

**ARTICLE**

# Mind-wandering: A philosophical guide

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**Abstract**

Philosophers have long been fascinated by the stream of consciousness – thoughts, images, and bits of inner speech that dance across the inner stage. Yet for centuries, such ‘mind-wandering’ was deemed private and thus resistant to empirical investigation. Recent developments in psychology and neuroscience have reinvigorated scientific interest in the stream of thought. Despite this flurry of progress, scientists have stressed that mind-wandering research requires firmer philosophical foundations. The time is therefore ripe for the philosophy of mind-wandering. Our review begins with a foundational question: What is mind-wandering? We then investigate the significance of mind-wandering for general philosophical topics, namely, mental action, introspection, and the norms of thinking and attention.

## 1 | INTRODUCTION

Philosophers have long been fascinated by the stream of consciousness—thoughts, images, and bits of inner speech that dance across the inner stage. Yet for centuries, such ‘mind-wandering’ was deemed private and thus resistant to empirical investigation. Recent developments in psychology and neuroscience have reinvigorated scientific interest in the stream of thought, leading some researchers to dub this “the era of the wandering mind” (Callard, Smallwood, Golchert, & Margulies, 2013). Despite this flurry of progress, scientists have stressed that mind-wandering research requires firmer philosophical foundations (Christoff, 2012; Christoff, Irving, Fox, Spreng, & Andrews-Hanna, 2016; Seli, Kane, Smallwood, et al., 2018; Smallwood, 2013). The time is therefore ripe for the philosophy of mind-wandering (Carruthers, 2015; Dorsch, 2014; Irving, 2016, 2018, 2019a; Irving & Thompson, 2018; Metzinger, 2013, 2015, 2018; Regis, 2013; Sripada, 2016a, 2018; Sutton, 2010). Section 2 of our review begins with a foundational question: What is mind-wandering? Section 3 then investigates the significance of mind-wandering for general philosophical topics, namely mental action (Section 3.1), introspection (Section 3.2), and the norms of thinking and attention (Section 3.3).

## 2 | WHAT IS MIND-WANDERING?

### 2.1 | Standard views in psychology

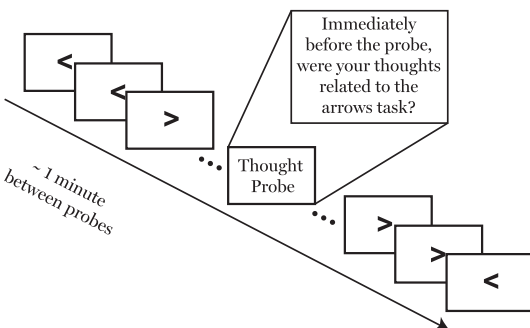
Most psychologists define mind-wandering as task-unrelated and/or stimulus-independent thought (Smallwood & Schooler, 2015). One advantage of the standard view is that it captures paradigm cases of mind-wandering. Consider a student whose mind wanders during lecture, meandering from grocery shopping, to a joke, to her upcoming camping trip. Her thoughts are (a) *unrelated to her current task* of listening to lecture and (b) *decoupled from perceptual stimuli* in the classroom. So the standard view (correctly) says that her mind is wandering. Another advantage is that the standard view is (relatively) straightforward to study empirically. Mind-wandering studies use an introspective method called 'thought sampling,' during which participants classify their experiences (e.g., as task related or unrelated) during an experiment or their daily lives (Figure 1).

Philosophers have leveled three objections against the standard definition. First, task-unrelated and/or stimulus-independent thought is an overly heterogeneous category (Christoff et al., 2016; Irving, 2016; Irving & Thompson, 2018). Consider the student whose thoughts turn inwards during lecture. Her mind might indeed wander from groceries to a joke to camping. Or alternatively, she might rigorously solve her calculus homework in her head. Or she might obsessively ruminate on a fight she just had with her friend. All of these thoughts are unrelated to the student's task – paying attention to lecture – and decoupled from perception. The standard definition therefore lumps them together as mind-wandering. Yet goal-directed and ruminative thinking seem antithetical to mind-wandering. Specifically, they lack its characteristic *dynamics*: mind-wandering *meanders* between topics, and thus contrasts with thinking that is *focused* on calculus homework or a fight.

Second, mind-wandering can be task *related* (Irving, 2016). Mind-wandering researchers characterize tasks as 'What you are doing' (Kane et al., 2007). Similarly, Mole says that tasks are 'things that the subject is in the business of doing ... making a cup of tea, following a conversation, or looking for the car keys' (Mole, 2011, p. 52). But our minds often wander to goals such as planning a camping trip or studying for an upcoming test (Klinger, 2013; Morsella, Ben-Zeev, Lanska, & Bargh, 2010). Surely, planning a camping trip or studying for a test can count as *what you are doing*, and thus as a task. Mind-wandering can therefore be task related.

Third, mind-wandering can be stimulus *dependent* (Christoff et al., 2016; Irving, Glasser, Gopnik, & Sripada, 2019; Seli, Kane, Smallwood, et al., 2018). Consider Darnell, whose mind wanders on the bus to work. He smells delicious coffee, then imagines eating breakfast, then sees an insurance advertisement and remembers to check for quotes, then laughs at a remembered joke. While Darnell's mind wanders, he perceives stimuli in his environment: he smells coffee and sees an advertisement. But this is inconsistent with the view that mind-wandering must be decoupled from perceptual inputs (Kam & Handy, 2013; Smallwood, McSpadden, & Schooler, 2007).

Although the standard view remains popular, alternative theories of mind-wandering are emerging in philosophy and psychology. Are they an improvement?



**FIGURE 1** Thought sampling in the laboratory (example). Participants perform a boring task: Press 'right' for a right arrow, and 'left' for a left arrow. At pseudo-random intervals of approximately 1 min, participants are interrupted by a 'probe' that asks them questions about their immediately preceding thoughts. Here, subjects who answer 'yes' are classified as task-unrelated and thus mind-wandering

## 2.2 | Mind-wandering as unintentional or unaware

We must distinguish mind-wandering from mental actions such as solving a calculus problem during lecture. Accordingly, two theories define mind-wandering as a *passive* mode of thought. First, Watzl (cf. Watzl, 2017, p. 134; McVay & Kane, 2010) proposes that mind-wandering is *unintentional* task-unrelated thought.<sup>11</sup> The mind-wanderer *intends* to focus on one thing – for example, lecture – and finds that his thoughts have gone astray. Contrast this with a student rigorously solving her calculus homework during lecture. That student *intends* to work on calculus, not pay attention to lecture. So her mind is not wandering.

Second, Metzinger (2013, 2015) defines mind-wandering as thought that lacks 'veto-control,' the capacity to voluntarily suspend a behavior or thought. You exercise veto control, for example, when you open your mouth to snark at your partner and then (smartly) hold back. Metzinger argues that veto control requires meta-awareness: that is, explicit knowledge that you are tokening a behavior or thought (or are about to). For you cannot voluntarily terminate a behavior you are unaware of performing. Metzinger also assumes that mind-wandering lacks meta-awareness: that is, you are never aware that your mind is wandering until after the fact. He therefore concludes that mind-wandering lacks veto control. In contrast, a student retains veto control when she works on calculus during lecture. She knows that she isn't paying attention to lecture, and could bring herself back any time – she simply chooses to keep working. So she isn't mind-wandering.

Can we define mind-wandering as task-unrelated thought that is unintentional and/or lacks veto control? Not without difficulty. Neither view completely solves the heterogeneity problem. Recall that the standard definition cannot distinguish mind-wandering from cases of rumination, such as obsessing about a fight. Rumination, a hallmark of depression, seems antithetical to mind-wandering. Rather than meander from one topic to another, rumination is inflexible and excessively stable (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Watkins, 2008). But often, people do not *intend* to ruminate and cannot disengage from their ruminative thoughts (and thus cannot exert *veto control*) (Joormann, Levens, & Gotlib, 2011; Martin & Tesser, 1996). Task-unrelated thought that is unintentional and/or lacks veto control is therefore a heterogeneous category that includes both mind-wandering and rumination.

Furthermore, these definitions exclude common cases of mind-wandering. People frequently report 'intentional mind-wandering' – that is, letting their minds wander on purpose – in the laboratory, classroom, and everyday life (Seli, Risko, & Smilek, 2016). Consider a student who's bored stiff in lecture. Rather than listen to her soporific teacher, she might intentionally let her mind wander, allowing her thoughts to meander from groceries, to a joke, to camping. But this mind-wandering is not *unintentional* task-unrelated thought.

Similarly, many participants report mind-wandering *with meta-awareness* (Christoff, Gordon, Smallwood, Smith, & Schooler, 2009; Schooler et al., 2011). For example, readers frequently reported being 'aware that your mind has drifted, but for whatever reason you still continue to read... your mind wanders and you know it all along.' (Schooler et al., 2011). But Metzinger relies on the (empirically dubious) premise that mind-wandering lacks meta-awareness to argue that we cannot veto our wandering thoughts.

One common factor of all the views we have considered is that they omit mind-wandering's *dynamics* (Christoff et al., 2016; Irving, 2016). We might therefore make progress with a dynamic definition focused on how mind-wandering meanders over time.

## 2.3 | Disunified thinking

One dynamic definition says that mind-wandering is *disunified thinking* (Carruthers, 2015, pp. 168–169; Dorsch, 2014, p. 805; O'Shaughnessy, 2003, pp. 217–219). Specifically, a stream of thoughts is wandering if and only if those thoughts are not unified under a common goal. Dorsch explains this view with an analogy between mind-wandering and physically wandering around a city (for similar analogies, see Carruthers, 2015, pp. 168–169; O'Shaughnessy,

2003, p. 217). When you wander around a city, your short-term actions are intentional: you might browse a bookshop, then buy a pastry. Yet when considered over the longer-term, your behavior is disunified, it lacks an overarching purpose. Similarly, Dorsch claims that individual wandering thoughts are intentional: you might briefly but deliberately plan your grocery shopping or camping trip. Yet over the longer-term, mind-wandering lacks an overarching purpose: you flit, disunified, from topic to topic. We think the disunity view is correct to focus on the dynamics of mind-wandering.

Yet the disunity view overgeneralizes. Consider your goal-directed thoughts on an average afternoon. Over a ten-minute period, you might start by writing a paper, then answer a quick email, then browse the headlines on ESPN, and so on. Since your thoughts are not unified under a common goal, the disunity theory classifies them as mind-wandering. This raises another problem: whether thinking counts as disunified depends on an arbitrary choice about how far we zoom out (Irving & Thompson, 2018). Consider your thoughts in the preceding example. If we look at a two-minute interval, your thoughts might be unified around the goal of writing a paper. But if we zoom out to ten minutes, you have three goals, and thus are mind-wandering. The problem is that we have no principled way to decide how far to zoom out, and thus lack principled grounds for saying whether your mind is wandering at any point in time.

## 2.4 | Unguided attention

Irving and colleagues propose that mind-wandering is *unguided attention* (Christoff et al., 2016; Irving, 2016). The view employs an action-theoretic conception of guidance (Brownstein & Madva, 2012; Frankfurt, 1978; Pacherie, 2008; Railton, 2006).

Attentional guidance involves two forms of control: proactive and regulatory (Irving, 2016, 2019b). 'Proactive control' raises the probability that one attends to goal-relevant information (Miller & Cohen, 2001). Yet proactive control isn't perfect; even the most attentive of us will briefly go off task. It's during these periods of distraction that a regulatory mechanism kicks in to bring guided attention back on task (Braver, 2012; Jacoby, Kelley, & McElree, 1999). Phenomenologically, an individual's attention is guided when he would feel pulled back, were he distracted from his current focus. Guidance explains the characteristic *dynamics* of goal-directed attention: we focus on a goal for extended periods of time because we are guided to remain there.

We can illustrate attentional guidance with an example. Consider Yifan, a student diligently focusing on lecture. Her attentiveness manifests in two ways. First, she is typically on topic (exerting proactive control). Second, when Yifan gets momentarily distracted by a student texting beside her, she returns to lecture after a moment of frustration (exerting regulatory control). Yifan therefore remains focused on lecture for an extended period of time.

Mind-wandering lacks the regulatory control necessary for guidance (Irving, 2016, 2019b). When a student's mind wanders from groceries to camping, for example, she does not *feel pulled back*. Rather, she drifts on unchecked. We can thus explain the characteristic *dynamics* of mind-wandering: it meanders from topic to topic because it is not guided to remain in place.

This theory has two advantages. First, it solves problems with previous theories of mind-wandering (Section 2.4.1). Second, the philosophical theory can generate an empirical research program (Section 2.4.2).

### 2.4.1 | Solving problems

The unguided attention theory solves six problems with previous accounts of mind-wandering.

1. Mind-wandering is distinct from goal-directed task-unrelated thought, such as solving a calculus problem during lecture. Goal-directed thought is guided, mind-wandering is not (Irving, 2016; Irving & Thompson, 2018).

2. Mind-wandering is distinct from rumination, which is subject to *affective guidance* (Christoff et al., 2016; Irving, 2016; Irving & Thompson, 2018; Watzl, 2017). Rumination is guided via affective versions of proactive and regulatory control. Consider someone who is obsessing over a fight. He will likely attend to affectively salient information about the fight (exerting proactive control). Furthermore, if he were momentarily 'distracted' by groceries, he would feel *pulled back* to the fight. His affective state thus exerts *regulatory* control to keep him focused on emotionally salient information. Affective guidance explains rumination's characteristic dynamics: we rigidly focus on an affectively salient topic because we are guided to remain in place.
3. Unguided attention can be *related* to tasks such as planning a camping trip (Irving, 2016; Irving & Thompson, 2018). Our minds often wander to tasks, at least for a moment. Yet because we are not guided to *remain* on task, we quickly wander onwards.
4. Unguided attention can wander to perceptual stimuli such as the smell of coffee or an advertisement on a bus. So long as one is not guided to remain on these perceptual states, they can be part of an episode of mind-wandering.
5. Unguided attention can be intentional and meta-aware. During a soporific lecture, a student may intentional decide to let her mind wander. Yet after this initial decision, she doesn't choose *what* to think about, exerting no guidance over *where* her mind wanders. She meanders unguided from groceries to camping to a joke. Her mind is therefore wandering (Irving, 2019b). Furthermore, the student might be *aware* that her mind is wandering, and not stop herself or guide her attention to any particular topic. Contra Metzinger, then, mind-wandering is compatible with meta-awareness (Irving, 2016).
6. Unlike the disunity view, whether attention is unguided does not depend on how far we zoom out (Irving & Thompson, 2018). Consider a ten-minute period where you write a paper, then answer an email, then browse headlines on *ESPN*. Your thoughts are not unified for ten minutes. But so long as your attention is guided to each goal, your mind is not wandering.

## 2.4.2 | Interdisciplinary model

The philosophical view of mind-wandering as unguided attention has begun to inform scientific research. Specifically, Christoff, Irving and colleagues proposed a dynamic neuroscientific model of mind-wandering (Andrews-Hanna, Irving, Fox, Spreng, & Christoff, 2018; Christoff et al., 2016). On this model, attentional guidance<sup>22</sup> arises due to the interactions of large-scale neural networks, especially the medial-temporal default subnetwork (DN<sub>MTL</sub>). The DN<sub>MTL</sub> is a set of regions including the hippocampus and para-hippocampus that (re)activates episodic memories and imaginings (Moscovitch, Cabeza, Winocur, & Nadel, 2016; Teyler & DiScenna, 1986). During goal-directed and affectively guided attention, control and salience networks exert top-down constraints on the DN<sub>MTL</sub>. As a result, the DN<sub>MTL</sub> generates a stream of memories and imaginings that are *focused* on one's goal or salient topics. During mind-wandering, constraints from control and salience networks are relatively weak. Thus, the DN<sub>MTL</sub> is free to generate a meandering stream of pseudorandom episodic memories and imaginings (mind-wandering) (Christoff et al., 2016).

Christoff et al.'s (2016) model clarifies the role of mind-wandering in clinical conditions. Psychologists have implicated excessive task-unrelated thought in conditions ranging from attention deficit hyperactivity disorder (ADHD) (Seli, Smallwood, Cheyne, & Smilek, 2015; Sonuga-Barke, Cortese, Fairchild, & Stringaris, 2016) to depression (Berman et al., 2010; Ottaviani et al., 2014) to obsessive-compulsive disorder (OCD) (Seli, Risko, Purdon, & Smilek, 2017). Yet these conditions are associated with disparate forms of thinking. ADHD patients often struggle to stabilize their thoughts whereas patients with depression and OCD often struggle to disengage from a single topic (Christoff et al., 2016). By studying task-unrelated thought, we therefore gain little insight into the *differences* between conditions. Rather, clinical differences are reflected in the *dynamics* of thought. ADHD is associated with excessively weak guidance of thoughts, and thus excessive mind-wandering. In contrast, obsessions and rumination

are associated with excessive *affective* guidance of thought, and thus excessively stable thinking. Philosophical clarity about the stream of thought therefore gives us insight into disordered minds (Ratcliffe, 2014).

Philosophically informed thought sampling methods can also *measure* unguided thought. Mills, Raffaelli, Irving, Stan, and Christoff (2017) trained participants to classify their immediately preceding thoughts when interrupted by a cellphone app. Specifically, participants were asked whether their thoughts were (a) task unrelated, (b) stimulus independent, and (c) dynamically unguided. Mills and colleagues found that unguided thought was orthogonal to task-unrelated or stimulus-independent thought. Thus, the dynamic theory of mind-wandering is empirically separable from the standard views. Mills and colleagues also found that self-reports of unguided thought track an important behavioral variable, happiness, which suggests that there is a psychologically real distinction between guided and unguided thought (Section 3.3).

Experimental philosophy also supports the unguided attention theory. Irving et al. (2019) experimentally tested which theory of mind-wandering best captures the folk concept. In three multifactorial studies, participants ( $n=822$ ) read vignettes that describe a character's thoughts and rated whether her mind was wandering. Irving and colleagues manipulated features relevant to four theories of mind-wandering: (a) task-unrelated thought; (b) unintentional thought; (c) stimulus-independent thought; and (d) unguided thought. Compared to other theories, the unguided thought theory explained between four and twenty times more variance in participants mind-wandering ratings. Furthermore, participants ( $n = 153$ ) contrasted mind-wandering with ruminative thinking, which is consistent only with the unguided attention view. The dynamic view best coheres with the folk concept.

By defining mind-wandering as unguided attention, we capture data from analytic philosophy, neuroscience, thought sampling, and experimental philosophy. We cannot capture the wandering mind without a theory of why it meanders over time.

## 2.5 | Family resemblance theory

We have considered six theories, which define mind-wandering as follows: (a) task-unrelated thought, (b) stimulus-independent thought, (c) unintentional thought, (d) unaware thought, (e) disunified thought, and (f) unguided thought. Family resemblance theorists deny that these six features (or any others) are necessary or sufficient for mind-wandering (Metzinger, 2018; Seli, Kane, Metzinger, et al., 2018; Seli, Kane, Smallwood, et al., 2018). Rather, they argue that mind-wandering is a family resemblance concept (Rosch & Mervis, 1975; Wittgenstein, 1953) with many characteristic features (including the above six theories). Streams of thought with more of these features are better exemplars of mind-wandering than streams of thought with less features.

Think of the student during lecture, who finds her thoughts meandering from groceries to camping to a joke. Her thinking is a paradigm case of mind-wandering: task unrelated, stimulus independent, unintentional, unaware, disunified, and unguided. Contrast this with a student who decides to work on calculus in her head during lecture. Her mind is wandering *a little bit*, because her thoughts are task unrelated and stimulus independent. But her thinking isn't a paradigm case of mind-wandering, because it is guided, intentional, and aware.

Proponents of the family resemblance theory argue that it is the *only* way to resolve disagreement over how to define mind-wandering:

Neither logic nor empirical evidence can adjudicate among proposed definitions ... Suppose another research group advocated a conflicting definition. How should a field taking a necessary-features definition approach, which requires one and only one reductive definition, proceed? ... These crucial problems with definition approaches ... prompted us to adopt the family-resemblances framework. (Seli, Kane, Metzinger, et al., 2018, p. 960)

This argument rests on a dubious assumption: there is no way to adjudicate definitional debates. But there are many methods. We prefer a version of inference to the best explanation. Step 1 is to propose competing theories of a phenomenon. We can start with the six first-order theories of mind-wandering mentioned above. Step 2 is to gather data about the phenomenon, which can include (at least) scientific data, thought experiments, logical inconsistencies, conceptual connections, experimental philosophy, ordinary language, and phenomenology (Box 1). Step 3 is to ask which theory (if any) provides the best explanation of the available data. If one theory provides the best explanation, we should adopt that theory. If multiple theories provide equally good explanations, we should either (a) search for a new theory or (b) adopt the family resemblance framework.

We leave open the possibility that the family resemblance theory is true (though we currently favor the unguided attention theory). However, it is far too early in the dialectic to reach that conclusion. We must first thoroughly test whether any first-order theory is successful, in that it provides the best explanation for our data about mind-wandering. Only then, if all else fails, should we accept that mind-wandering is a family resemblance concept. At this early stage in a burgeoning field, all else has not yet failed. We still have far too many theories to consider.

Our discussion bears on the broader question of whether we should adopt family resemblance theories of psychological phenomena such as attention (Mole, 2011, chap. 1; Wu, 2014, chap. Introduction) and psychiatric conditions (see Murphy, 2017, sections 2–3 for a review). We contend that there is no general answer to the question. Rather, it depends on whether one first-order theory best explains the phenomenon in question. If so, we should adopt that theory (and thereby reject a family resemblance framework). If not, we should either (a) search for a new theory or (b) adopt a family resemblance framework.

### 3 | THE PHILOSOPHICAL SIGNIFICANCE OF MIND-WANDERING

We now turn to the significance of mind-wandering for general philosophical topics, namely, mental action (Section 3.1), introspection (Section 3.2), and the norms of attention and thinking (Section 3.3).

#### 3.1 | Mind-wandering and mental action

One can learn about action through its opposite: passivity. Mind-wandering is therefore a valuable case for the philosophy of action, because it is paradigmatically passive. Indeed, philosophers since Hobbes (1651, pp. 20–21) *define* mind-wandering in contrast to mental actions like reasoning and planning (Dorsch, 2014; Irving, 2016; Irving & Thompson, 2018; Metzinger, 2013, 2015, 2018; Regis, 2013; Sripada 2016a, 2018; Watzl, 2017).

Metzinger uses mind-wandering to argue against the 'myth of cognitive agency' (Metzinger, 2013). According to this myth, most thinking is active. One could draw this conclusion from the kinds of thinking that receive philosophical attention, such as mental actions (e.g., O'Brien & Soteriou, 2010), planning (e.g., Bratman, 1987), and reasoning (e.g., Broome, 2013; Harman, 1986; Jackson & Jackson, 2019). But mind-wandering occupies up to half of our waking thoughts (Kane et al., 2007; Killingsworth & Gilbert, 2010; Mills et al., 2017). Since mind-wandering is passive, Metzinger concludes that mental agency is far less pervasive than philosophers assume.

Irving (2016) argues that mind-wandering raises puzzles about mental action. Mind-wandering seems paradigmatically passive. Yet empirical research suggests that mind-wandering can be active in two ways. First, participants frequently report *intentional* mind-wandering (Section 2.2). Second, mind-wandering is active in a Davidsonian sense: it is *causally motivated* by goals (Davidson, 1963; Irving, 2016). Giving subjects a geography quiz, for example, causally motivates their minds to wander to geography (Morsella et al., 2010). If mind-wandering can be intentional and motivated, how is it passive?

From these puzzles, Irving concludes that mind-wandering occupies a middle ground between mental action and passivity. In one sense, mind-wandering is always passive because it is *unguided* (Section 2.4). Yet mind-wandering

**BOX 1 Data for definitional debates**

Philosophers and cognitive scientists are in the midst of a debate about how to define 'mind-wandering.' We can consider (at least) seven kinds of data.

**Scientific data:** Theories should explain existing empirical results and generate predictions for future research.

Theories of mind-wandering should explain its (a) behavioral consequences, (b) neural correlates, and (c) relationship to clinical conditions, and so on. One empirical desideratum is that our theory should pick our unified phenomenon: For example, streams of thought with similar relationships to behavior, the brain, and clinical conditions.

**Case method (thought experiments):** Philosophers use thought experiments to test the boundaries of a concept. For example, we can imagine an experience that counts as mind-wandering on view X, but not Y. If this is an intuitive case of mind-wandering, the data supports view X. If not, the data supports view Y. Less simplistically, the case method can help us refine theories to rule out counter-examples.

**Experimental philosophy (X-Phi):** Experimental philosophy can also test the boundaries of concept. Such 'experimental explication' (Schupbach, 2017) or 'method of cases 2.0' (Machery, 2017, chap. 7) avoids pitfalls of the standard armchair case method. While experimental philosophers typically explicate classic philosophical concepts such as *responsibility*, *belief*, or *explanation*, these methods can also be used to explicate concepts that appear in folk and scientific psychology, such as *innateness* (Griffiths, Machery, & Linquist, 2009) or *mind-wandering* (Irving et al., 2019). Specifically, experimental results suggest that the unguided attention theory captures the folk concept of mind-wandering far better than other theories (Section 2.4.2). We use both experimental and armchair methods of conceptual analysis and believe that they are complementary. Since armchair and experimental methods have independent sources of error, agreement between these methods is strong support for a conceptual analysis. A full defense of this view is unfortunately outside the bounds of this paper.

**Ordinary language philosophy:** Theories should capture how *terms* are used in ordinary language. Ordinary language philosophy complements the case method and experimental philosophy, since linguistic patterns can reveal features of common-sense concepts that participants cannot explicitly report on. One can test linguistic intuitions from the armchair or by empirically analyzing large-scale linguistic corpora. For example, one corpora analysis suggests that *intentional* mind-wandering is a core case of mind-wandering (Irving et al., 2019).

**Phenomenology:** Theories should cohere with detailed descriptions of actual experiences (Hurlburt & Heavey, 2015; Varela, 1996). One variant of this method uses experienced meditators, who are trained to report on fine-grained details of experience (Ellamil et al., 2016; Hasenkamp, Wilson-Mendenhall, Duncan, & Barsalou, 2012; Thompson, 2009). Another variant draws phenomenological data from descriptions of experience in literature such as Virginia Woolfe (Cuddy-Keane, 2017).

**Logical inconsistencies:** *Ceteris paribus*, theories should not have logically inconsistent commitments. For example, Murray and Krasich (2019) argue that the traditional definition of intentional task-unrelated thought is logically inconsistent and thus that we must either (a) deny that intentional mind-wandering is possible or (b) deny that mind-wandering is task-unrelated thought.

**Conceptual connections:** Concepts don't exist in a vacuum, and instead are defined by their connections with other concepts. By considering these connections, we can advance debates that appear to be 'merely linguistic' (Chalmers, 2011). For example, philosophical debates over free will and personal identity hinge on the connections to moral responsibility. Similarly, we should capture the connections between mind-wandering and mental action, passivity (Section 3.1), normativity (Section 3.3), and responsibility (Section 3.3.2).



can be active in other ways. During intentional mind-wandering, you *intentionally decide to initiate* an unguided stream of thoughts (Irving, 2019b). During motivated mind-wandering, goals *proactively control* your thoughts: they increase the likelihood that your mind wanders to goal-relevant information (Section 2.4). Yet even motivated mind-wandering lacks the *regulatory* component of guidance. For if your mind wandered away from your goal, you would not be guided back (Irving, 2016; Section 2.4).

Regardless of whether you accept the details of existing philosophical theories, their big-picture point remains. Mind-wandering can teach us much about mental action.

### 3.2 | Mind-wandering and introspection

Epistemologists have been skeptical of introspection's reliability for both theoretical (Boghossian, 1989; Srinivasan, 2015; Williamson, 2000) and empirical (Doris, 2015; Schwitzgebel, 2008) reasons. If we cannot gain knowledge from introspection, mind-wandering research is in trouble. For the field relies on an introspective method called 'thought sampling' (Section 2).

Due to similar concerns, mind-wandering researchers have attempted to use machine learning to move beyond introspection (e.g., Bixler & D'Mello, 2016; Faber, Bixler, & D'Mello, 2018; Mittner et al., 2014). The idea is to train an algorithm to identify mind-wandering on the basis of neuroimaging or behavioral data (e.g. eye movements). Yet even these purportedly objective methods are ultimately justified via introspection (Irving, 2018; cf. Windt, 2015, chap. 3 for a similar argument about dream research). For researchers require introspective self-report data to *train* the algorithm and *test* whether it is accurate. Philosophers have appealed to similar cases to argue that mind-wandering research depends on introspection: studies must either use introspection or use a method that is justified by introspection (Irving, 2018; Windt, 2015).<sup>33</sup>

Irving (2018) identifies a principled reason why mind-wandering research is especially dependent on self-report. Psychologists typically study cognitive processes by having subjects perform *voluntary tasks* that activate those processes. But because mind-wandering is passive, no voluntary task activates mind-wandering.<sup>44</sup> So researchers need 'task-free' methods to measure the wandering mind. Introspective self-report is one such method. This explains why self-report is especially central to fields that study passive experiences such as dreaming and mind-wandering.

We can draw (at least) three different conclusions from the methodological role of introspection in mind-wandering research. First, the field is on shaky epistemic foundations. Second, the success of mind-wandering research may be a counterexample to general skepticism about introspection. Introspection may be reliable under carefully specified conditions, such as when reports are given shortly after an experience. Indeed, we may look to thought sampling research for insights about *which* methods are reliable.

Third, self-report may be a methodological starting point on which mind-wandering researchers iteratively improve. One historical example of this kind of iterative progress concerns the measurement of temperature (Chang, 2004). Scientists first developed thermoscopes that could compare the temperature of two phenomena (and thus ordinarily rank temperatures). Although scientists used subjective temperature judgments to validate thermoscopes, these devices yielded more precise and consistent temperature comparisons than subjective reports. Scientists subsequently built on thermoscopes to develop numerical thermometers that measured degrees of hot and cold (and thus furnished a cardinal scale for temperature). Chang (2004, chaps. 1 and 5) says that the history of temperature is one of 'iterative progress,' where each new method 'enriches' an old method on which it is based.

Similarly, new methods in mind-wandering research may *enrich* the introspective methods on which they are based. Consider one major drawback of probe-caught thought sampling (Section 2.2). Thought probes may interfere with normal mind-wandering, because they force participants to frequently interrupt and introspect on their train of thoughts. Objective methods like machine learning could ameliorate this problem. Think of an algorithm that is trained to classify (self-reported) mind-wandering on the basis of eye gaze (Bixler & D'Mello, 2016; Faber et al., 2018). Once trained, this classifier could then detect mind-wandering during periods where participants are *not*

reporting on their thoughts. So, we could (in principle) measure mind-wandering without the interference of thought probes. This example illustrates a general epistemic point. Introspective thought sampling no doubt has epistemic limitations. Yet methods *based* on thought sampling may transcend those limits. Even if mind-wandering research begins with introspection, it needn't stop there.

### 3.3 | Mind-wandering and normativity

Philosophers have just begun to ask two normative questions about mind-wandering. First, is mind-wandering normatively good or bad? Second, are we responsible for the normative consequences of mind-wandering?

#### 3.3.1 | Is mind-wandering good or bad?

Aquinas held that mind wandering is the 'daughter sin' of sloth (1273, *Ila Ilae* q.35 a.4). James claimed that the ability to restrain mind-wandering is 'the very root of judgement, character, and the will' (1890, Vol. 1, p. 424). Psychologists have dubbed mind wandering as a 'curse' (Hasenkamp, 2013) and studied its ill effects on learning (Smallwood, Fishman, & Schooler, 2007), driving (Galéra et al., 2012; He, Becic, Lee, & McCarley, 2011; Yanko & Spalek, 2014), mood (Killingsworth & Gilbert, 2010; Smallwood et al., 2009), and mental health (Section 2.4.2; Shin et al., 2015; Robison, Gath, & Unsworth, 2017). All these scholars characterize mind-wandering as normatively costly, as an ill to avoid.

Yet it is unclear whether all these costs are attributable to mind-wandering. For example, Killingsworth and Gilbert (2010) influentially argue that 'a wandering mind is an unhappy mind' because task-unrelated thought is associated with decreased self-reported happiness. However, Mills et al.'s (2017) philosophically inspired methods revealed that unhappiness is driven by *guided* task-unrelated thought (e.g. goal-directed thinking and rumination). If mind-wandering is *unguided* attention (Section 2.4), it may not lower happiness after all. Nuanced philosophical theories (Section 2) can therefore shape the normative discourse about mind-wandering.

Cognitive scientists have also argued that mind-wandering can be normatively good, insofar as it facilitates creativity (Agnoli, Vanucci, Pelagatti, & Corazza, 2018; Baird et al., 2012; Christoff et al., 2016; McMillan, Kaufman, & Singer, 2013) and mental exploration (Irving, 2019a; Mittner, Hawkins, Boekel, & Forstmann, 2016; Sripada, 2018). Sripada (2018) has the best developed philosophical, computational, and neural model of mind-wandering's benefits. He conceptualizes mind-wandering as a form of mental *exploration* that allows us to consider unusual parts of conceptual space that we overlook during focused, goal-directed, thinking. One should therefore balance between exploratory mind-wandering and 'exploitative' goal-directed (Sripada, 2018) or ruminative thinking. Future research should incorporate such an explore-exploit norm into a philosophical theory of the norms of attention (Irving 2019a; Siegel, 2017, chap. 9).

#### 3.3.2 | Responsibility for mind-wandering

We blame distracted drivers whose mind-wandering leads to accidents. We praise scholars who come to insights while their minds wander. Yet it is unclear how to square these patterns of praise and blame with the *passivity* of mind-wandering (Section 3.1). How can we be *responsible* for the consequences of a passive happening (Irving, 2019a)?

Philosophers have yet to grapple with this difficult question, but three potential answers are promising. First, we are responsible for mental happenings that issue from our deep evaluative attitudes (Smith, 2005; Sripada, 2016b). We might blame a distracted driver because his mind-wandering reflects his disregard for safety. Or we might praise a scholar's insight because her mind-wandering reflects a preoccupation with research.

Second, we are responsible for inattention when it reflects a failure to exercise control in circumstances where we are *capable* of exercising control (Murray, Murray, Stewart, Sinnott-Armstrong, & De Brigard, 2018). We might blame a distracted scholar because he could have exercised control to stop mind-wandering. Yet it's less clear why we would praise a scholar's insight *because* it comes from a failure of control.

Third, we are responsible for mind-wandering when it is *intentional*. We might blame the distracted driver because he let his mind wander to relieve boredom. Or we might praise a scholar's insight because she went for a walk and let her mind wander to overcome an impasse.

It's not clear which of these three views (if any) is correct. But mind-wandering opens intriguing new questions about responsibility for our thoughts.

## 4 | CONCLUSIONS

Philosophers sometimes gravitate to mature areas of psychology such as vision research. By comparison, mind-wandering research is embryonic. Philosophers who focus on such a young field lose out in some ways: our theories are hostage to empirical questions that remain unanswered; we cannot appeal to the received definition of mind-wandering, because there is little agreement on *what mind-wandering is*. Yet we gain the thrill of the frontier. Whereas others refine and clarify extant territory, philosophers of mind-wandering can help chart a new area of cognitive science. We can develop new theories and work with scientists to test them. We can discover new ways that mind-wandering bears on old philosophical questions. Frontier life can be lonely and hard; but it is fun.

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## ENDNOTES

- <sup>1</sup> Watzl (2017, p. 134) holds that mind-wandering engages the executive control system to actively decouple from perceptual stimuli. Yet one does not *intend* to decouple in this way.
- <sup>2</sup> The neural model refers to 'constraints' on attention, rather than guidance. This is meant to remain theoretically neutral on whether all constraints on attention involve the regulatory control characteristic of guidance. Irving's (2016, 2019b) philosophical theory is therefore a determinate version of his neuroscientific model (Christoff et al., 2016).
- <sup>3</sup> Irving denies Windt's strong claim that self-report is methodologically *necessary* for dream or mind-wandering research. Yet he maintains that dream and mind-wandering research depend on self-report more than other areas of cognitive psychology.
- <sup>4</sup> Irving claims that no voluntary task activates mind-wandering. Yet subjects regularly report intentional mind-wandering: letting their minds wander on purpose (Section 2.2). Might intentional mind-wandering be a *task* that activates mind-wandering? This difficult philosophical question (Murray & Krasich, 2019) has implications for both action theory (Irving, 2019b) and research methods.

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