-level of a different kind. While the first contains a meta-process regarding the experience, the second is a meta-process referring to a propositional state, knowledge, *of* the experience. As a result I am aware of being in the state and not just of the experience. Moreover, reflection is a vague term. How exactly do we reflect on a state, process, or content of a state? What exactly does this entail? So the question is: what is meta-awareness and what distinguishes it from simple awareness? Finally, re-representation is mentioned, yet another concept used to characterize meta-awareness. Without further explanation, re-reflection seems a very broad and vague concept that would include all kinds of re-represented contents. Do most of these occur unconsciously, as certain kinds of functional accounts, higher-order accounts, predict (Jackendoff 1987; Rosenthal 2005)? How is something re-represented? How exactly

do the representation and the re-representation relate to one another?

The question of which types of neural processes might be sufficient for awareness is highly controversial in current debate, as is whether there can be any awareness of a state without access (see the exchange between Fahrenfort & Lamme 2012 and Cohen & Dennett 2011, 2012). Relatedly, the status of local recurrences is debated. Block and Lamme argue that there are perceptual cases in which subjects do not attend to a stimulus (in change blindness, inattentional blindness, and attentional blink) and as a result are not able to report the presence of the stimulus. They might nonetheless be phenomenally conscious of the stimulus because it induces local recurrence in perceptual brain regions. As a result, a subject's reports are not to be trusted in all cases: subjects could be conscious of stimuli even when they themselves deny it. This sounds very close in spirit to Schooler's idea. However, Schooler doesn't tell us how his account, and pure mind-wandering versus meta-awareness of mind-wandering, relates to this debate.

Despite these unclear aspects, the underlying intuitive idea is clear: Schooler wants to distinguish phenomenally-conscious experience from a meta-level of consciousness, in the literature also referred to as meta-awareness, and sometimes as reflective awareness, reflexivity, or reflexive consciousness. But what exactly characterizes this meta-level remains unclear. We are simply not told, the used concepts seem vague, and, without further explanation, underspecified. But, of course, this does not imply that the main idea is not helpful, or that it is not possible to specify them.

However, Schooler seems to sympathize with Cohen and Dennett, so I take it that he thinks (like them), that awareness differs from behavioral reportability. However, Cohen and Dennett explicitly state that they do not see many reasons to think such conscious information exists before it is accessed (Cohen & Dennett 2012, p. 140). So they reject the very option, the third category, that Schooler wants to postulate. There seems to be a sharp tension between Schooler's distinction and his agree-

ment with Cohen and Dennett's general approach: Whereas Cohen and Dennett argue that theories postulating inaccessible conscious states are intrinsically off-limits to investigation, Schooler not only defends an account along those lines, but also argues that his account gives us a solution strategy to overcome the tension between the first- and third-person. Obviously, there is a need for conceptual clarification of this highly original idea.

However, I think we can learn a few interesting things from this. First, we can rule out a very general understanding of reflection or meta-cognitive processes. Most theorists agree that part of what it is to be in a conscious state is to have a unified perspective on the world. So the possibility of distinguishing between me and the world, or a self, or some kind of self-consciousness is required as an indispensable part of conscious experiences of many kinds. One way of describing this is to say that experience includes some kind of categorization. In other words, it is a kind of meta-cognition on this highest and most general level. At least, we as humans keep track of this interdependence of action and perception/experience at the personal level. To mention a classical example, it seems very hard to experience pain if one doesn't classify something as painful, or without seeing it as painful *for me*. Indeed, some kind of evaluation, conscious or not, seems to be required for something to classify as pain; just as, in order to see something visually as a cow, we have to classify or categorize it as a cow (Dretske 1993).

At first glance, an account like Schooler's cannot allow for this because the standard view requires meta-cognition for conscious experience. Experience is cognitively penetrable, such that knowledge about categories influences how we experience an object. In contrast, Schooler distinguishes both, and wants to allow for experience before (any?) meta-level involved. At least he talks sometimes as if meta-cognition in general is the issue when it comes to meta-awareness of mind-wandering. When he talks about theory of mind and the areas involved in meta-cognition (Schooler this collection, p. 17), he suspects that because certain meta-cognitive

processes and mind-wandering occupying both engage the same systems, specially the dorsal ACC and the anterior PFC, this might explain why it is so hard to catch oneself mind-wandering, i.e., to gain meta-awareness of mind-wandering. However, he notices that identity of brain regions does not imply a causal relationship, and that further research is necessary.

However, it would be hasty to conclude that Schooler cannot concede that meta-cognition can be involved in experience on his account. Though he talks frequently as if the issue were meta-cogniton in general, he is not committed to excluding *any kind of* meta-cognitive process. But what is needed is a differentiation between different kinds of meta-reflection or re-representation. Schooler needs to address the question of whether we see the same kind of meta-cognitive processes in different kinds of experiences, and how exactly this changes the experience. Interpreted this way, only a certain *kind* of meta-reflection or meta-cognition might establish meta-awareness. As I will show, this move avoids a number of other problems.

We know that experience depends on background knowledge, and that our knowledge and our classification processes change our experience in many cases. This seems to be the case not just in mind-wandering, Schooler's favorite example, but also in many other cases. What matters is not just how I classify a state or process; many other internal states and contextual factors influence experience. Let's assume that I am a big fan of Baroque music, but cannot stand twelve-tone music. I happen to blunder into a concert with music by Penderecki, and of course do not like what I hear. Simply by gazing at the program and learning that I am listening to Penderecki's Saint Luke Passion, which uses references to motives by Johann Sebastian Bach and is in a sense a homage to a well-known Bach piece, how I experience this piece of music might change. Chances are that I am still not able to hear the references to Bach and the coded references to passages in Lucas in the middle of all the dense tone clusters. But my belief that it is a homage to my beloved Bach will change my experience in general. Other states, beliefs, and emotions in-

fluence my auditory experience and make it, in this case, somehow more enjoyable.[7] It is also well known that crossmodal influences change experience: ones taste experience changes with conflicting visual experience. So a pure strawberry juice tastes less like strawberry to us if it is colored blue, even if the juice itself is not altered.[8] How we experience a certain wine depends on knowledge about price, how famous the winery is, and many situational aspects. In these examples, the real question seems to be how exactly our experience changes, and how do particular internal and external factors contribute to the change. What changes in how we re-represent, and how fundamental is this change? And what is meant by these terms?[9]

So Schooler's meta-awareness can come in many forms. "Meta-cognition" includes a broad range of phenomena. What they have in common is that subjects have some insight into their own cognitive functioning. It is not clear to me that it is an all-or-nothing affair between pure experience and meta-awareness or reflection. So a specification of what exactly is meant by meta-awareness, re-reflection, and access seems necessary. We also need to answer the question of how the two categorically differing states differ in content, and which *exact kinds of meta-processes* are relevant. "Reflection" and "re-representation" are notoriously vague terms. Some kind of reflection at least seem indispens-

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7 Bayne & Montague (2011) provide a nice overview of the complex cognitive phenomenology debate in his introduction to his volume. One might think that other contents causally influence the phenomenology of a state. A second option would be that "what it is likeness" is not a useful conceptual distinction at all (Lycan 1996, p. 77; Papineau 2002, p. 227). A third option would be that there are several meanings of "what its likeness"—indeed, in the literature different distinctions have been suggested. I will go into more detail in a later section, when I introduce elements of an improved taxonomy.

8 See further discussion in Grush (this collection).

9 Regarding visual perception Siegel (2005) has argued that that learning to recognize an object can change the way that it looks—in the phenomenal sense of "look", which is taken to imply that the cognitive components of such states are necessary for explaining the change in phenomenal character. In contrast, one could argue that the phenomenology does change, but the change can be explained in sensory terms instead of in terms of cognitive components. Either a subject's concepts do not directly constitute the subject's phenomenal states, such that they can have a causal influence on their phenomenology (Carruthers & Veillet 2011), or the contrast between both is the result of differences in the way that one processes the information within the sensory system (Tye & Wright 2011). For my purposes here, what matters most is *that* the phenomenology differs, and that we need an explanation for it.

able for a state to be conscious. But that doesn't mean the distinction above is not justifiable. We just need to determine and specify the kind of reflection and/or re-representation. I will make some suggestions later in this paper (see p. 15).

To be fair, while Schooler does not distinguish between different kinds of reflections, he indirectly assumes that there are differences. But in his view the phenomenon dictates what the criterion for introspective awareness is. He distinguishes classification under the concept of "taking stock": "there are some mental states (e.g., mind-wandering) for which the crucial bottleneck in people's introspective awareness stems not from their capacity to classify the experience, but rather from the fact that people only intermittently take stock of what is going in in their own minds" (Schooler this collection, p. 8).

This obviously implies that for other phenomena the crucial difference does stem from their capacity to classify an experience. As a result, we in effect have different criteria for introspective awareness and for mind-wandering and visual perception. I believe a more promising route is to allow for dimensions of reflection and complexity of experience along multiple dimensions, but to try to find as uniform criteria as possible. The experience and phenomenology in cases of thought and sensory states (broadly construed) might be different.[10] But some properties or property clusters have to bind instances of introspective or meta-awareness together.[11] Otherwise, what would justify classifying them as the same, if both the phenomenon and the properties associated with the phenomenon differ? We would just be talking about different things. I have already ruled out two kind of meta-cognitive processes the author cannot use for a more detailed characterization of the difference between conscious states and meta-aware states: categorization under concepts is one kind of meta-cognitive reflection that itself is unconscious, but necessary for con-

scious experience. Distinguishing between self and world is another dimension of reflection, at the highest level, that seems necessary. Meta-cognition always requires representational use (of some kind), because within it we find monitoring of cognitive affordances. But there are several *ways* in which this monitoring can take place. As I argue below, meta-cognition, the ability to monitor and control one's owns cognition, and the ability to attribute mental states to oneself and others can occur in different ways; and both the self-other distinction, and self-awareness can occur in a number of ways.

3.2 Meta–cognitive accounts of consciousness: Content vs. function

A core idea in the target paper is the claim that there is a difference between an experience and an experience one is aware of having. Both states are experienced, but the idea seems to be that reflection could potentially change an experience in a certain way, because it focuses on the content of the intentional formerly un-reflected state. Interpreted this way, Schooler seems to defend the content view, though I do not think he is committed to it. He doesn't explicitly subscribe to it, but it seems implicit in what he says when he talks about the content of states and frequently switches back and forth between content talk and talk of experience. He seems to think that these are related. And he doesn't say much about the functional role that the states in question play in other states, or how cognitive processes use them—something one would expect if he held the functional view. So it is tempting to interpret him as having the view that content determines experience (Block 2005). For example, in writing that there are "some situations in which observers might have better knowledge about a person's mental state than does the person in question" (Schooler (this collection, p. 8), what he must mean is that observers have better insight into the *content* of people's states. A little later, he claims, regarding misrepresentations, "while in the process of re-representing, one omits, distorts or otherwise misrepresents one's mental state to oneself and/or others" (Schooler this collection,

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10 As the complex debate about of the possibility of a phenomenology of thought suggests.

11 At the very least we would need to insist that there is a family of co-occurring properties playing an explanatory role within theories (Boyd 1999).

p. 10). Again, what we misrepresent is obviously the *content of the state*.[12] If he has a content view, than his view is that (at least in some cases) I have an experience first, and then, when I reflect on it, that very process changes the content of the initial intentional state. That then is the reason why the experience differs between mind-wandering as "purely experienced", and mind-wandering experienced with awareness. The phenomenon of mind-wandering indeed introspectively changes after we reflect upon it, and become aware that we are mind-wandering.

But I think there is a larger issue here. Interpreted this way, it is tempting to judge that accounts claiming that what makes a state a conscious state is its functional role are inconsistent with Schooler's account. Again, I think this would be too hasty. Let me explain. Assuming a representational theory of phenomenal consciousness,[13] there are accounts that provided in purely first-order terms and accounts that implicate higher-order cognition of one sort or another (see below) with conscious experience. If we accept Schooler's distinction, a state is conscious before we are aware of it, or know that we are in this state, and, when we become aware of it, this changes the state, or its content, to be more precise, as Schooler seems to suggest. Thus, Schooler seems to defend a first-order account, namely an account in which it is claimed that the consciousness of a state is partly (or entirely) determined by its representational content, or sometimes the format of its representational content, not primarily at first the function it plays (Byrne 2001; Dretske 1993; Kriegel 2009).

In the class of functional[14] accounts we find a great range of different accounts, including second-order accounts, accessibility accounts (Prinz 2012), and global workspace accounts (Baars 1988). Many of these are close in spirit to Dennett's. Though they differ, they have one thing in common: it is a certain functional relationship the states in question have to other states or within the system, which makes these states conscious states.

Second-order accounts, for example, would claim that what makes a state a conscious state is that the state is (or is disposed to be, in some versions) the object of a higher-order representation of a certain sort. This state is a meta-level state, a mental state directed at another mental state. Higher-order accounts differ on how exactly this higher-order representation is characterized and what the exact relationship between both states is. In some versions the higher-order representation is a higher-order thought (Rosenthal 1986, 2005), in others a higher order-order perceptual or experiential state (Lycan 1996), yet other versions see the higher-order state as dispositional (Carruthers 2000). There are also differences concerning the question of whether the higher-order state should be understood as entirely distinct from its target state (Rosenthal), or whether the higher-order thought is better viewed as intrinsic to the target state, which would imply that we have a complex conscious state with parts. There exist different versions of the intrinsic view, which all have in common the idea that instead of a separate higher-order state there is a global meta-representation within a complex brain state (Gennaro 1996; Van Gulick 2000; Metzinger 1995). For the purposes of this commentary, I will focus on Rosenthal's higher-order thought theory, but my considerations generalize to many of the higher-order accounts. The existence of the higher-order state and the right connection between both (one is the object of the other) makes the lower level one a conscious state. The higher-level state, however, is itself unconscious, unless there exists a third-level state—the existence of which would result in awareness of being in a conscious state. In effect, the existence of a certain kind of meta-cognition is what makes the lower level state a conscious state, or even a state that we are aware of being in. In this framework, Schooler's meta-awareness would require a third-order state.

Accessibility accounts, for example that of Jesse Prinz' (2012), would claim that attention is both necessary and sufficient for states to be conscious. In global availability accounts[15] it is

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12 See also, for example Schooler (this collection), pp. 16-17.
13 For the purposes of this commentary I neglect biological state theories.
14 On a very broad reading of "functional".

15 Initially introduced by Baars (1988, also 1996). More modern proponents would be, for example, Dehaene et al. (2006).

claimed that the functional role is the global availability, or the workspace. The idea is that there is competition among neural coalitions; the winning coalitions are the conscious ones. There are a lot of similarities between higher-order theories and the neuronal global-workspace theory, but we should not see them as theories of the same type. According to the neuronal global-workspace theory, a state is conscious due to the global availability of its content, whereas higher-order theories see a state's being conscious as "consisting of one's being aware of oneself as being in that state" (Rosenthal 2012, p. 1433). If one interprets Rosenthal's reference to "oneself" as Metzinger's phenomenal self-model (2003), then a higher-order theory requires the integration of an individual state in a coherent representation or inner model of oneself, in contrast to a global-workspace theory, in which all that is required is availability of the content. Both aspects, the kind of meta-representation (the number of higher-order steps) and a certain identification of the original state as *my* state are dissociable, and they are examples of what I mean by different dimensions of reflection.

I think Schooler's account stands in natural alliance with both kinds of accounts, in contrast to what one might initially think. It is the vagueness of the term "meta-awareness" that is causing this unjustified reluctance. For example, higher-order thought accounts seem a natural way to specify what Schooler might have in mind when he talks about meta-aware states. According to Rosenthal, there can be unconscious pain states, if these are accompanied by the thought that I am in pain, I am experiencing pain, but the thought itself is unconscious. Only if there is a third-order state, the thought that I have the thought of being in pain, am I aware that I think that I am in pain. To me, this sounds close to Schooler's meta-awareness of taking "stock of our ongoing experience and re-represent[ing] it to ourselves" (this collection, p. 8). However, there is an important difference: for Rosenthal there are only conscious and unconscious states; the presence of the third-order state gives us what Schooler might call meta-awareness. However, Rosenthal

denies the very possibility Schooler claims exists, that one can be in a conscious state but not aware of it. "No mental state is conscious if the individual that is in that state is in no way aware of it" (Rosenthal 2012, p. 1425). Due to the existence of a third-order state with the right content, we get introspective awareness of a conscious state: a third-order awareness that makes one aware of the second-order awareness. Rosenthal expects such cases, in which we "are aware of focusing attentively on that state" (2012, p. 1427), to be rare. It seems to me that there is a natural fit between Schooler's meta-aware states, in which we know that we are having a certain experience and Rosenthal's introspective awareness of a conscious state. In Rosenthal's framework, meta-awareness necessarily requires a third-order representation.

In addition, Schooler's suspicion that "meta-awareness appears to be associated with rhythms of attentional flux" (this collection, p. 17) relates nicely to accessibility accounts.[16] But as I will claim in the next section, global availability accounts stand in another obvious alliance with Schooler. Again, it seems that it all depends upon our understanding and further specification of "reflection" or the "meta" in Schooler's meta-awareness. Is reflection itself necessarily a conscious process? Is it a thought, or just any kind of representation for the purposes of monitoring one's owns cognition or an explicit higher-order classification? Unfortunately, Schooler does not describe his meta-awareness in more detail.

It seems to me that we should concede that some kind of "reflection" might be required for something to be an experience. This leaves still plenty of room to specify different kinds of reflections, some of which might constitute more than awareness, namely meta-awareness. This becomes the real question. Is this reflection itself unconscious or even necessarily conscious? Is it a re-representation of some kind? If that is the case, what kind of re-representation is required? Schooler's meta-awareness might require a rather demanding kind of reflection, and the

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16 However, in the end accessibility accounts will not be Schooler's best bet—after all, I interpreted him above as agreeing that access and awareness differ.

relationship Rosenthal describes seems a good candidate. But perhaps what we have instead of a simple dichotomy between pure experience and meta-awareness is a full spectrum of dimensions of meta-representation. Then the question is, what are the dimensions of reflection required for Schooler's "pure experience" and those for meta-awareness, and which other reflections are there? This search for a proper taxonomy of "reflection" seems the most pressing need. It will hence be my main focus, and I will suggest some building blocks for such a taxonomy (p. 15). Rosenthal's introspective awareness of a conscious state as an possibility for characterizing Schooler's meta-awareness will be one element of this.

3.3 A general concern for scientific practice and a conceptual worry

This brings us to another and more problematic issue. I find the general line of thought behind a rigid distinction between pure experience and meta-awareness of this experience problematic. First, it presupposes that we accept the distinction between access-consciousness and phenomenal consciousness—a distinction not everybody (to say the least) is happy to accept.[17] Second, and more fundamentally, such a new category would have to be motivated. How do we distinguish "conscious processes, which are not accessed" from unconscious activity? Are they *de facto* not explicitly re-represented, or is it impossible to re-represent them? What does it then mean to say that something is "conscious"? On might suspect that this new concept of "conscious" is not compatible with our common-sense intuitive understanding of the term. Moreover, the stronger reading of Schooler's position might invite further problems. If we claim that access to a state would necessarily change the status of its content (or the content itself), it would be impossible to address whether it was of a phenomenal or unconscious nature prior to this conscious access. If

such an "observer-effect" exists, it could potentially render the whole issue completely immune to scientific investigation (Kouider et al. 2012).

Another open question is how Schooler's account relates to others that seem close in spirit. Dehaene et al. (2006) have presented a more modern and updated version of Freud's concept of preconscious activity. They introduce a proposal with a carefully defended taxonomy of three categories: subliminal, preconscious, and conscious activity. According to Dehaene and Changeux's workspace model developed a little later, dominant neural coalitions involving the workspace are *accessed.* In contrast, existing other weaker activations in the workspace, such as a connection that *could be activated*, for example by a shift of attention, are only *accessible.* Processes that are potentially accessible, but are not accessed at the moment because of sufficient top-down attentional amplification, are "preconscious" phenomenal conscious processes in Dehaene et al.'s terminology (2006, pp. 206-207). I am not sure whether what Schooler is proposing is another version of Dehaene et al.'s "preconscious" phenomenal consciousness. This is consistent with what he writes. In debates on the third category of phenomenally conscious but not accessed states, their distinction between cognitive access and cognitive accessibility is often used to defend the possibility of the aforementioned third category (see for example Block 2011). My own suggestion is related, although I will suggest more closely specifying different kinds of access (see p. 11) and multiple levels of representation, instead of just distinguishing between accessibility and access.

I think Schooler's account would profit from directly relating his terminology to other concepts already in use in the debate. However, there are problems looming: Dehaene at al. defend a version of a functional account, which Schooler seems to explicitly reject when he seemingly advocates a first-order account. But if Dehaene's taxonomy is *not* what the author has in mind, what is the difference between the Schooler's phenomenally conscious but unaccessed activities and Dehaene's preconscious activities?

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17 However, one might be able to resist the distinction between access-consciousness and phenomenal consciousness and at the same time allow for Schooler's distinction between experienced consciousness and meta-awareness if one claims that access is *not* what characterizes the meta-level in Schooler's meta-awareness.

Let us take stock. I have argued so far for three closely related points. The basic distinction between being experientially conscious of a state and being meta-conscious of being in a state needs further conceptual clarification. Moreover, the combination of a first-order account of consciousness (the content view) and this very distinction might not be the optimal strategy. In fact, a functional or hybrid account seems to provide a more natural strategic alliance for Schooler's main project. Finally, it seems there is no strict dichotomy between experiential consciousness and meta-awareness; we rather face a difference in many dimensions. From my perspective, both higher-order accounts as well as global workspace accounts might be helpful regarding this issue. They connect nicely with Schooler's main project, and would help to clarify his basic distinction. But we might very well end up with a more complex understanding of different meta-cognitive dimensions and differentiations instead of a simple conceptual dichotomy. This is what I will provide later in this paper. In order to do this we need to take a closer look at Schooler's second step; his argument that his conceptual distinction is something we find in cognitive capacities.

4 Mind-wandering—and noticing it. The bundle of critera

On the basis of the former considerations he presents, Schooler argues that in many capacities we actually find a difference between being in a certain state and noticing that one is in a state (meta-awareness). So he moves onto his second claim, the claim that his conceptual distinction is empirically supported (see p. 3). According to Schooler, there are two forms of dissociations, *temporal dissociations* one the one hand and *translation dissociations* (misinterpretations) on the other. Let me begin with temporal dissociations. Examples of temporal dissociations are mind-wandering vs. noticing one's mind-wandering, but also mindless behaviors, suppressed thoughts, and unwanted emotions. Schooler mostly uses mind-wandering, however, characterized as situations, in which

we "lose track of the contents of our own minds" (Schooler this collection, p. 9). This is the starting point for the introduction of Schooler's new "framework for scientifically investigating first-person experiences" (Schooler this collection, p. 9).

I find this focus on mind-wandering a little puzzling, because I am not sure why this is an example supporting the general claim that the content of individual states changes in the specific intentional states. Why is it an individual intentional state that changes? Mind-wandering (at least intuitively) seems to be a complex process, and involves a number of states. In mind-wandering the issue is creature consciousness, not the experience or phenomenal character of an individual state, i.e., state-consciousness. Mind-wandering is about a train of thoughts, often accompanied by emotions, and autobiographical memories. In mind-wandering, we mostly think about issues related to our own life. For example we consider our "to-do" lists for today, what to have for dinner, our relationship to people close to us, telephone calls we need to make, and even our next lecture. At least the phenomenal character we experience during mind-wandering seems to include these the associated sensory states—broadly construed to include feelings of emotions, images, moods—which have a distinctive "phenomenal character" or "what it's likeness". But the stream of consciousness also contains episodes of conscious thought.[18] If we use this standard understanding of mind-wandering, it would rather be a bundle of thoughts, associations, or states, in other words a number of many more or less related thoughts, emotions, or other states and processes, not all of them necessarily fully specified in terms of content. And if so, it is not necessarily the content of individual states that changes—we seem to have multiple options for characterizing what changes once we

18 Schooler (2013) gives a good overview of the performance costs associated with mind-wandering (including reading comprehension, model building, and impairment of the veto-option to automatized responses) and suggests that mind-wandering may represent a pure failure of cognitive control. For this reason it is so useful to study consciousness. He argues that mind-wandering offers little benefit, though it might have a positive role in topics related to autobiographic episodes and information, for example in autobiographical planning and creative problem-solving.

are aware that we are mind-wandering. An alternative interpretation would be that the network of associated elements might change, or even the kind of associations involved. For a conceptual analysis, whether one should include these autobiographic sensory states in the phenomenon itself or just say the "train of thoughts in mind-wandering" causes them, is unclear. But it will determine how we analyze the experience of mind-wandering and the meta-awareness of mind-wandering, and its implications for theories of consciousness. There is also evidence that it has different functions and might itself be a heterogenic phenomenon (Northoff 2014, especially chap. 26; Metzinger 2013). For example, it is not clear whether mind-wandering is the same as day-dreaming, and if not, what the differences are.

Moreover, it is controversial whether thoughts even *have* a phenomenal character, and if so, how to analyze it (Bayne & Montague 2011). The orthodox view is that conscious thoughts themselves do not have a distinctive "phenomenal character". They are either considered conscious without phenomenal character, or it is conceded that conscious thoughts might possess phenomenal character, but only in virtue of the sensory states with which they are associated (for example Braddon-Mitchell & Jackson 2007; Carruthers 2005; Nelkin 1989; Tye 1995). However, recently, a number of author introduced views according to which conscious thoughts themselves possess a "distinctive" phenomenology, but the phenomenal character differs from sensory states (Siewert 1998; Pitt 2004; Robinson 2005; Prinz 2004).

So there are a lot of further issues to consider, for a project like Schooler's; we need to analyze the experience of mind-wandering and contrast it with meta-awareness or reflective experience in mind-wandering. However, Schooler gives some other examples for temporal dissociations, which can more obviously be explained in terms of individual states we do not notice or misinterpret. He doesn't go into detail, but has mentioned mindless behaviors, suppressed thoughts, and unwanted emotions. The idea seems to be that we are not aware of an individual unwanted emotion, or a thought that causes behavior. However, these case could also be explained as processes rather than individual states. Mindless behavior is in many cases caused by a bundle of connected states, unwanted emotions relate to other internal states (which make them unwanted), and suppressed thoughts are suppressed due to other internal states.

Nonetheless, if Schooler means by "state" the "general state of mind"[19] rather than individual states, his examples become more convincing. But this seems inconsistent. Schooler takes inspiration from Dennett, who is interested in beliefs subjects have about phenomenal experience of individual states. Schooler switches between talk of phenomenal experience of individual states, and talk about the stream of consciousness the subject experiences. This is evident in the way he introduces the core distinction, namely in terms of the phenomenal experience of a state. At other times he talks about states of which I am aware, and sometimes about "what is going on in one's mind", which I take to refer to the stream of consciousness, or more precisely the sequence or combination of contents of individual states, rather than a classification of the experience of just one state. So the pressing question is really: what kind of reflection is "taking stock" exactly? How should we characterize what we do when we "take stock" and reach meta-awareness? In the following section I present more detailed suggestions for a taxonomy of different kinds of reflection. For now let me just say that one possible view would be that the content of these states (or the states) are accessed by other states, and maybe (unconsciously) evaluated. In that case, we should talk about complex processes rather than re-accessed individual states. Such a view would also be compatible with certain higher-order theories of consciousness.

Later in the paper, Schooler discusses examples of misrepresentation, in his terminology "translational dissociations": emotions, or cases in which it is less controversial whether a phenomenal character is involved than in case of thoughts. He gives two examples of such misrep-

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19 As formulations such as "take stock what's going in their own minds" (Schooler this collection, p. 8) suggest.

resentations: emotions of anxiety, which are not reported, and reported disgust for homosexuality. In his first example we find a correlation with the inconsistent behavioral measures of heart rate and galvanic skin response, as indicators of existing unreported anxiety. In his second example we have a correlation with penile tumescence (an erection). In both cases we know the bodily aspects of the emotion well (or the caused bodily changes associated with the feeling on an emotion), and thus, so the argument goes, have evidence for the occurrence of the emotion. But in both cases there is also a discrepancy between the subject's reports (assuming the subject is honest) and its potential reportability. Schooler interprets the behavioral facts as indication of the real emotion the subjects experiences, but in the first case fails to acknowledge, and in the second misinterprets.

I am not so sure. First, the theory of emotion one feels committed to certainly plays a central role. Schooler seems to presuppose that unconscious emotions are not possible. Furthermore, it seems to me that both cases are open to a different interpretation, in fact the same interpretation I suggested for mind-wandering. Both unreported (or unreportable?), emotions of anxiety and reported disgust for homosexuality are complex cases. It might very well be that we do not have an individual content of a state that differs, but we rather simply struggle with a number of different but conflicting emotions, the reported one simply being in conflict with others. In both cases we have rather complex scenarios. And if one defends a multi-component account of emotions, it might very well be that the components of these emotions differ— it could be an element in a network that realizes the state, instead of the content of an individual state. This might seem like a minor point, but I think it is important. It undermines a central second part of the strategy, namely the empirical support for the theoretical distinction. Schooler needs more than a theoretical distinction (his first claim); he needs to show that this very distinction is helpful for understanding certain aspects of consciousness, mind-wandering, and other cases (his second claim; see p. 3). Otherwise the conclusion he draws, the new methodological approach to studying consciousness, would not follow or would lose its plausibility. So undermining Schooler's second claim by showing that in the case of his examples related to emotions (as well as in case of mind-wandering) this evidence is not as clear as one might think, results in a problem for his view.

But there is another important issue here. The empirical evidence seems to be relevant to the stream of consciousness rather than to the experience versus meta-awareness of individual intentional states. The formulation of the main claims suggests that state consciousness is the issue. However, in other sections Schooler refers to the stream of consciousness (See quote above, p. 8). If this is correct, Schooler's empirical project, or more precisely the evidence he has gathered, is about a central aspect of *creature consciousness*. Philosophers distinguish creature consciousness from mental-state consciousness: the first is about a subject that is conscious (either in general or of something in particular), whereas state-consciousess is about conscious states of a creature that it is conscious. Though Schooler's project (especially claim (1)) is formulated in terms of *state consciousness*, the empirical support targets a different kind of consciousness. This also undermines Schooler's second claim by showing that the meaning of consciousness differs in claims (1) and (2). But, as I pointed out in section 1, the stream of consciousness claim would be compatible with a more functional interpretation of claim (1) as well. There is a way to revise claim (1) in a way that avoids this problem.

Using mostly the empirical evidence of mind-wandering, Schooler then suggest a bundle of criteria we might use for the third-person evaluation of what is actually going on in somebody's mind; in my analysis of his main argument this is the third step (see p. 3). These behavioral criteria include behavioral measures (eye-movements, reading comprehension, sustained attention to response) and neurocognitive criteria (ERP, fMRI, behavioral, neuroscientific, fMRI and others). His list is in the spirit of a cognitive account, and similar to others (Seth et al. 2005; Seth et al. 2008). For protagonists of non-cognitive accounts there seems

to be room for attack. But, as I have mentioned, this is not my project (see p. 2). In this commentary, I prefer to focus on conceptual issues *within* cognitive accounts, rather than the debate between cognitive vs. noncognitive accounts (See p. 2). As long as one commits to such a cognitive account, Schooler's list of criteria turns out to be very useful for our evaluation of the meta-components we need for a fined-grained understanding of reflection and re-representation. And this is the case independently of the worries I presented regarding his first two claims. However, I think there is a problem looming: Schooler is challenging both the reliability of first-person reports and the view that conscious states are accessible states. With a position that is in such sharp tension with our commonsense understanding, he needs to motivate this radical move: he needs to provide an answer to *why* we have this deep pre-theoretic entrenchment of the first-person accessibility of our own conscious states (Cohen & Dennett 2011).

5 A new taxonomy of different kinds of reflection

It's time for a positive proposal. I claimed that I would introduce suggestions for the building blocks of a new taxonomy of different kinds of reflections. As I argued, we need to further specify the kind of reflections required for Schooler's "pure experience" and for his meta-awareness, and to get a better grasp on what is meant by "taking stock" and "re-representation". I also argued that the difference between consciousness and meta-awareness should not be understood as a dichotomy. Rather, we should understand reflection itself as a hierarchical and multidimensional process. So, what exactly is the "taking stock" required for meta-awareness? According to Schooler, meta-awareness requires an explicit representation of the current contents of thought (2011, p. 321). But at least two of the terms involved in this characterization are used in several and distinct meanings: knowledge, and explicit representation.[20] Explicit rep-

resentation might be interpreted as being itself conscious, or as having symbolic or conceptual content. The notion of knowledge is also problematic, simply because knowledge is a factive verb. It implies that we cannot be wrong.[21] As a result, Schooler built the impossibility of misrepresentation into his definition of meta-awareness. This might be consistent with his claim that the first-level perspective inhabits its own ontological realm. But it also creates a problem, because any view that understands introspection or reflection as an inner perception or re-representation automatically has to allow that this process can go wrong. In other words, it has to allow for misperception/misrepresentation. Moreover, Schooler himself want to allow for a certain kind of misrepresentation, in his terminology translational dissociations—cases in which at the personal level we misinterpret what we experience.

In my discussion of the distinction I claimed that we are able to rule out two kinds of reflections that are not helpful. First, categorization under concepts is one kind of meta-cognitive reflection that is itself unconscious, but necessary for conscious experience. Second, being able to distinguish between self and world is another dimension of reflection, at the highest level, that seems necessary for any conscious experience. Neither of these can be the kind of reflection that distinguishes Schooler's experience from meta-awareness. In addition I claimed that both the self–other distinction and self-awareness can happen in a number of ways. Different kinds of meta-cognition, the general ability to monitor and control one's owns cognition, and the ability to attribute mental states to oneself and others, can as a result be further specified and characterized along those dimensions.

But again, what is the kind of reflection or "taking stock" required for meta-awareness? At the end of the last section I suggested that the kind of reflexion involved in "taking stock" could be characterized as a case in which the content of these states (or the states) are accessed by other states, and maybe (unconsciously) evaluated. So at issue are complex pro-

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20 For a more detailed discussion of the same issue see Metzinger (2013, p. 11).

21 Otherwise we would have a false belief, not knowledge.

cesses rather than re-accessed individual states. Such a view is compatible with certain higher-order theories of consciousness. And this would allow that misrepresentation is in fact possible. However, not only do authors like Rosenthal build several meta-representational levels into their theories, the content of the higher level thought contains an element of self, a reference to "oneself". Self-awareness is built in the analysis, not just any kind of reflection, access, or re-representation. This interpretation uses a certain reading of creature consciousness. It requires that an organism is not only aware but also self-aware. This is a notion of creature consciousness that at first seems to be in tension with Schooler's main distinction. However, as I argued, this is not necessarily the case. Self-awareness itself comes in degrees and varies along multiple dimensions. Creature consciousness in mind-wandering can than be understood as an intentional relation between the organism and some object or item of which it is aware, in our case a train of thoughts (and/or the sensory states associated with it). This is where the contrast between content theories and functional theories comes into play. As I have argued, pure content or representationalist theories, which claim that conscious states have their mental properties due to their representational properties, are not a good strategic partner for Schooler. In contrast, a certain class of functional accounts, especially higher-order theories, turn out to be a nice fit for his account. These accounts analyze consciousness as a certain form of self-awareness. As a result, we can grant that for the experience of mind-wandering without meta-awareness there is some self-awareness required, and for meta-awareness another more demanding kind of self-awareness is necessary. Rosenthal's higher-order account would give Schooler this kind of distinction: meta-awareness would include a third-order state, in his terminology a re-re-representation, whereas the experience of mind-wandering would involve only a second-order state, a re-representation (see p. 10).

The literature on phenomenology offers more helpful distinctions of how we can further evaluate these different dimensions. Most of

these distinctions are orthogonal. Several authors claim that "what is likeness" comes in different forms. For example, Carruthers distinguishes the "what it's likeness" of the world (or *worldly* subjectivity—what the *world* is like for the subject—from *experiential* subjectivity—what the *subject's experience is like for the subject*; Carruthers 1998, 2000). Rosenthal uses a similar distinction. He distinguishes thin from thick phenomenality, whereby thin phenomenality is the occurrence of a certain qualitative character. Thick phenomenality is richer: "[t]hick phenomenality is just thin phenomenality together with there being something it's like *for one* to have that thin phenomenality" (Rosenthal 2002, p. 657, emphasis added). So thick phenomenality includes a certain kind of reflexion or extra level; it includes an awareness of a richer kind. For Rosenthal this is identical with the existence of an appropriate higher-order representation. But it is a specific kind of meta-cognitive process, one that contains a representation of "oneself", or in other terminology, a selfmodel (Metzinger 2003). But the self-model itself, our understanding of ourselves and of the difference between oneself and others, might itself come in degrees and on different levels. So the issue is not meta-cognition or reflexion in general, but different levels and involvements of self-awareness.

Instead of focusing on the differing phenomenology, one might also try to specify the notion of access in further detail (Kouider et al. 2010), a suggestion that I think helps us to better understand what is meant by states referring to other states or accessing them. In the workspace model discussion a simple distinction between cognitive access and cognitive accessibility is introduced to defend the possibility of the abovementioned third category, unaccessed but conscious states. Instead of just access vs. accessibility, I suggest that we distinguish different kinds of access (see p. 11). Rather than assuming a rich phenomenology and differing forms of consciousness, one could also propose that awareness itself might come in degrees and that something like partial awareness might exist (Kouider et al. 2010). Instead of distinguishing dissociable forms of consciousness or differ-

ent kinds of personal level phenomenal character like the above accounts, Kouider et al. (2010) use sub-personal descriptions explaining what awareness might be. More exactly, dissociable levels of access are distinguished and differentiated by a hierarchy of representational levels. In case of partial awareness, we have informational access at *some but not all representational levels*. The crucial idea is that information at other levels can remain inaccessible. Or, in some situations, information at these levels could be accessed, but plausible content is filled, which than potentially results in misrepresentation.

I prefer this line of thinking, and I believe it gives us an improved understanding of the sub-personal processes involved in the different levels of reflection and "taking stock" we want to characterize. This framework is very suitable for a revised understanding of Schooler's main distinction. However, Kouider et al. (2010) postulate partial access as an alternative explanation for conscious visual perception,[22] not for internal cases like mind-wandering. But I think the analyses might be useful for our purposes as well. According to this framework, accessible contents at each level of representation are seen as resulting from the integration of signals with contextual prior information, processes that are also influenced by other internal factors (for example attentional factors or vigilance); this integration is further assumed to be modulated by the degree of confidence of the subject. The result is a more fine-grained perspective on conscious experience; instead of simply conscious or unconscious, we can talk about different dimensions of experience. And this is done at the sub-personal level by a specification of access. This also avoids another problem. As I pointed out, Schooler's account seems very close in spirit to modern versions of workspace accounts. However, these accounts typically assume all-or-nothing mechanisms for access. This is no prob-

lem for Schooler, who proposes his core distinction as a dichotomy. However, it is a potential problem for the revised view I suggest. But I think this can in fact be an advantage. We can indeed grant that representations *within* each level might be accessed in an all-or-nothing manner (as is assumed in workspace models), but none the less insist that the full set of all the representations associated with this process do not have to be conscious.

Different terminologies aside, I think this fits nicely with the spirit of Schooler's general distinction, and his distinction between experience and meta-awareness. I admit that these are just first steps towards a better conceptual understanding. But interpreted this way, there is not just conscious experience of mind-wandering versus meta-awareness. The situation is more complex. Reflection comes in many forms and involves representations at many levels, as well as access at all these levels of representation. In addition, whether, and to what degree, self-awareness and a self-model is involved makes a difference as well.

6 Perceptual perspective shifting. The Analogy and the mind–body problem

Let me take stock. I have been through the claims made in Schooler's main underlying argument (see p. 3) So far, I have discussed claim (1), the initial conceptual distinction been experiential consciousness and meta-awareness, a distinction Schooler sets up as a dichotomy. I then discussed his second claim that there is empirical evidence that this conceptual distinction is something we find in cognitive abilities in cases of dissociations, especially in temporal dissociations like mind-wandering and in emotional transitional dissociations. I then argued that his empirical criteria developed in claim (3) are useful for cognitive accounts in general, independently of the worries one might have about claims (1) and (2). Finally I suggested a finer-grained conceptual distinction between different levels of awareness, different kinds of reflection, and "taking stock". I will turn now to the last issue we shall examine, which is Schooler's last and main claim (see p. 3):

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[22] Like most authors, they focus for the most part on the discussion of conscious perception, and especially Sperling (Block this collection; Fink this collection) and Stroop's paradigms (see Mroczko-Wąsowicz this collection) and what we can learn from them for consciousness. For a more detailed discussion of the pros and cons or an understanding of consciousness as graded within conscious perception see the debate between Cleeremans (2008), Sergent & Dehaene (2004), Seth et al. (2008), and Overgaard et al. 2006).

Schooler claims that this can be used for a new theoretical and ontological framework for studying consciousness, and this is the declared goal of the target paper. He claims that his perceptual perspective-shifting analogy, together with insights from the sections before, gives us a new ontological perspective on the mind–body problem, not just a new methodological strategy. I found this section of the paper surprising. In my opinion, it is relatively independent of the main project he undertakes. Schooler starts by describing the main thought experiments in the philosophical literature used to challenge reductive physicalism.[23] He concludes that the main problem with the reductive positions is that it needs to "reject" those aspects of first person experience "that are not readily handled by a third-person account" (Schooler this collection, p. 25).

I am not convinced that this is correct. It seems a viable alternative solution to me to just subscribe to the traditional reply, and point to some kind of epistemic gap between the third-person approach and the first-person approach instead of an ontological one. One can admit that there is a gap, but it is an explanatory gap between physical processes and conscious experience. One could even state that the gap may be uncloseable in principle, but that consciousness is nonetheless physical (Levine 1983). That is, there is an epistemological gap, but no ontological gap. That we intuitively see a gap might be true; it does not follow that there actually *is* a gap in what exists. All one can conclude is that, epistemologically, there is gap. In addition, our intuitions might simply be wrong: we might be "innate dualists" and that this is the reason why to so frequently slip back in dualist talk (despite knowing better; Papineau 2011). That is the real reason why commonsense intuition pumping thought experiments work so

well. According to this view, the feeling that some part of reality is "left out", i.e., the "explanatory gap", arises only because we simply cannot stop ourselves thinking about the mind–brain relation in a dualist way, though this is actually the wrong thing to do. One can be a reductive physicalist without having to reject the phenomenon of conscious experience, despite the fact that we cannot (yet) reduce it or have proper explanations available as to why we experience certain phenomena the way we do. We can experience a gap, have the intuition that something is "left out", and nonetheless that very intuition might very well be wrong. I simply do not see the need for Schooler's solution, the postulation of a new realm, that gives rise to both the physical and subjective reality.

I am also not sure about the meaning of the perceptual perspective-shifting analogy itself. Because it rests on a purely metaphorical use of "perspective", the analogy does not go through. Perceptual perspective-shifting happens at a personal level, moreover, shifting *experience* at the personal level. The supposedly analogous case occurs at the level of theories or accounts, which emphasize either the first- or third-person perspective. But individual experiences differ in principle from the focus certain theories have. Schooler suggests that the resolution of the conflicting perspectives lies in a meta-perspective that acknowledges the existence and irreducibility of both, even though both are somehow equally valid, such that the solution to this tension is a new realm, a meta-perspective which gives us a "higher-order outlook" (Schooler this collection, p. 26). However, Schooler agrees "that [i]t is easier to recognize the need for a meta-perspective than to identify precisely what such a view might be" (Schooler this collection, p. 26). He admits the character of the introduced meta-perspective is "speculative and highly underspecified" (Schooler this collection, p. 28) but thinks that it has intuitive appeal. He also concedes that this is the most speculative part of the paper. I must admit that I struggle with the concept. I fail to see the intuitive appeal. Mostly because it eludes my understanding what the proposed meta-perspective might be and how it is help-

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[23] However, this section of the target paper goes beyond the discussion of the well-known traditional arguments from the phikosophical debate, including the explanatory gap argument, the Mary argument, and others. Schooler adds a section on the phenomenon of time experience and reductive accounts that explain time. I found the last example very inspiring, because in contrast to the other arguments it is not just based on thought experiments. However, the implications of this for my purposes here do not matter; they are used as a intuition pump to appeal to the necessity of a meta-level, so I cannot cover this aspect in this commentary.

ful despite acknowledging our commonsense intuition, not at an epistemological but an ontological level. As a result, I do not find it explanatory. Moreover, it does not follow from the analogy. For an argument by analogy one needs properties shared by both parts of the analogy. Even if we admit that in perceptual perspective-shifting both personal-level interpretations of an ambiguous figure are equally valid, it does not seem to follow that the first-person perspective and the third-person perspective in *strategies to study consciousness* require a meta-perspective not identical with either of these perspectives. Both the cases seem to have only one thing in common, "persepective shifting". But "perspective" is used purely metaphorical in the second case. Moreover, bridging the first- and third-person perspectives seems to be an epistemic challenge. But from an epistemic observation or claim an ontological claim does not follow. Even if we admit an epistemic gap and agree that we cannot help but see an explanatory gap in all these cases, the postulation of an independent higher-order meta-level, an ontological claim, is not well supported. In addition, both of these issues, the ontological as well as the epistemological claim, differ from the methodological approach defended by Schooler. To summarize, in my opinion this section, and the preferences regarding solutions of the mind–body problem, are conceptually relatively independent from the main project, which I take to be the development of a useful strategy to study consciousness and mind-wandering. Schooler's strategy might be helpfully independently of whether one is a reductive or non-reductive physicalist. I think that such a methodological reading of his approach strengthens the project, because it disassociates it from a completely different issue.

7 Conclusion

Having noted the initial plausibility of the general outline of Schooler's account, I pointed out some problems and expressed some general reservations about its scope. First, I argued that the postulation of a third kind of conscious but not accessed or reflected state is not justified. As a result, the account is too narrow, because one of the underlying general assumptions is not justified. This assumption causes a number of problems and a few misunderstandings. However, the assumption seems conceptually independent of the main project, which is to allow us to bridge the gap between first- and third-person criteria for consciousness. I suggested that the main distinction is underspecified and needs further clarifications of the elements involved: access, reportability, and levels of awareness.

Second, although it is tempting to attribute a first-order account to Schooler, a more convincing alliance would actually be certain functional accounts, especially higher-order accounts and global workspace accounts. And I argued that we should replace the introduced dichotomy by a finer-grained distinction of different kinds of meta-cognitive processes and meta-reflections in several dimensions.

In discussing support for the underlying conceptual framework, I then argued that the evidence offered is actually about complex cases. As exciting as the empirical results are, they seem not to be about individual states, but rather about the connection between many states or even the stream of consciousness. The project is about creature consciousness, not state consciousness—though the initial distinction suggests otherwise. This is the first result of my commentary.

I would suggest giving up the idea that the account offers a new meta-perspective, which for Schooler is a preferable alternative to reductive physicalist accounts. I do not think there is a need for this ontological element in his account, and it does not seem to fit with the rest of the methodological project. In addition, the claim seems independent of the rest of the project and there are reductive accounts available that fit very nicely with his project. This is the second result.

In essence I suggested a few conclusions and recommendations, mostly based on conceptual considerations, which clarify and strengthen the main project, with which I sympathize.

1. We keep many main insights of the paper:
   a) The account is still be a cognitive account, and we allow that cognitive factors help to get a grasp on consciousness; the project is still to bridge the gap between the first- and third-person perspective.
   b) We also keep the insight that further processing and certain kinds of further processes might either change the state itself and/or the state's content. But we acknowledge that we need to consider the embeddedness of the state to determine the experience. In other words, we focus on processes and phenomena, instead of individual states. This allows Schooler to associate his project with either a hybrid account or a version of a functional account, more specifically a workspace account or higher-order account. Which in turn helps to specify the dimensions of meta-processing in more detail and get a better grasp of the necessary conceptual clarifications. Nonetheless, we still see meta-awareness and consciousness as distinct phenomena. I take this to be the driving idea in his initial distinction.
   c) The proposed list of potential criteria is still extremely useful, since it helps to determine these very reflective dimensions and factors, which determine both experience and the activities of the mind. For example, the behavioral criteria[24] will be caused by these very meta-processes, which we try to identify in more detail.
   d) Finally, we keep the insight that factors accessible through the third-person perspective can give us insight into what is going on in the mind, as well as in conscious processes.
2. The remaining task, then, is to specify the aspects and dimensions that are relevant, and the kinds of meta-processes, access, or reflection in question. I suggested building blocks for an improved taxonomy of different kinds of reflections and "taking stock". I suggested that awareness itself might come in degrees and at different levels of representation. By

distinguishing dissociable levels of access differentiated at hierarchical representational levels, we allow for partial awareness. In effect, this allows for a fine-grained perspective on conscious experience. Instead of just unconscious, conscious, and a meta-reflective level of awareness, we have different dimensions of experience. And this is done at the sub-personal level by a specification of the term "access". But we should restrain from simply postulating a third category, namely a state that is unaccessed (or un-accessible) but conscious, thereby avoiding the problems associated with the postulation of this third category. The resulting finer-grained taxonomy allows an improved understanding of how exactly meta-awareness and conscious experience differ. Of course there is a price to pay if we accept this change of focus. While we can still claim that the criteria give an insight into what is going on *in the mind*, "the mind" includes unconscious states, conscious states, and several levels of re-representational processes.

There are a number of advantages of a view like this. First, it is not in conflict with some of the most promising candidates for philosophical theories of consciousness. Moreover, one can still account for the similarity of an unconscious state and its conscious counterpart. And third, one can keep the initial idea behind Schooler's distinction between the experienced state and a meta-reflective level of awareness of "knowing that one is in this state", but would substitute it with a finer-grained conceptual framework of multiple differences among several dimensions.

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24 For example in the the discussion of emotions p. 13.

References

Baars, B. J. (1988). *A cognitive theory of consciousness.* Cambridge, UK: Cambridge University Press.

——— (1996). *In the theater of consciousness: The workspace of the mind.* New York, NY: Oxford University Press.

Bayne, T. & Montague, M. (Eds.) (2011). *Cognitive phenomenology.* New York, NY: Oxford University Press.

Block, N. (2005). Bodily sensations as an obstacle for representationalism. In M. Aydede (Ed.) *Pain. New essays on its nature and the methodology of its study* (pp. 137-142). Cambridge, MA: MIT Press.

——— (2011). Perceptual consciousness overflows cognitive access. *Trends in Cognitive Sciences*, *15* (12), 567-575. 10.1016/j.tics.2011.11.001

——— (2015). The puzzle of perceptual precision. In T. Metzinger & J. M. Windt (Eds.) *Open MIND.* Frankfurt a. M., GER: MIND Group.

Boyd, R. (1999). Kinds, complexity and multiple realization. *Philosophical Studies*, *95* (1/2), 67-98.

Braddon-Mitchell, D. & Jackson, F. (2007). *Philosophy of mind and cognition.* Oxford, UK: Blackwell.

Byrne, A. (2001). Intentionalism defended. *Philosophical Review*, *110* (2), 199-240. 10.1215/00318108-110-2-199

Carruthers, P. (1998). Natural theories of consciousness. *European Journal of Philosophy*, *6* (2), 203-222. 10.1111/1468-0378.00058

——— (2000). *Phenomenal consciousness.* Cambridge, UK: Cambridge University Press.

——— (2005). Conscious experience versus conscious thought. In P. Carruthers (Ed.) *Consciousness: Essays from a higher-order perspective.* Oxford, UK: Oxford University Press.

Carruthers, P. & Veillet, B. (2011). The case against cognitive phenomenology. In T. Bayne & M. Montague (Eds.) *Cognitive phenomenology* (pp. 35-56). New York, NY: Oxford University Press.

Cleeremans, A. (2008). Consciousness: The radical plasticity thesis. *Frontiers in Psychology*, *168*, 19-33. 10.1016/S0079-6123(07)68003-0

Cohen, M. A. & Dennett, D. C. (2011). Consciousness cannot be separated from function. *Trends in Cognitive Sciences*, *15* (8), 358-364. 10.1016/j.tics.2011.06.008

——— (2012). Response to Fahrenfort and Lamme: Defining reportability, accessibility and sufficiency in conscious awareness. *Trends in Cognitive Sciences*, *16* (3), 139-140. 10.1016/j.tics.2012.01.002

Dehaene, S., Changeux, J.-P., Nacchache, L., Sackur, J. & Sergent, C. (2006). Conscious, preconscious, and subliminal processing: A testable taxonomy. *Trends in Cognitive Sciences*, *10* (5), 204-211. 10.1016/j.tics.2006.03.007

Dretske, F. (1993). Conscious experience. *Mind, 102* (406), 263-283.

Fahrenfort, J. J. & Lamme, V. A. F. (2012). A true science of consciousness explains phenomenology. Comment on Cohen and Dennett. *Trends in Cognitive Sciences*, *16* (3), 138-139. 10.1016/j.tics.2012.01.004

Fink, S. B. (2015). Phenomenal precision and its possible pitfalls: A commentary on Ned Block. In T. Metzinger & J. M. Windt (Eds.) *Open MIND.* Frankfurt a. M., GER: MIND Group.

Gennaro, R. J. (1996). *Consciousness and self-consciousness: A defense of the higher-order thought theory of consciousness.* Amsterdam, NL: John Benjamins.

Grush, R., Jaswal, L., Knoepfler, J. & Brovold, A. (2015). Visual Adaptation to a Remapped Spectrum. In T. Metzinger & J. M. Windt (Eds.) *Open MIND* (pp. 1-16). Frankfurt a. M., GER: MIND Group.

——— (2015). Visual adaptation to a remapped spectrum: Lessons for enactive theories of color perception and constancy, the effect of color on aesthetic judgments, and the memory color effect. In T. Metzinger & J. M. Windt (Eds.) *Open MIND.* Frankfurt a. M., GER: MIND Group.

Jackendoff, R. S. (1987). *Consciousness and computational mind.* Cambridge, MA: MIT Press.

Kouider, S., de Gardelle, V., Sackur, J. & Dupoux, E. (2010). How rich is consciousness? The partial awareness hypothesis. *Trends in Cognitive Sciences*, *14* (7), 301-307. 10.1016/j.tics.2010.04.006

Kouider, S., Sackur, J. & de Gardelle, V. (2012). Do we still need phenomenal consciousness? Comment on Block. *Trends in Cognitive Sciences*, *16* (3), 140-141. 10.1016/j.tics.2012.01.003

Kriegel, U. (2009). *Subjective consciousness: A self-representational theory.* Oxford, UK: Oxford University Press.

Lamme, V. (2003). Why visual attention and awareness are different. *Trends in Cognitive Sciences*, *7* (1), 12-18.

Levine, J. (1983). Materialism and qualia: The explanatory gap. *Pacific Philosophical Quarterly*, *64*, 354-361.

Lycan, W. (1996). *Consciousness and experience.* Cambridge, MA: MIT Press.

Metzinger, T. (1995). Faster than thought: Holism, homogeneity and temporal coding. In T. Metzinger (Ed.) (pp. 425-461). Imprint Academics.

——— (2003). *The self-model theory of subjectivity.* Cambridge, MA: MIT Press.

——— (2013). The myth of cognitive agency: subpersonal thinking as a cyclically recurring loss of mental autonomy. *Frontiers in Psychology*, *4* (931), 1-19. 10.3389/fpsyg.2013.00931

Mroczko-Wąsowicz, A. (2015). What can sensorimotor enactivism learn from studies on phenomenal adaptation in atypical perceptual conditions? A commentary on Rick Grush and colleagues. In T. Metzinger & J. M. Wiindt (Eds.) *Open MIND.* Frankfurt a. M., GER: MIND Group.

Nelkin, N. (1989). Propositional attitudes and consciousness. *Philosophy and Phenomenological Research*, *49* (3), 413-430.

Northoff, G. (2014). *Unlocking the brain. Vol II: Consciousness.* New York, NY: Oxford University Press.

Overgaard, M., Rote, J., Mouridsen, K. & Ramsøy, T. Z. (2006). Is conscious perception gradual or dichotomous? A comparison of report methodologies during a visual task. *Conscious Cognition*, *15* (4), 700-708.

Overgaard, M. & Grünbaum, T. (2011). Cognitive and non-cognitive conceptions of consciousness. *Trends in Cognitive Sciences*, *16* (3), 137-137. 10.1016/j.tics.2011.12.006

Papineau, D. (2002). *Thinking about consciousness.* Oxford, UK: Oxford University Press.

——— (2011). What exactly is the explanatory gap? *Philosophia*, *39* (1), 5-19. 10.1007/s11406-010-9273-6

Pitt, D. (2004). The phenomenology of cognition. Or what is it like to think that P? *Philosophy and Phenomenological Research*, *69* (1), 1-36. 10.1111/j.1933-1592.2004.tb00382.x

Prinz, J. J. (2004). The fractionation of introspection. *Journal of Consciousness Studies*, *11*, 40-57.

——— (2012). *The conscious brain.* New York, NY: Oxford University Press.

Robinson, W. S. (2005). Thoughts without distinctive non-imagistic phenomenology. *Philosophy and Phenomenological Research*, *70* (3), 534-561.

Rosenthal, D. (1986). Two concepts of consciousness. *Philosophical Studies*, *49*, 329-359.

——— (2002). How many kinds of consciousness? *Consciousness and Cognition*, *11* (4), 653-665. 10.1016/S1053-8100(02)00017-X

——— (2005). *Consciousness and mind.* Oxford, UK: Oxford University Press.

——— (2012). Higher-order awareness, misrepresentation, and function. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *367* (1594), 1424-1438. 10.1098/rstb.2011.0353

Schooler, J. W. (2002). Re-representing consciousness: Dissociations between experience and meta-consciousness. *Trends in Cognitive Sciences*, *6* (8), 339-344. 10.1016/S1364-6613(02)01949-6

——— (2013). The costs and benefits of mind-wandering: A review. *Canadian Journal of Experimental Psychology*, *67* (1), 11-18. 10.1037/a0031569

——— (2015). Bridging the objective/subjective divide: Towards a meta-perspective of science and experience. In T. Metzinger & J. M. Windt (Eds.) *Open MIND.* Frankfurt a. M., GER: MIND Group.

Schooler, J. W., Smallwood, J., Christoff, K., Handy, T. C., Reichle, E. D. & Sayette, M. A. (2011). Meta-awareness, perceptual decoupling and the wandering mind. *Trends in Cognitive Sciences*, *7* (15), 319-326.

Sergent, C. & Dehaene, S. (2004). Is consciousness a gradual phenomenon? Evidence for an all-or-none bifurcation during the attentional blink. *Psychological Science*, *15* (11), 720-728. 10.1111/j.0956-7976.2004.00748.x

Seth, A. K., Baars, B. J. & Edelman, D. B. (2005). Criteria for consciousness in humans and other mammals. *Consciousness and Cognition*, *14* (1), 119-139. 10.1016/j.concog.2004.08.006

Seth, A. K., Dienes, Z., Cleeremans, A., Overgaard, M. & Pessoa, L. (2008). Measuring consciousness: Relating behavioural and neurophysiological approaches. *Trends in Cognitive Sciences*, *12* (8), 314-321. 10.1016/j.tics.2008.04.008

Siegel, S. (2005). Which properties are represented in perception? In T. Gendler & J. Hawthorne (Eds.) *Perceptual Experience* (pp. 481-503). Oxford, UK: Oxford University Press.

Siewert, C. (1998). *The significance of consciousness.* Princeton, NJ: Princeton University Press.

Tye, M. (1995). *Ten problems of consciousness.* Cambridge, MA: MIT Press.

Tye, M. & Wright, B. (2011). Is there a phenomenology of thought? In T. Bayne & M. Montague (Eds.) *Cognitive Phenomenology* (pp. 326-344). New York, NY: Oxford University Press.

Van Gulick, R. (2000). Inward and upward: Reflection, introspection, and self-awareness. *Philosophical Topics*, *28* (2), 275-305.

Stepping Back and Adding Perspective

A Reply to Verena Gottschling

Jonathan Schooler

In this reply, I circumvent (some might say dodge) a number of Gottschling's fine-grained comments by stepping back and reviewing the key points of the three major sections of my target paper in light of her more general concerns. I first consider Gottschling's primary criticism of the first section of my paper, namely that insights that might emerge from considering the perspective shifting associated with reversible images do not apply in the context of differences between first and third-person perspectives. Although I concede there are differences in the meaning of "perspective" in conceptual and perceptual domains, I argue that the common element of a reliance on a frame-of-reference is sufficient to make the analogy helpful. I contend that a necessary element in overcoming the limitations of particular perspectives in both conceptual and perceptual domains is attempting to consider alternative vantages. This approach is then used to justify the tack of the next two sections: considering first-person experience from the vantage of third-person science and considering third-person science from the vantage of first-person experience. I note that Gottschling is largely sympathetic to the broad goals of the second section of my paper, and observe that her major concern with the construct of experiential consciousness emerges from her burdening it with unwarranted assumptions. I use her constructive suggestion for the need for further development of the notion of meta-awareness as a springboard for introducing a previously overlooked element (experiential monitoring) that may be useful for explaining how people can knowingly monitor performance without explicit verbal re-representation. Finally, I consider Gottschlings' view that the third section fails to add to the value of the paper. Although I acknowledge that the arguments in the second section stand independently, I argue that discussion of how science can inform experience gains greater balance by also considering how experience informs science. I close by challenging the view that knowledge gained from science necessarily trumps that gained by experience, and conclude that it remains a worthy goal to seek a meta-perspective that accommodates both first- and third-person perspectives without reducing one to the other.

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1 Introduction

Reviewing a commentary on one's work, even one as thoughtful as that provided by Gottschling (this collection), is much like viewing a close-up picture of one's face on a large high-definition screen; every blemish seems patently visible and appears to overshadow even the most genuine of expressions. The temptation is to pull out one's metaphoric Photoshop and doctor up every imperfection. There is another option, however, and that is to step back and consider whether from a broader perspective the blemishes are really as disfiguring as they might initially appear.

Inspired by this analogy, I will not attempt to rebut all of Gottschling's consistently

incisive remarks about my paper. Rather I will use this essay as an opportunity to step back and review the broad strokes of my arguments in light of Gottschling's more general concerns. In so doing, I hope to demonstrate that while Gottschling offers a number of insightful suggestions for clarification and elaboration, the general logic of my arguments remain largely intact. Nevertheless, Gottschling's critique offers an excellent opportunity to clarify some points that may have been lost in the expanse of my initial paper.

2 Reflections on section 2[1]: Applying perspective shifts to conceptualizing human experience from the first– versus third–person perspective

My paper opens with the contention that seemingly opposing arguments can often reflect alternative vantages of a larger meta-perspective from which both views can be understood. I illustrate this point using the example of reversible images that can be seen as corresponding to two entirely different objects depending on one's perspective. I argue that when one recognizes that both vantages are true from their particular perspective, one gains an understanding of the larger context (i.e., a meta-perspective). Although most of my examples are perceptual illustrations, I suggest that there is a close correspondence between the processes involved in perspective taking in perceptual and conceptual domains, and that an appreciation of meta-perspectives in the perceptual domain may help the formulation of meta-perspectives in the conceptual domain. In the spirit of this argument I suggest that the long-standing debate between approaches that emphasize the subjective first-person perspective of experience and those that emphasize the objective third-person perspective of science, may be akin to debating which direction the dancer is rotating in the spinning dancer illusion (see figure 6 in Schooler this collection). In both cases, it simply depends on your perspective. Taken from the perspective of

the individual, understanding consciousness necessarily invites a reliance on introspection and first-person analysis. Taken from the perspective of conventional third-person science, understanding consciousness necessarily requires objectively observable facts (e.g., behaviors, physiological responses) that can be derived independently of any single individuals' experience

I argue that both of these views have merit, that both researchers and schools of thought have debated (often vehemently) about which of these two vantages is more appropriate, and that part of the heat of this controversy may stem from people's disinclination to switch back and forth between perspectives and thereby gain a larger view that treats neither as decisively superior.

Gottschling rejects the notion that the alternative perspectives afforded by reversible images has relevance to conceptualizing the challenges of reconciling first- and third-person perspectives. Her difficulty with this analogy stems (at least in part) from her view that the meaning of "perspective" in these two contexts does not align. As she puts it: "Because it rests on a purely metaphorical use of 'perspective', the analogy does not go through" (Gottschling this collection, p. 18). To be sure there are significant differences between the meaning of "perspective" in the context of perceptual experience, such as reversible images, and conceptual ideas, such as the difference between first- and third-person approaches to the study of consciousness. However, I argue that there are some deep parallels between the meanings of "perspective" in these two contexts that make the analogy a useful one. I'll begin by considering the broader issue of the parallels between perceptual and conceptual perspectives and then the more specific question of how these parallels might usefully apply to the conceptual distinction between first- and third-person perspectives.

Critically, in both perceptual and conceptual contexts "perspective" is defined by a frame-of-reference that determines how the constituent elements are understood and related to one another, as well as which elements are

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[1] The paper begins with a very brief introduction that is numbered section 1. As a result the first major section of the paper is numbered section 2.

taken as central and which as more peripheral. In perceptual contexts, the frame-of-reference is defined in terms of the assignment of spatial arrangements; i.e., what is to the left and the right, what is in the foreground and background etc. In conceptual contexts, the frame-of-reference is defined in terms of the assignment of conceptual arrangements; i.e.; which elements are conceptually closer or further apart, which are more essential and which more peripheral. In both cases, frame-of-reference can have profound effects as evidenced by the reversible image research in perception (Chambers & Reisberg 1992) and research on cognitive framing (Tversky & Kahneman 1981) in cognition. A further striking parallel between perceptual and conceptual perspectives is that they both become easily entrenched. When one watches the spinning dancer (figure 6) it is very difficult to recognize that at any time she can be seen as facing in one of two different directions. In a very similar way, when one works on a conceptual problem it is very easy to interpret it in a particular way that creates a "mental set" that can impede its solution. There is even a common cognitive ability (Schooler & Melcher 1995; see also, Wiseman et al. 2011) for overcoming the mental sets associated with solving conceptual problems (e.g., insight problems) and perceptual problems (e.g., recognizing out-of-focus pictures). In short, perceptual reversible images elegantly illustrate a fundamental aspect of not just perception but of human cognition more generally; namely, that we routinely consider things (be they objects or ideas) within the context of a particular frame-of-reference (be that frame perceptual or conceptual), and we can have a very hard time reconsidering those things from a different perspective.

Even if it is appropriate to draw a parallel between the meaning of "perspective" in perceptual and conceptual contexts, it does not necessarily follow that the analogy can be extended to the particular conceptual problem of distinguishing between the first- and third-person perspective approaches. But I maintain that it is in fact particularly applicable in this context. The essence of the distinction between first- and third-person perspectives has to do with one's

frame-of-reference. If one considers consciousness from a first-person perspective, one is understanding it in relationship to one's own personal experience, taking subjectivity as the foreground and objective reality as the background. One is considering consciousness through one's own experience, and grounding assumptions on what is real and important on the basis of that personal subjective vantage. In contrast, a third-person perspective takes the objective world as the frame-of-reference. Personal experiences that cannot be independently verified are therefore suspect and inferences must be drawn, as they are in all of science, on the basis of people's measurable behaviors and physiological responses. In my view, it is no accident that these two approaches to thinking about consciousness have historically been described in terms of differences in *perspective* as they self-evidently entail thinking about consciousness from distinctly different frames-of-reference.

In short, I maintain that the notion of distinct conflicting perspectives akin to those associated with perceptual reversible images aptly applies to many conceptual distinctions, but especially apply when it comes to characterizing the objective/subjective divide. The corollary of this claim is the possibility that, like the alternative perspectives of reversible images, the objective/subjective divide may be usefully informed by recognizing that both perspectives represent equally meaningful interpretations that cannot be reduced to one another, but may be better understood from a meta-perspective that acknowledges the larger context in which they are both embedded.

In my view, the importance of the distinct perspectives that emerge from alternative frames-of-reference simply cannot be overstated. In addition to its self-evident effects in the context of perception, frames-of-reference are a powerful determinant of the actions that people take in important real-life situations. For example, doctors' prescriptions of how to treat an epidemic is profoundly influenced by whether the treatment is framed in terms of lives saved or lives lost even when it corresponds to precisely the same scenario (Tversky & Kahneman 1981). In physics, fundamental breakthroughs

have repeatedly taken place as a function of changes in scientists' frame-of-reference. For example, Newton's laws of gravity emerged when he realized that the same frame-of-reference that applies to forces on the ground equally applies to the motion of the heavens (Westfall 1980). Einstein's special theory of relativity was fostered by his replacement of the notion of an absolute frame-of-reference with a frame-of-reference defined relative to the observer (2001). Given the significance of perspective and frame-of-reference in other contexts it stands to reason that something so salient as whether one is thinking about consciousness from their own perspective or from the objective perspective of science should profoundly impact the questions that they ask and the answers that they reach.

In the case of reversible images, the best way to understand how they can correspond to two so entirely distinct yet self-consistent representations is to practice alternating between vantages. Although at first it is very difficult to see how the spinning dancer alternatively rotates in two different directions, with practice one comes to appreciate the two vantages that the image affords, and thus to understand why her direction changes. The primary goal of my paper is to explore the hypothesis that a deeper understanding of the subjective/objective divide can emerge in a similar fashion. By thoroughly considering each vantage from the perspective of the other, it is hoped that a meta-perspective will emerge that recognizes the logical consistency of each, while not attempting to reduce either one to the other.

Gottschling suggests that my emphasis on "meta-perspective" is an unnecessary strategic move that ultimately detracts from the primary value of my paper. Part of her difficulty with the meta-perspective emphasis may arise from my inadequately situating the second section of my paper in the context of this construct, and the seeming equation of meta-perspective with non-reductionism in the third section. However, the value of considering alternative perspectives in overcoming the limitations that can emerge when one solely considers a single vantage has merit regardless of whether one ascribes to any of the ontological speculations I suggest in the

third section of my paper. Independent of the conclusions that one derives, there seems to be great value in systematically considering subjective experience from the vantage of a third-person perspective, and objective reality from the vantage of a first-person perspective, which are the goals of section 2 and section 3 respectively.

3 Reflections on section 3: Gaining a third-person perspective on people's first-person experience

In the second section of my paper I review research that attempts to inform our understanding of the first-person experience using the third-person perspective of science. This approach takes at its starting point a theoretical distinction between experiential consciousness (corresponding to the contents of on-going experiences) and meta-consciousness (or meta-awareness—the terms are used interchangeably) corresponding to the explicit re-representation of the contents of experiential consciousness. These levels are illustrated by the case of mind-wandering while reading. In this context, experiential consciousness corresponds to the content of the mind-wandering episode and meta-awareness is initially absent but suddenly emerges with the realization that one was mind-wandering rather than attending to the text.

An important implication of the distinction between experiential consciousness and meta-consciousness is that people can have experiences (e.g., mind-wandering) that they either fail to notice explicitly (temporal dissociations) or notice but manage to mischaracterize (translation dissociations). I review a program of research that has fleshed out this distinction in various contexts, with a particular focus on mind-wandering. Using assorted methodologies including the combination of experience sampling measures, self-catching, and behavioral measures, we find evidence that people routinely fail to notice episodes of mind-wandering but are nevertheless accurate at reporting it when they are directly queried.[2]

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2 A very recent paper (Seli et al. in press) suggests some variablity in the accuracy of mind-wandering reports as assessed by the corres-

Gottschling devotes the bulk of her remarks to discussing efforts to develop a third-person science of first-person experience. In general, she is sympathetic to the approach. However, she raises a variety of concerns and makes a number of useful suggestions. As noted, I will not endeavor to respond to all of her concerns; however, there are several that stand out, and so I will consider them in turn.

Gottschling's primary reservation about the distinction between experiential consciousness and meta-awareness is that she is not persuaded by my characterization of experiential consciousness. Essentially she does not see how it is possible to "distinguish conscious processes which are not accessed from unconscious activity" (Gottschling this collection, p. 11). Although it is true that there are some situations where it may be difficult to distinguish experienced but not meta-aware from unconscious processes (as in the case of potentially unconscious emotions, see Schooler et al. 2015), often this distinction is quite straightforward. For example, when people are surprised to suddenly realize that they are mind-wandering instead of paying attention to what they reading. In this case, it is evident that they were experiencing the contents of the mind-wandering as they are typically able to report them. It is simply that they had not engaged in the reflective process of noting that they were mind-wandering instead of reading. In short, Gottschling is unpersuaded by a mental state—"conscious processes which are not accessed"—that I never actually postulated. Essentially, she layered onto the construct the notion that experiential consciousness is not accessed, and then criticized it for this reason.

In fact, although I am not committed to the notion that non-conscious higher order thoughts underpin all conscious thoughts (Rosenthal 1986), I have no problem with Gottschling's attempted revision to my notion of experiential consciousness, namely that it represents a third-order level of consciousness. Indeed I have speculated about this possibility in the

past (see Schooler et al. 2015). I am therefore entirely comfortable with Gottschling's suggestion that "meta-awareness would include a third-order state, in his terminology a re-re-representation whereas the experience of mind-wandering would involve only a second-order state, a re-representation" (this collection, p. 16). Just so long as the second-order cognition is not *experienced* as a reflection about experience, I have no problems with whatever non-conscious higher-order cognitions may be required to produce it.

Although Gottschling's concerns with the notion of experiential consciousness seem to be largely a product of her reading into my distinction more than was intended, her suggestion that it may be helpful to consider more fine-grained levels of meta-awareness is a worthwhile idea that merits development. As Gottschling observes, there is a need for "an improved taxonomy of different kinds of reflection and 'taking stock' ... awareness itself might come in degrees and at differently levels of representation" (this collection, p 20). Indeed, one feature that has been notably absent from my discussion of meta-consciousness (here and elsewhere) is consideration of the possibility of monitoring processes that may take place at the experiential level, without explicit re-representation at the meta-level For example, sometimes when people are on-task they may experience a palpable sense of sustained attention without having explicitly to note to themselves that they are on-task. Similarly, when mind-wandering, people sometimes report that they knew they were mind-wandering. This awareness, however, may not necessarily be associated with an explicit acknowledgment of that fact. Rather they maintain a continuous unstated awareness that they are off-task. In short, a further distinction may be needed between a non-propositional "feeling of awareness" that one is doing something ("experiential monitoring") and the verbal/propositional state of meta-awareness that may occur when people intermittently take stock of their mental state, as when one suddenly thinks to themselves, "Darn! I was mind-wandering again!"

The notion that sometimes people explicitly re-represent their state to themselves (meta-awareness) whereas other times they simply "just

pondence of such reports to behavioral indices of lapses. Nevertheless, people appear to have some access to when their reports are likely to be more vs less accurate as evidenced by a significant correlation between confidence in self-reports and correspondence to the behavioral indices of mind-wandering.

know" they are in that state (experiential monitoring) would also be consistent with alternative mindfulness practices (Thompson 2014). For instance, open-monitoring involves monitoring the content of experience from moment-to-moment without deliberately attending to any particular object (Lutz et al. 2008). Open-monitoring cultivates an aspect of mindfulness described as "observing", measured with items such as "When I walk, I deliberately notice the sensation of my body moving" (Baer et al. 2006). This seems akin to what I am referring to as experiential monitoring. A somewhat different practice involves labeling one's experiences as they occur with short tags like "thinking," "feeling," or "sensation." This cultivates an aspect of mindfulness called "describing", measured with items such as: "My natural tendency is to put my experiences into words." This process of re-representing experience in words seems akin to meta-awareness.

The distinction between experiential monitoring and meta-awareness might also speak to another of Gottschling's concerns, namely the question of whether meta-awareness is necessarily all-or-none (as I intimated) or more continuous (as she proposes). Although research would be required to tease out this conjecture, it seem quite plausible to me that experiential monitoring might take place at a continuous level with individuals ranging from either dimly to explicitly aware of what they are doing. In contrast, a more discrete process may occur when individuals suddenly realize that they are engaging in a mental state (e.g., mind-wandering) that they had not previously noticed.

Several other concerns that Gottschling raises about my paper, including the possibility of unconscious emotions and how the distinction between experiential consciousness and meta-awareness relates to other distinctions of consciousness (including those of Dehaene et al. 2006; Block 1995 and Rosenthal 1986) are discussed in other locations (e.g., Schooler et al. 2015). While she points out a number of other modest blemishes that I will not address, ultimately the approach for gaining a third-person perspective of first-person experience that I articulated in section 2 of my paper appears logically intact.

4 Reflections on section 4: Toward a meta–perspective for considering the meta–physics of first– versus third–person perspective

Gottschling seems less optimistic about the contribution of the third section of my paper. She dismisses speculations I derive from considering third-person science from the vantage of first-person experience, as a "largely unnecessary strategic move" (Gottschling this collection, p. 1) that "does not seem to fit with the rest of the project" (p. 22). I concur with Gottschling that first person experience can be assessed from the third person perspective of science without also considering objective science from a first-person perspective. In the past I have routinely considered what science has to say about first-person experience without considering the other side of the coin (e.g., Schooler 2002; Schooler et al. 2011; Schooler et al. 2015). Clearly the two sides of the discussion are not logically co-dependent on one another.

I acknowledge that the final section of the paper was not necessary for shoring up any of my arguments in the second section. Nevertheless I maintain that it adds an important balance to the discussion by illustrating the potential value of considering both first- and third-person approaches from the vantage of the alternative perspective. In this concluding section of my paper, I change my frame-of-reference from a third- to a first-person perspective, and consider the current assumptions of science from this vantage. I identify three aspects of existence that I argue are axiomatic from a first-person perspective, including: the existence of experience, the flow of time, and the fact that the present is qualitatively different from the past or the future. I argue that all three of these essential elements are either unexplained by science (i.e., experience) or outright discounted as an illusion of consciousness (i.e., the flow of time, the privileged present). I contend that while many aspects of experience could be illusory, it is hard (indeed impossible for me) to conceive of how experience, the flow of time, or the privileged nature of the present could be among them. On these grounds, I suggest that there may be something missing from the current

account of objective science and speculate that an additional subjective dimension of time might fit the bill. I argue that a subjective dimension of time would provide: 1) a realm of reality for experience to reside, 2) the additional degree of freedom necessary to enable the flow of time in physics' current "block universe", and 3) a way to conceptualize the present. I readily acknowledge that such an account is highly speculative, but I offer it as an example of the type of meta-perspective that I think could emerge by attempting to reconcile the axioms required for both objective and subjective frames-of-reference.

Gottschling's assessment of my arguments in this section are largely a rehash of standard critiques of the "explanatory gap" (Levine 1983) and the hard problem of consciousness (Chalmers 1996). The standard refrain is that the inability of science to account for subjectivity corresponds to an epistemological gap not an ontological one. The fact that we cannot explain something, and perhaps never will be able to, does not require us to assume a different ontological foundation for reality. I concede that this kind of mysterian (McGinn 1989) account of the explanatory gap, although profoundly unsatisfying, is difficult to dispute. However, she largely ignores the more novel aspects of my arguments. Namely, she disregards my claim that not only is the current physicalist account unable to explain consciousness, it outright rejects two additional subjectively self-evident aspects of reality. It rejects the flow of time and the privileged present. While she acknowledges in a footnote that she finds this aspect of the paper "inspiring," it does not impact her overall dismissal of the need for a meta-perspective. As she puts it, "what the proposed meta-perspective might be and how it is helpful despite acknowledging our common sense intuition eludes my understanding not at an epistemological level but at an ontological level" (Gottschling this collection, p. 23).

Gottschling's reaction to the third section of my paper was not unexpected. As I noted in the close of my paper, "my arguments on this point will likely remain wholly unpersuasive to those who cannot conceive of subjective experience as offering an epistemological authority that rivals science." I recognize that it will be an uphill

battle to persuade philosophers and scientists steeped in the supremacy of the third-person perspective to consider that conclusions drawn from our own experience could possibly carry ramifications comparable to conventional objective science. But at the end of the day all of the science that we believe we know is necessarily delivered to us through our subjective experience. While what we know about objective reality is necessarily dependent on experience, the same is not the case for experience. Objective reality could conceivably be an illusion. This could all be a dream or we could be the proverbial brain in a vat. But the *experience* of objective reality is unquestionable, as even an illusory experience is still an experience. Given that the existence of objective reality is ultimately on less certain ground than the existence of experience, it is far from obvious why the third-person frame-of-reference holds its current unchallenged dominion.

5 Conclusion

I suspect that my big-picture approach to replying to Gottschling's very detailed analysis may be unsatisfying to some (Gottschling included) who might have expected point-by-point replies to each of her concerns. However, I hope that my stepping-back tactic enabled me to address the major concerns that were raised. At the outset I noted the close parallels between the factors that contribute to conceptual and perceptual processes. In addition to the value of perspective shifting, it might also be noted that stepping-back is another strategy that is useful in both conceptual and perceptual domains. For example, it is easier to decipher a highly pixelated photo from a distance than up close. Similarly, when people confront conceptual insight problems from a more distant perspective (e.g., imagining themselves a year from now) they are often better able reach a solution (Förster et al. 2004). Conceptual stepping back can enable one to distinguish the metaphorical "forest from the trees." It remains unclear whether there could be a genuine meta-perspective that enables us to accommodate the assumptions of both the first- and third- person perspectives. But if such a perspective does ex-

ist, it seems likely that finding it will require stepping back...way back.

Acknowledgements

References

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J. & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, *13* (1), 27-45. 10.1177/1073191105283504

Block, N. (1995). On a confusion about a function of consciousness. *Behavioural and Brain Sciences*, *18*, 227-287.

Chalmers, D. J. (1996). *The conscious mind: In search of a fundamental theory.* New York, NY: Oxford University Press.

Chambers, D. & Reisberg, D. (1992). What an image depicts depends on what an image means. *Cognitive Psychology*, *24*, 145-174.

Dehaene, S., Changeux, J. P., Naccache, L., Sackur, J. & Sergent, C. (2006). Conscious, preconscious, and subliminal processing: A testable taxonomy. *Trends in Cognitive Sciences*, *10*, 204-211.

Einstein, A. (2001). *Relativity: The special and the general theory (reprint of 1920 translation by Robert W. Lawson ed.).* London, UK: Routledge.

Förster, J., Friedman, R. S. & Liberman, N. (2004). Temporal construal effects on abstract and concrete thinking: Consequences for insight and creative cognition. *Journal of personality and social psychology*, *87* (2), 177-189.

Gottschling, V. (2015). Bridging the gap-A commentary on Jonathan W. Schooler. In T. Metzinger & J. M. Windt (Eds.) *Open MIND*. Frankfurt a. M., GER: MIND Group.

Levine, J. (1983). Materialism and qualia: The explanatory gap. *Pacific Philosophical Quarterly*, *64*, 354-361.

Lutz, A., Slagter, H. A., Dunne, J. D. & Davidson, R. J. (2008). Attention regulation and monitoring in meditation. *Trends in Cognitive Sciences*, *12* (4), 163-169. 10.1016/j.tics.2008.01.005

McGinn, C. (1989). Can we solve the mind-body problem? *Mind*, *98* (391), 349-366.

Rosenthal, D. (1986). Two concepts of consciousness. *Philosophical Studies*, *49* (3), 329-359. 10.1007/ BF00355521

Schooler, J. W. (2002). Re-representing consciousness: Dissociations between experience and meta-consciousness. *Trends in Cognitive Sciences*, *6* (8), 339-344. 10.1016/S1364-6613(02)01949-6

—— (2015). Bridging the objective/subjective divide. In T. Metzinger & J. M. Windt (Eds.) *Open MIND*. Frankfurt a. M., GER: MIND Group.

Schooler, J. W., Smallwood, J., Christoff, K., Handy, T. C., Reichle, E. D. & Sayette, M. A. (2011). Meta-awareness, perceptual decoupling and the wandering mind. *Trends in Cognitive Sciences*, *15*, 319-326. doi/org/10.1016/j.tics.2011.05.006.

Schooler, J. W., Mrazek, M. D., Baird, B. & Winkielman, P. (2015). Minding the mind: The value of distinguishing among unconscious, conscious, and metaconscious processes. In M. Mikulincer, P. R. Shaver, E. Borgida & J. A. Bargh (Eds.) *APA handbook of personality and social psychology, Vol. 1. Attitudes and social cognition* (pp. 179-202). Washington, DC: American Psychological Association.

Schooler, J. W. & Melcher, J. (1995). The ineffability of insight. In S. M. Smith, T. B. Ward & R. A. Finke (Eds.) *The creative cognition approach* (pp. 97-134). Cambridge, MA: MIT Press.

Seli, P., Jonker, T. R., Cheyne, J. A., Cortes, K. & Smilek, D. (in press). Can research participants comment authoritatively on the validity of their self-reports of mind wandering and task engagement? *Journal of Experimental Psychology: Human Perception and Performance*

Thompson, E. (2014). *Waking, dreaming, being: Self and consciousness in neuroscience, meditation, and philosophy.* New York, NY: Columbia University Press.

Tversky, A. & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, *211* (4481), 453-458. 10.1126/science.7455683

Westfall, R. S. (1980). *Never at rest: A biography of Isaac Newton.* Cambridge, UK: Cambridge University Press.

Wiseman, R., Watt, C., Gilhooly, K. & Georgiou, G. (2011). Creativity and ease of ambiguous figural reversal. *British Journal of Psychology*, *102* (3), 615-622. 10.1111/j.2044-8295.2011.02031.x