

# Is the wandering mind a planning mind?

Frederik Tollerup Junker<sup>1,2</sup>  | Thor Grünbaum<sup>1,2,3</sup>

<sup>1</sup>Section for Philosophy, Department of Communication, University of Copenhagen, Copenhagen, Denmark

<sup>2</sup>CoInAct Research Group, University of Copenhagen, Copenhagen, Denmark

<sup>3</sup>Department of Psychology, University of Copenhagen, Copenhagen, Denmark

## Correspondence

Frederik Tollerup Junker, Section for Philosophy, Department of Communication, University of Copenhagen, Karen Blixens Plads 8, DK-2300 Copenhagen, Denmark.

Email: [ftj@hum.ku.dk](mailto:ftj@hum.ku.dk)

## Funding information

Carlsbergfondet, Grant/Award Number: CF22-1111

Recent studies on mind-wandering reveal its potential role in goal exploration and planning future actions. How to understand these explorative functions and their impact on planning remains unclear. Given certain conceptions of intentions and beliefs, the explorative functions of mind-wandering could lead to regular reconsideration of one's intentions. However, this would be in tension with the stability of intentions central to rational planning agency. We analyze the potential issue of excessive reconsideration caused by mind-wandering. Our response resolves this tension, presenting a model that aligns the roles of mind-wandering in planning with empirical evidence and the sustained stability of intentions.

## KEYWORDS

belief, deliberation, intention, mind-wandering, planning, rationality

## 1 | INTRODUCTION

Recent empirical work on mind-wandering suggests that it might have various functional roles, including in autobiographical planning (Baird et al., 2011; Klinger, 2013; Stawarczyk et al., 2011, 2013) and creative problem-solving (Baird et al., 2012; Fox & Beaty, 2019; Gable et al., 2019; Ruby et al., 2013). This has led some to suggest that mind-wandering might be an explorative process, allowing agents to explore new and potentially better opportunities (Sripada, 2018) or to search for more rewarding goals when the value of current goals is expected to be low (Shepherd, 2019). In this article, we review recent work on the functions of mind-wandering and develop a novel account of its role in planning. Our account will be motivated partly by philosophical theorizing and partly by empirical work.

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Our starting point will be the suggestion that mind-wandering has an explorative function. If mind-wandering often involves switching from exploiting existing goals to an explorative mode of thought where new goals are assessed in the mind, it might involve some process in which current intentions are evaluated and possibly discarded. Add to this the observation that mind-wandering is ubiquitous. According to some estimates, we spend up to half of our waking hours mind-wandering (Killingsworth & Gilbert, 2010). This raises the possibility that reconsideration of one's intentions happens regularly. Yet, this conflicts with a central assumption of the influential *planning theory of intention* (henceforth, PTI; Bratman, 1987) according to which intentions remain relatively stable over time and reconsideration should be rare.

According to PTI, future-oriented intentions are partial plans of action that play fundamental roles in deliberation and help coordinate our projects over time and with other agents. By committing ourselves to action in advance, we are able to make rational decisions in situations where we have too little time to deliberate, or it is too costly to do so. If this picture is correct, it helps explain how planning agents can make the best possible use of finite time and limited cognitive resources. But for this to work, the agent's prior intentions must remain relatively stable over time, that is, they must resist reconsideration. This we will refer to as the *intention stability assumption*. An agent that regularly reconsiders would likely tend to give up their intentions before the time to act on them arrives and so would have little to gain from committing themselves in advance compared to simply deliberating about what to do immediately before acting. Worse still, regular reconsideration risks undermining the benefits of committing and sticking to long-term projects and being reliable and predictable collaborators. To obtain these benefits, we trade off flexibility for stability. The worry is that explorative mind-wandering might introduce too much flexibility.

The aim of the article is to discuss the proper characterization of the role of mind-wandering in planning. In Section 2, we introduce the hypothesis that mind-wandering has an explorative function. In Section 3, we show that if this implies that mind-wandering leads to regular reconsideration, it is in tension with the PTI. In Section 4, we show that reconsideration is not the only planning-related function attributable to mind-wandering and in Section 5, we use this analysis to argue that mind-wandering does not lead to excessive reconsideration. In Section 6, we discuss how mind-wandering might alter our stock of beliefs and whether this makes it rational to regularly reconsider one's intentions. We argue that under certain models of rational formation and revision of intentions and beliefs, mind-wandering is unlikely to make regular reconsideration rational. Finally, in Section 7, we discuss the relationship between mind-wandering and active deliberation and explain how they are distinct despite sharing certain functions such as attitude change.

## 2 | MIND-WANDERING AS MENTAL EXPLORATION

Some might find surprising the proposal that mind-wandering has a goal-directed dimension. The extent of one's surprise might depend on one's notion of mind-wandering. While we remain uncommitted to any particular conception and operationalization of mind-wandering in this article, we rely mainly on empirical studies that operationalize mind-wandering as task-unrelated and/or stimulus-independent thought. It remains to be seen exactly how these approaches relate to alternative operationalizations, such as freely-moving thought (Mills et al., 2018) informed by the dynamic framework of thought (Christoff et al., 2016). Proponents of the dynamic framework

(Christoff et al., 2016; Irving, 2016, 2021) sometimes emphasize the difference between mind-wandering, a relatively unconstrained and freely-moving mode of thought, and planning, a more constrained, deliberate, and goal-directed mode of thought. We suggest that the border between these modes of thought is not quite so categorical in that that mind-wandering might make certain contributions to planning and deliberation without itself being highly constrained or deliberate.

Why should we think that mind-wandering plays a role in planning? Growing evidence suggests that rather than being a mere failure to control our thoughts, mind-wandering can be a strategy. Studies show that our thoughts frequently wander to information that is future-oriented, self-related, and goal-relevant thus potentially allowing us to anticipate personally relevant future goals (Baird et al., 2011; Stawarczyk et al., 2011, 2013). Mind-wandering can be swiftly and strategically modulated in anticipation of changes in task demands (Seli et al., 2018) and improve performance on social problem-solving (Ruby et al., 2013) and creative thinking tasks (Baird et al., 2012; Fox & Beaty, 2019; Gable et al., 2019). Hence, sometimes the best use of our cognitive resources (e.g., attention, working memory, and executive control) might be to let our minds wander.

Mind-wandering is also linked to episodic thought, that is, the ability to reconstruct events from one's personal past and to imagine counterfactual and possible future scenarios. Both mind-wandering and the various forms of episodic thought have self-generated content and activate the default mode network (Fox et al., 2015; Smallwood & Schooler, 2015). According to recent work, we flexibly recombine information from past experiences to construct simulations of what could have happened in the past or what may happen in the future (De Brigard, 2014; Schacter et al., 2007). Episodic simulation seems to be implicated in far-sighted decision-making, emotion regulation, prospective memory, and spatial navigation (Schacter et al., 2015, 2017). During mind-wandering, we also tend to generate episodic simulations (Baird et al., 2011; Stawarczyk et al., 2011, 2013). Other findings show that when coupled with the frontoparietal control network, the default mode network supports autobiographical planning, that is, the ability to identify and organize the steps needed to arrive at a certain personal future event (Spreng et al., 2010), and that mind-wandering shows similar coupling between the default mode network and executive areas (Fox et al., 2015). Together, these findings make it plausible that mind-wandering has mechanisms and functions in common with other kinds of episodic thought, including a role in planning.

But do the benefits of mind-wandering outweigh its costs? Studies show that mind-wandering can negatively affect performance on tasks that require monitoring and encoding of immediate input (e.g., comprehension during reading and lectures) and demanding tasks that require general intellectual functioning and executive control (e.g., sitting exams; Smallwood & Schooler, 2015). To reduce its costs, mind-wandering should be regulated in a context-dependent manner (Smallwood & Andrews-Hanna, 2013; Smallwood & Schooler, 2015), making it more common in non-demanding contexts and less common in tasks that require focused attention. This pattern is borne out by the evidence (Konu et al., 2021; Mulholland et al., 2023; Smallwood et al., 2021; Turnbull et al., 2019) with lower rates of mind-wandering during undemanding tasks in individuals with higher working memory capacity (Levinson et al., 2012). Moreover, the content of mind-wandering should tend to be future-oriented to allow agents to anticipate and plan for the future rather than past-directed which is associated with negative mood (Killingsworth & Gilbert, 2010; Smallwood & Schooler, 2015). These are exactly the patterns we find (Baird et al., 2011; Stawarczyk et al., 2011, 2013) with a stronger prospective bias in individuals with higher working memory capacity (Baird et al., 2011).

In sum, mind-wandering likely plays a significant and occasionally adaptive role in cognition, including in processes having to do with planning. One way to capture this is to think of mind-wandering as a kind of mental exploration. We might sometimes switch to mind-wandering to explore new options, because it is not always optimal to continue exploiting the same known options. That is, there might exist an *exploration–exploitation tradeoff* between mind-wandering and goal-directed thinking.

One such account comes from Joshua Shepherd (2019). Shepherd builds on the *expected value of control* theory of cognitive control according to which the cognitive control system determines how much control to exert toward specific goals based on a rational cost–benefit analysis (Shenhav et al., 2017). Specifically, the cognitive control system tries to estimate which package of control signals (e.g., dictating what to attend to and how intensely) has the highest expected value of control, that is, strikes an optimal balance between expected gains (e.g., reward rate) and expected cost (including intrinsic costs to exerting control and opportunity costs of pursuing some strategies over others). According to Shepherd, the optimal package of control signals sometimes causes a switch to exploration, that is, a search for new and better goals, and sometimes *mental* exploration (e.g., querying memory) is deemed more cost-effective than exploring the environment.

Shepherd proposes that the function of mind-wandering might be such mental exploration: When the current goal is deemed insufficiently rewarding, the cognitive control system initiates a search for a new, more rewarding goal. Shepherd limits his discussion to unintentional mind-wandering, which he describes as “episodes of mind-wandering that are neither initiated nor governed by any reportable intention of the agent” (p. 2) and posits that the agent is not conscious of the cognitive control mechanism directing the content of their stream of consciousness in a different direction. This is in line with research suggesting that mind-wandering is characterized by a lack of meta-awareness, that is, awareness of the current contents of one’s stream of consciousness, including that one’s mind is wandering (Smallwood, 2013; Smallwood & Schooler, 2015). Shepherd allows that mind-wandering might sometimes be completely unguided or guided in other ways (e.g., by affectively salient stimuli or other distractors) and sometimes happen consciously. Yet, even when mind-wandering episodes are unguided, the cognitive control system should, Shepherd suggests, be able to commandeer them for guided mental exploration when a valuable goal becomes salient.

A similar proposal has been made by Chandra Sripada (2018). According to Sripada, mind-wandering has the explorative function of increasing informational stores and potentially open up new opportunities. He proposes three possible accounts of the switching mechanism. First, mind-wandering might be the default state, which the mind switches to when goal-directed thinking is not required. Second, the brain might be wired to oscillate between wandering and goal-directed states at an appropriate rate to reap the benefits of each and avoid being stuck in either. And third, it might be that goal-directed thinking exhibits diminishing marginal utility over time, because after a certain amount of time, additional efforts are expected to be increasingly unlikely to yield additional gains. Thus, at some point, it becomes favorable to switch to mind-wandering to generate new information and creative insights. The agent might find it increasingly effortful to continue with goal-directed thinking and become increasingly prone to switch to mind-wandering which is experienced as less effortful. Like Shepherd, Sripada posits that the mechanisms leading to explorative mind-wandering are unconsciously and unintentionally implemented.

### 3 | EXPLORATIVE MIND-WANDERING AND RECONSIDERATION

While recent research on mind-wandering and related mental phenomena supports the hypothesis that mind-wandering is involved in planning, it is not clear how it interfaces with philosophical work on planning. To close this gap, we propose an interpretation of explorative mind-wandering from the perspective of rational planning agency. We begin by considering the possible connection between explorative mind-wandering and reconsideration of one's practical commitments and intentions.

According to Shepherd (2019), mind-wandering functions as a search for new and better goals. A goal can be understood as something the agent *intends to achieve*. One implication of this search might therefore be that the agent opens up the question about whether to do as previously intended, that is, she comes to *reconsider* her prior intention. Sripada's (2018) account can be interpreted similarly. On his account, mind-wandering can increase informational stores to potentially open up new opportunities. Again, we might say this process could lead the agent to open up the question of whether to act as previously intended, that is, to reconsider prior intentions. If explorative mind-wandering does indeed lead to reconsideration, this could have profound implications for rational planning agency. Specifically, if explorative mind-wandering leads to regular reconsideration, this would conflict with the intention stability assumption of the PTI. We might state the problem as follows:

#### *The problem of excessive reconsideration*

1. Mind-wandering has an explorative function.
2. Explorative mind-wandering can lead to reconsideration (*assumes 1*).
3. If explorative mind-wandering happens regularly, then reconsideration happens regularly (*assumes 2*).
4. If reconsideration happens regularly, then the intention stability assumption of the PTI is false (*from the definition of intention stability in the PTI*).
5. Explorative mind-wandering happens regularly (*assumes 1*).
6. Reconsideration happens regularly (*from 3 and 5*).
7. *Conclusion*: The intention stability assumption of the PTI is false (*from 4 and 6*).

Since many researchers have since built on the insights of the PTI, this would be disruptive for an entire research program. Thus, the argument also highlights the significance of mind-wandering research for research on planning agency. Yet, the planning-related functions of mind-wandering might be more multifaceted than suggested by this argument.

### 4 | THE MANY FACES OF EXPLORATIVE MIND-WANDERING

Thus far, we have only considered reconsideration, but there are other roles mind-wandering could play in planning. In this section, we provide a deeper analysis of the various planning-related functions mind-wandering might serve. This will in turn allow us to formulate various responses to the problem of excessive reconsideration.

## 4.1 | Three kinds of reconsideration

To properly assess if mind-wandering can lead to reconsideration—and if so, how regularly—we need to consider which forms of reconsideration mind-wandering can plausibly take. We will consider three different kinds: Deliberative, policy-based, and non-reflective reconsideration (cf. Bratman, 1987, Chap. 5).

First, there is *deliberative reconsideration*. Here, the agent deliberates about whether to reconsider and decides to reconsider, which might result in either reaffirming her prior intention or canceling it. Might agents deliberate about whether to reconsider and decide to use mind-wandering as a means to do so? In that case, the agent would seem to engage in such mind-wandering intentionally. According to some studies, people report that they often do intentionally let their minds wander (Seli et al., 2016). However, there are reasons to think that mind-wandering cannot take the form of deliberative reconsideration. First, the coherence of intentional mind-wandering is itself controversial (Murray & Krasich, 2020). Second, existing accounts of intentional mind-wandering seem to rule out this type of deliberative reconsideration. According to Santiago Arango-Muñoz and Juan Pablo Bermúdez (2021), intentional mind-wandering is the intentional omission to control one's thoughts, specifically, “the control required to string thoughts together toward the completion of a goal” (p. 7738). On Zachary Irving's (2021) account, intentional mind-wandering amounts to a type of meta-control where one monitors and regulates one's thinking to ensure that one's mind is wandering freely rather than fixating on a specific topic. However, during deliberative reconsideration one is in fact guiding one's thoughts toward the completion of an occurrent goal, namely, to figure out whether to reaffirm or cancel one's intention and, in doing so, guiding one's thoughts toward information considered relevant to settling this particular question—thus fixating on a specific topic.

Second, there is *policy-based reconsideration*. This is when an agent adopts a policy to reconsider if certain conditions obtain. Perhaps agents can form a general policy to let their minds wander in certain situations (e.g., when their goals have proved unsuccessful or shown diminishing returns for some time) in the hopes of thinking of either reasons to reaffirm their current intention or of better alternatives and reasons for adopting them instead. However, this proposal is confronted with the same problem as the deliberative case. When the relevant circumstances obtain and the agent notices this and starts to reconsider—as prescribed by the policy—the agent (implicitly) adopts the goal of figuring out whether to reaffirm or cancel her current intention. The ensuing thought process of trying to achieve this goal will not be one of mind-wandering.

Finally, we have *non-reflective reconsideration*. This happens when an agent starts to seriously consider options incompatible with her prior intentions because of certain habits, skills, or dispositions (e.g., to notice certain problems or salient features of the environment) rather than through explicit deliberation. The agent thereby *implicitly* reopens the question of whether to do as previously intended. It seems plausible that we have a disposition to sometimes respond in this way to the propositions entertained during mind-wandering.

Example: While mind-wandering, Esme comes to think of a festival she would like to attend and that it takes place the same week that she plans to go hiking with her friend. Knowing that it might be possible to reschedule with her friend, she implicitly reopens the question of whether to go hiking that week. It might be argued that as Esme starts to weigh reasons for and against sticking to her original intention, she will be guiding her thoughts toward the completion of the goal of figuring out whether to reaffirm or cancel her original intention.

At this stage, she is no longer mind-wandering. However, by making salient a conflict between her various interests, her mind-wandering still provided the initial reason to reconsider and so *lead* her to reconsider even if the subsequent *weighing* of reasons no longer counts as mind-wandering. The possibility of such cases suggests that we cannot rule out that mind-wandering can lead to reconsideration. To rule out excessive reconsideration, we therefore need to rule out that such reconsideration is *excessive*. One way to do so is to show that reconsideration is a rare consequence of mind-wandering. This can be done by showing that the information generated during mind-wandering tends to support rather than question our existing intentions.

While the example considered above focused on distal or ultimate goals of the agent, the evidence suggests that most mind-wandering episodes relate to goals that are more proximal. According to one study by Stawarczyk et al. (2013), 38% of future-oriented mind-wandering episodes relate to what will happen later in the present day and 27% to what will happen between tomorrow and the next 7 days. To the extent that mind-wandering leads to reconsideration, it should therefore be more prone to make us reconsider more proximal goals than distal ones. However, an alternative explanation is that mind-wandering is more likely to influence temporally closer sub-goals than make us reconsider distal goals.

## 4.2 | Filling out of partial plans

Consistent with this last suggestion, an alternative construal of the explorative function of mind-wandering is that mind-wandering helps fill out partial plans by exploring relevant means, preliminary steps, and more specific courses of action. This is supported by the evidence cited above suggesting that mind-wandering plays a role in autobiographical planning. Given looser constraints on its content, mind-wandering enables the consideration of a broader set of possibilities than more constrained, goal-directed thinking (Christoff et al., 2016; Irving, 2016, 2021). If this occasionally inspires better strategies, including better suggestions for how to fill out partial plans than would otherwise have been considered, this could explain the time and resources spent mind-wandering by a planning agent. According to the PTI, there is a rational requirement of *means-end coherence* such that when we intend a certain end and believe something to be a necessary means to achieve that end, we should also intend the means. This norm is pragmatically justified because abiding by it contributes to us getting what we (rationally) want in the long term (Bratman, 1987, Chap. 3). Thus, if mind-wandering makes us consider means to our ends, and we are rational planning agents, mind-wandering could bring us to intend such means.

Example: Zara intends to go to the cinema with her friend this weekend, but they have not specified this plan further. As the weekend is only a few days away, her mind is prone to wander to this intention of hers and when it does, she starts thinking about which movie to see, which cinema to go to, and a few options spring to mind. Next, she starts thinking about calling her friend tonight to settle on a movie, place, and time and book the tickets before the good seats get taken. For the rest of the day, her mind tends to wander to these sub-goals, thus making it more likely that she will eventually become aware of the new options afforded to her during mind-wandering, consider them, commit to them, and ultimately execute them. We might add that these thoughts occurred to her during a moment of rest where she had no intention of thinking of anything in particular. Furthermore, the process was unconsciously implemented. As her mind wandered, she was unaware of it and did not intentionally

guide her thoughts toward the completion of some particular goal (such as planning her weekend). This then seems like a paradigmatic example of mind-wandering. In addition, it also seems such mind-wandering helps the agent fill out a partial plan.

### 4.3 | Reason-changing non-reconsideration

Another possibility is that mind-wandering might lead the agent to incorporate new considerations into her reasons for doing as she already intends without reconsidering those intentions. It seems plausible that this sometimes happens during mind-wandering. For example, during mind-wandering, Malik comes to think of an additional reason to visit his sister this week - something he has already decided to do - when he recalls that she is in the process of moving to a new flat and would no doubt appreciate his help. He does not reopen the question of whether to visit his sister (i.e., reconsider his intention) but his wandering mind changes his reasons for doing as he already intends.

Since neither filling out of partial plans nor finding new reasons for doing as one already intends entail reconsideration, they pose no threat to intention stability. Instead, they seem to support our commitment to and chances of successfully meeting our prior intentions. How does our account relate to that of Shepherd and Sripada? According to Shepherd (2019), explorative mind-wandering consists in searching for new and better goals. Since filling out of partial plans might be understood as specifying sub-goals of more complex, distal goals, if we constrain the search to primarily specifying such sub-goals, Shepherd's account becomes compatible with ours. The discovery of new reasons for one's existing intentions is harder to construe as a search for goals, since reasons for action are (often) not themselves goals. On Sripada's (2018) account, mind-wandering increases informational stores to open up new opportunities for action. Nothing in this formulation seems to rule out that the new information and opportunities afforded by mind-wandering can support existing intentions by helping us fill out partial plans or discover new reasons for doing what we already intend.

## 5 | EXCESSIVE RECONSIDERATION RECONSIDERED

### 5.1 | Does explorative mind-wandering lead to (regular) reconsideration?

We are now in a position to respond to the problem of excessive reconsideration. One response would be to deny that mind-wandering has any explorative function (against premise 1). However, the fact that mind-wandering tends to generate future-oriented, self-related, and goal-relevant information suggests that mind-wandering does allow us to explore new options that might lead to better outcomes in the long term. Another response would be to deny that mind-wandering ever leads to reconsideration (against premise 2). Yet the possibility of non-reflective reconsideration speaks against this. A more modest case can instead be made that explorative mind-wandering does not lead to *regular* reconsideration (against premise 3). We have argued that other planning-related functions can plausibly be attributed to mind-wandering. It might be that most explorative mind-wandering serves to fill out partial plans or come up with new reasons supporting one's current intentions as opposed to triggering reconsideration.



Moreover, it might be argued that given the advantages to cognitively limited agents of forming plans ahead of time and sticking to them, it is implausible that mind-wandering would have evolved in a way that fundamentally undermined these advantages. More plausibly, the dispositions that might trigger reconsideration via mind-wandering are limited in scope (e.g., to infeasible, unimportant, or high-stakes intentions) so that they do not generally undermine the stability of our intentions. One might object that this begs the question by simply asserting that explorative mind-wandering does not undermine rational planning agency because of the advantages of being a rational planning agent. So, what further reasons do we have for assuming that explorative mind-wandering does not lead to regular reconsideration?

Here, we can appeal to *two-tier accounts of rational (non)reconsideration* (Bratman, 1987; Holton, 2009). Such accounts are designed to explain why it is rational for a planning agent not to reconsider in certain circumstances and avoid reconsideration in the face of prima facie triggers of reconsideration. The rationality of one's non-reconsideration (the lower tier) is assessed in terms of the rationality of the habit of non-reconsideration from which one's non-reconsideration follows (the higher tier). This is particularly important for explaining our tendency to resist non-reflective reconsideration for which there are many potential triggers, including thoughts we might have during mind-wandering. The two-tier approach states that an agent's non-reflective non-reconsideration of an intention is rational if it is the manifestation of general habits of non-reconsideration which are reasonable for the agent to have.

Michael Bratman (1987) argues that general habits of non-reconsideration explain our tendency not to reconsider our intentions in general. Having general habits of non-reconsideration is reasonable because it allows us to achieve complex projects that require long-term planning and vigilance and because it makes us more reliable partners when coordinating our plans with others which allows us to achieve more complex projects than we could individually. Richard Holton (2009) argues that the empirical literature bears out that we do in fact have such general habits of non-reconsideration and that such habits also provide the best explanation of our tendency not to reconsider our resolutions to resist temptation. However, occasional reconsideration is of course better than none. We should not be completely inflexible in light of changing and unexpected circumstances. We might have corresponding habits of rational reconsideration which dispose us to reconsider our prior intentions when the stakes of our actions are high, or it is possible to deliberate in a low-cost, rational fashion.

Applied to explorative mind-wandering, a case can now be made that we have a general presumption in favor of non-reconsideration even in the face of triggers of reconsideration, including those sometimes afforded by mind-wandering. However, when the stakes are sufficiently high or the opportunities afforded sufficiently great, we could be disposed to reconsider, and this would be rational under the circumstances. This view simultaneously allows that mind-wandering can occasionally lead to non-reflective reconsideration while remaining consistent with intention stability and rational planning agency. There is some evidence that mind-wandering supports non-reconsideration and intention stability. In one study, mind-wandering was associated with a greater capacity to resist the temptation of an immediate economic reward in favor of a larger future reward (Smallwood et al., 2013). According to a recent review, future-oriented mind-wandering tends to be about upcoming tasks and planned activities instead of novel hypothetical scenarios and mind-wandering about planned activities seems to increase the likelihood that these are accomplished (Kvavilashvili & Rummel, 2020). Thus, reflecting general habits of non-reconsideration, explorative mind-wandering might be biased against reconsideration and toward filling out of partial plans and reason-changing non-reconsideration. But is a process biased against reconsideration in this way truly rational? We see no reason to deny this.

If such a bias allows cognitively limited agents to enjoy the dual fruits of mental exploration and rational planning agency, it might in fact be an optimal mental make-up for agents like us and thus no insult to rationality.

## 5.2 | How regular is explorative mind-wandering?

Finally, one could deny premise 5 of the problem of excessive reconsideration and claim that no empirical evidence supports the claim that explorative mind-wandering is a common phenomenon. One might try to draw a distinction between explorative and non-explorative mind-wandering and argue that mind-wandering only rarely serves its explorative function. It might be that the conditions necessary for mind-wandering to take the form of mental exploration only rarely obtain. What might such conditions be? First, we might say that mind-wandering is only explorative when it is future-oriented because only future possibilities are relevant to our intentions and whether to reconsider them. Second, it might be argued that only mind-wandering with explicitly self-related and goal-relevant content serves its explorative function, since the purpose of exploration is to discover new information that the agent might exploit to improve her prospects.

There are, however, several problems with this argument. First, studies show that a quarter of mind-wandering episodes are reported to be planning-related (Stawarczyk et al., 2013) and future-oriented, self-related, and goal-relevant (Baird et al., 2011) which suggests that a lot of mind-wandering does have a bearing on our intentions. Second, it is difficult to clearly delineate between those stretches of mind-wandering that turn out to be useful and those that do not. We might not usually be aware of the potential utility of what we are experiencing during mind-wandering. For instance, the new information might not seem immediately relevant to the agent but be stored in memory and become useful later when the agent draws on it during reasoning while the agent remains unaware that this information was first generated during mind-wandering. Admittedly, given the vagueness and uncertainty that surrounds these distinctions and estimates, it is hard to precisely determine how often mind-wandering is genuinely explorative.<sup>1</sup> But combined with the arguments above, we have good reason to doubt that explorative mind-wandering leads to excessive reconsideration—even if we allow the occasional non-reflective reconsideration.

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<sup>1</sup>Recent studies using multidimensional experience sampling (Konu et al., 2021; Mulholland et al., 2023; Smallwood et al., 2021; Turnbull et al., 2019) have probed participants on multiple dimensions including temporal orientation, whether their thoughts were about themselves or others, whether they were thinking about solutions to problems (or goals), whether their thoughts were deliberate or spontaneous, whether they were thinking about one topic or many, whether their thoughts were about the environment or from memory, whether their thoughts were about something they already knew, and whether their thoughts were distracting from what they were doing among others. This has enabled researchers to study which patterns of ongoing thought tend to arise in in different task contexts, including during mind-wandering episodes. It would be interesting to see such methods brought to bear on whether mind-wandering makes the kinds of contributions to planning suggested here and, if so, in which task contexts and with what frequencies. One might add questions about whether the participants' thoughts led them to reconsider prior intentions, to fill out an existing plan, or to change their reasons for doing something they already intended to do. To our knowledge, no such study has been conducted. We would like to thank a reviewer for bringing these studies to our attention.

## 6 | CHANGING REASONS

There is another way in which intention stability might come under threat from mind-wandering. We have suggested that mind-wandering might change the reasons the agent holds for doing as she intends without changing the intention itself. If these changes are significantly large, this eventually changes what intentions it is rational for the agent to hold. If the agent becomes aware of such changes to her reasons, she might realize that it is now rational for her to reconsider her intentions.

As suggested by Sripada (2018), a key function of mind-wandering might be to increase informational stores to potentially open up new opportunities. Mind-wandering might affect what information is available to the agent for processes like deliberation (among others), and, most relevant to our discussion, what beliefs the agent holds and is able to infer based on available information (e.g., about possible opportunities or goals). How does this relate to planning agency? For a planning agent to be rational she must only hold intentions that she believes it possible for her to execute (Holton, 2009, Chap. 3) or at least does not believe impossible to execute (Bratman, 1987, Chap. 3). Thus, were her beliefs to shift in such a way that now, according to those beliefs, it is either impossible or highly unlikely that she will be able to meet one of her intentions, it might now be rational to revise that intention.

Among the considerations relevant to whether we should revise an intention are relevant beliefs, such as whether we believe what we intend to do to be feasible or whether it might help us advance toward other ends we intend to achieve. We should therefore consider whether mind-wandering might change our beliefs to a point where, if we were to reflect on these changes, we should realize that the considerations supporting certain intentions have changed enough that we ought to reconsider those intentions to check if they are still supported by our reasons. As pointed out by Holton (2009, Chap. 1), a key feature of intention stability is that there are different thresholds for intention formation and revision. To ensure the stability of intentions, considerations sufficient to revise an intention must include significantly more relevant information than those sufficient to form it. The concern is therefore whether mind-wandering can surreptitiously generate a drift of beliefs large enough to regularly reach the threshold of rational reconsideration.

### 6.1 | Doxastic effects of mind-wandering

But why should we believe that mind-wandering affects our beliefs? As mentioned above, mind-wandering often involves episodic simulation, which can affect beliefs in multiple ways. First, during episodic simulation, an agent may fill in gaps in memory with imagined or fictional details which might distort beliefs about past events (De Brigard, 2014). Second, counterfactual simulations of events that did not happen but could have might affect the agent's beliefs about causal relationships and probabilities. For instance, simulating alternative causes or outcomes might lead to updated beliefs about what caused a particular event or what is likely to happen in similar future events. Third, episodic simulations can evoke emotional experiences and change the agent's beliefs about the desirability and plausibility of such events. One study shows that repeated simulation increases the perceived plausibility for emotional (positive or negative) future interpersonal experiences, but not neutral ones (Szpunar & Schacter, 2013). Another study indicates that repeated simulation of episodic counterfactual events decreases their perceived plausibility regardless of valence (De Brigard et al., 2013).

Thus, under the assumption that episodic simulations generated during mind-wandering have similar effects on beliefs, we have some inductive reasons to accept that mind-wandering affects beliefs. And since our beliefs about, say, what is likely to happen in the future or what the consequences of our actions might be partially constitute what we have reason to do, significant changes to such beliefs can change what intentions it is rational for us to hold (onto). For example, if someone intent on leaving home without an umbrella gradually finds it more and more plausible that it will rain (perhaps through repeated simulations of the poor weather the past weeks), it eventually becomes rational for that person to reconsider whether to bring an umbrella. Large regular changes to the beliefs that guide our actions could make it rational for us to regularly reconsider, thus threatening intention stability. So, a key question is: Does mind-wandering cause large doxastic changes? Moreover, to determine whether mind-wandering supports or interferes with planning, we also need to consider whether the beliefs formed because of mind-wandering reliably help the agent meet her long-term goals.

## 6.2 | Is thinking believing?

Recent discussions of belief acquisition, revision, and storage provide a good starting point for investigating these questions. Some theorists distinguish between Cartesian and Spinozan models of belief acquisition (Egan, 2008; Gilbert, 1991; Mandelbaum, 2014). On the *Cartesian model*, when we encounter a proposition (e.g., through the deliverances of perception or imagination), we can entertain a proposition without believing it and only assent to it (thus coming to believe it) after subjecting it to an evaluation that determines whether it should be accepted or rejected. In contrast, on the *Spinozan model*, we directly and automatically come to believe the propositions we process and only after subsequent effortful evaluation might we come to reject it.

Several conclusions have been drawn from the Spinozan view. First, the Spinozan model implies, and is meant to explain, that we harbor inconsistent beliefs, since on this model new beliefs are continuously acquired without evaluating whether they are consistent with our current stock of beliefs (Egan, 2008; Mandelbaum, 2014). Proponents of the Spinozan view have argued that this is best explained by a *fragmentation model* of beliefs according to which beliefs are stored in distinct, independently accessible fragments which are typically activated (to guide reasoning and action) and updated one at a time. Which fragment is activated—and so, in which fragment new beliefs are stored—depends on our current context. A fragmented belief system allows us to store inconsistent beliefs across different fragments even if the beliefs stored within each fragment are kept consistent (Egan, 2008; Bendaña & Mandelbaum, 2021). This contrasts with a *unified model* of beliefs according to which beliefs are stored in a single database, reasoning and action is synchronically guided by the entire belief system, and belief revisions are sensitive to global properties of one's belief system such that when one belief changes, all other beliefs are (ideally) revised to remain consistent with the change.

Second, some proponents of Spinozan and fragmentation models argue that these best explain various ways in which our beliefs are biased with some perilous implications for rationality. According to Eric Mandelbaum (2014), the Spinozan view helps explain *confirmation bias* (i.e., our tendency to search for evidence that confirms our existing beliefs and resist evidence that disconfirms them). One puzzle about confirmation bias is that we sometimes experience cognitive dissonance even when we merely consider a proposition. If we automatically believe every proposition we consider, mere consideration will sometimes lead us to acquire

beliefs that conflict with other standing beliefs, resulting in a dissonant state. The dissonant state is experienced as discomfort which reinforces dispositions to avoid searching for or calling to mind disconfirmatory evidence. Mandelbaum (2014) argues that this makes impartial deliberation impossible: Whenever we consider a proposition, we come to believe it, thus making it susceptible to confirmation bias.

In addition, Mandelbaum (2019) argues that a core feature of belief revision is that it protects our self-image even at the expense of not being responsive to the evidence and not updating beliefs in a Bayesian way. When evidence contradicts subjectively important beliefs that constitute our self-image (e.g., that we are good, smart, and competent people), belief revisions resolve the resulting discomfort by protecting the subjectively important beliefs and resisting the conflicting evidence. According to Joseph Bendaña and Eric Mandelbaum (2021), this contrasts with a central assumption of unified models, namely, that the beliefs least open to revision are those whose revision requires the highest number of changes to other beliefs to keep the total belief system consistent (e.g., rules of logic or mathematics). Revising one's self-image, however, generally does require that one revises much else that one believes. Since fragmentation models are not committed to consistency across fragments, they can better accommodate such biased belief revision.

While none of these theories might be entirely true (e.g., maybe some belief-forming mechanisms are more Cartesian and some more Spinozan), they help capture general positions one can take on the nature of belief acquisition, revision, and storage and thus provide a useful starting point for theorizing about the doxastic effects of various mental phenomena. We will use these theories to make two points. First, the combination of Spinozan and fragmentation models defended by some (Egan, 2008; Bendaña & Mandelbaum, 2021) is in tension with rational planning agency. Second, when applied to mind-wandering as a belief-forming mechanism, the combination of Spinozan and fragmentation models has even more troubling implications for rational planning agency.

Spinozan fragmentation models are in tension with rational planning agency in several ways. It is hard to see how the kind of rational deliberation conducive to successfully meeting our long-term goals is possible under this picture. According to the PTI, to accrue the benefits of long-term planning, we are rationally required to keep our intentions consistent with each other and with our beliefs. However, if we have a fragmented belief system containing many inconsistent beliefs, for many intentions there is likely to be some fragments with which the intention is consistent and some with which it is inconsistent. This is worrisome enough as it stands. But, if we accept that mind-wandering can lead us to acquire and revise beliefs, the threat to intention stability and rationality is exacerbated. Should we accept the antecedent? On the Spinozan view, as it is often stated, it seems that we must, since it does not discriminate between belief-forming mechanisms. Some proponents mention that it does not matter whether the proposition appears in perception or imagination (Gilbert, 1991; Mandelbaum, 2014).<sup>2</sup> Since we imagine many different propositional contents during mind-wandering, these staunch Spinozans should accept that mind-wandering can form new beliefs.

Due to the ubiquity of mind-wandering, this seems to entail a fast build-up of inconsistent beliefs since new and old fragments would continuously be opened and new beliefs added, or old ones revised, as evermore propositions are entertained by our wandering thoughts. If at one moment an agent's mind wanders to her resolution to stick to her diet and the next moment to worry that she will be tempted to order too much junk food, does that suffice to make her

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<sup>2</sup>Egan (2008) restricts his discussion to perception.

believe that she will do both things? Worse still, does this make her resolution a victim to which fragment happens to be active around dinnertime? The Spinozan might respond by limiting their view to certain modalities (e.g., perception) and accept that beliefs are not automatically acquired about propositions entertained during mind-wandering (and perhaps imagination more generally). On the other hand, if the Spinozan fragmentationist doubles down and accepts that mind-wandering can indeed open and reopen new and old fragments, this could lead to substantial drifts in the agent's belief sets, or fragments, over time.

Different lines of work support that mind-wandering could lead to large doxastic drifts given the truth of the Spinozan story. First, according to the decoupling hypothesis (Smallwood, 2013; Turnbull et al., 2019), during mind-wandering, executive control processes disengage attentional processes from external stimuli, which insulates the internal stream of thought from perceptual distractions and ensures efficient processing of self-generated information. Second, work on the dynamics of mind-wandering suggests that mind-wandering episodes can vary widely in content and is characterized by a repeating pattern of a cluster of related thoughts about one topic followed by a jump to a new topic only modestly related to the previous one (Sripada & Taxali, 2020). Mind-wandering thus seems able to generate a diverse set of propositions linked to a wide set of contexts and so, if the Spinozan story is correct, to form and revise a large number of different beliefs. If large enough, such gradual drifts in the agent's belief sets might mean that the threshold for rational reconsideration is regularly crossed, thus making it irrational for the agent to avoid reconsideration of their intentions for very long.

One way even the staunch Spinozan could protect intention stability would be to argue that the threshold for rational reconsideration is very high indeed. But, this seems equivalent to saying that the agent is highly insensitive to the fact that her beliefs might no longer support her intentions, which seems irrational. The more promising solution might be to argue that beliefs are more stable than the Spinozan would have it. Indeed, some have argued that planning benefits from keeping our beliefs reasonably stable so that we can reason and plan on the basis of them and remain committed to pursuing (difficult) long-term goals even in the face of a constant flux of new relevant evidence or setbacks. On one model, we are disposed to ignore some new evidence so as not to regularly reconsider our beliefs unless it passes a threshold beyond which it cannot properly be ignored (Holton, 2014). On another, we remain open to evidence that success on difficult long-term goals is not forthcoming but only reduces our confidence that continued effort will yield success when a certain evidential threshold has been passed (Morton & Paul, 2019). How high this threshold should be depends on the context and the agent's ability to bear the costs of failure.

Another concern is that some Spinozan fragmentationists (Bendaña & Mandelbaum, 2021; Mandelbaum, 2014, 2019) might overstate the extent of biased belief revision in a way that could be detrimental to effective long-term planning. If we constantly and automatically acquire new beliefs, and these were systematically prone to confirm our existing beliefs and protect our self-image, we would risk being left with highly partial and unreliable information about the prospects of success in our long-term goals. If, when our minds wander to how we might meet our long-term goals, we were prone to exaggerate our own competence and generally come to believe that success is forthcoming even when it is not, we would be unable to properly assess when it is rational to stick to our guns and when it is rational to quit. A highly unreliable explorative system risks being maladaptive, and it is unclear why mind-wandering would have evolved that way.

While we agree that human agents sometimes do exhibit the kinds of irrational behaviors that have motivated Spinozan fragmentation models, the proposed cure could be worse than

the disease. Specifically, these models are in tension with some rational planning behaviors that we also seem to exhibit (even if fallibly so). However, it is important to note that not all fragmentationists are as pessimistic about our capacity for rationality as, for instance, Bendaña and Mandelbaum (2021). Seth Yalcin (2021) tries to show that fragmentation per se is not irrational. Andy Egan (2008) argues that fragmentation might help guard against unreliable belief-forming mechanisms, since beliefs from unaffected fragments can help us infer that the outputs of certain mechanisms are unreliable. Cristina Borgoni (2021) suggests that even if we only keep beliefs consistent within fragments, we might still be responsive to evidence across fragments by having beliefs from inactive fragments stand as evidence for active fragments. Adam Elga and Agustín Rayo (2022) develop a version of fragmentation that is compatible with Bayesian decision theory. Still, a tension remains between having a fragmented belief system containing inconsistent beliefs and the rational requirement on planning agents to keep their intentions and beliefs consistent.

Since it is primarily the Spinozan view that entails large inconsistencies in a fragmented belief system, we have reason to doubt that beliefs are always acquired as automatically as the staunch Spinozan suggests. While we might be more prone to automatically believe what we perceive (Egan, 2008; Gilbert, 1991), we might be less prone to automatically believe what we imagine (e.g., during mind-wandering). Importantly, not all fragmentationists explicitly endorse the Spinozan view potentially leaving room for fragmentation with less inconsistency and less irrationality (e.g., Borgoni, 2021; Elga & Rayo, 2022; Yalcin, 2021).

We conclude that on pain of undermining long-term planning, agents are under rational pressure to reduce inconsistencies. Accepting that mind-wandering can change our beliefs reinforces this need. Furthermore, for mind-wandering to support effective planning, the beliefs we form about our prospects for success during mind-wandering should be at least somewhat reliable. While we hope to have raised some interesting epistemological questions about mind-wandering (e.g., about its reliability and whether updating beliefs based on self-generated information is justified), providing satisfactory answers to these will be a project for another time. Suffice it to say that it might be possible to form justified beliefs based on mind-wandering (e.g., if it turns out to be sufficiently reliable). If during mind-wandering one is reminded of multiple failed attempts at pursuing a similar goal in the past and that one's skills and odds of success have not improved since, it seems that one is justified in forming the belief that success this time around is unlikely. Yet a question remains about how exactly mind-wandering might change our beliefs. On the face of it, the Spinozan model seemed well-positioned to explain how mind-wandering can lead to the acquisition of beliefs, since it does not require the kind of reflective evaluation of the evidence that seems to be absent during mind-wandering. But due to its apparent tension with rational planning agency, we have reason to be skeptical of such a model—at least in the domain of mind-wandering and imagination. In the next section, we discuss how mind-wandering might lead to attitude change.

## 7 | MIND-WANDERING AND DELIBERATION

So far, we have explained how explorative mind-wandering might modify our intentions and beliefs and argued that despite the ubiquity of mind-wandering, this need not conflict with us being rational planning agents. Explorative mind-wandering both contributes new considerations in support of our existing intentions and allows us to adapt to changing circumstances by updating our reasons for action. Given the multifaceted nature of mind-wandering, it should not

be too surprising that it can serve such different functions. However, in trying to reconcile explorative mind-wandering with rational planning agency, we seem to encounter another puzzle. The functions we have attributed to mind-wandering overlap with those standardly attributed to various forms of deliberation. But while deliberation seems to be constituted by a variety of different mental actions (shifting attention, inhibiting urges, imagining possible actions or consequences of actions, comparing options, weighing reasons, etc.), mind-wandering seems to be a more passive or uncontrolled mental activity.

We can resolve this apparent tension by explaining how mind-wandering relates to yet remains distinct from deliberation. Each of the planning-related functions we have attributed to mind-wandering (non-reflective reconsideration, filling out of partial plans, and reason-changing non-reconsideration) can be performed in the absence of the agentic features distinctive of the mental actions making up deliberation. During mind-wandering, the execution of its planning-related functions is not something the agent is intentionally trying to bring about (and thus is not a mental action, cf. Mele, 2009) nor is the agent attentively attuned to particular pieces of information relevant to making a specific plan or decision (and thus it is not a mental act of deciding, cf. Shepherd, 2015). Instead, to serve these functions, mind-wandering need only be guided in a minimal sense: There must be an increased likelihood that the agent will have thoughts that fulfill these functional roles. To achieve this, the agent need not intend to think of anything in particular and guide their thoughts toward the execution of these functions while correcting any deviation from such execution (for discussion, see Irving, 2016, 2021). Moreover, such minimal guidance allows that the same episode of mind-wandering can include thoughts related to various different goals as well as goal-irrelevant thoughts which, again, seems to distinguish it from goal-directed, deliberative thinking where we tend to focus on one goal for a longer period of time and bring our attention back to the task when it strays to goal-irrelevant thoughts.

There are several ways in which mind-wandering might interact with deliberation while remaining distinct from it. This depends on the view one takes on the role of deliberation in action, specifically, whether action always requires deliberation. One might adopt the view that intentional action requires that one has previously deliberated about whether to perform the action in question, decided to perform the action, and thus intentionally formed an intention to perform the action. If we also assume that mind-wandering never itself constitutes deliberation (say, because of lacking agentic features), this has important implications for how to cash out the planning-related functions of mind-wandering. On a strict version of this view, mind-wandering cannot directly change our intentions or beliefs without intermediate deliberation. Instead, mind-wandering might at best trigger acts of deliberation that evaluate the potentially goal-relevant information generated during mind-wandering or encode new information that can be recalled during later acts of deliberation. For the information to change our attitudes and cause action, it might be argued, requires that it first be critically evaluated and integrated with other information during acts of deliberation. In other words, on a view where deliberation is necessary for attitude change and action, mind-wandering can only *indirectly* affect our attitudes and actions by generating inputs to deliberation.

However, there is reason to reject such a view. Some have argued that to avoid an infinite regress, there must be processes that allow us to think and act for reasons without deliberation. Since deliberation is a mental action, if all actions required prior deliberation, all acts of deliberation would themselves require prior acts of deliberation ad infinitum. According to Nomy Arpaly and Timothy Schroeder (2012), non-deliberative, non-voluntary processes can still be reasons-responsive if mental transitions occur because certain logical relations (theoretical entailment, practical entailment, statistical relevance, etc.) obtain between the implicated attitudes. Such processes can involve



transitions “from some beliefs to others (when believing for reasons), from beliefs (and perhaps desires and plans) to an intention or willed action (when acting for reasons), and perhaps other transitions as well” (Ibid., p. 236). Explorative mind-wandering is one candidate for such non-deliberative, non-voluntary yet reasons-responsive processes. Thus, on this type of view, mind-wandering can bypass deliberation and *directly* change attitudes (e.g., form beliefs and intentions), which in turn changes what actions we are likely to perform.

Yet, given the foundational role ascribed to non-deliberative, non-voluntary processes in Arpaly and Schroeder’s account, this view risks ascribing too much importance to such processes relative to deliberation. On their account, deliberation plays the modest role of occasionally removing barriers to the non-deliberative, non-voluntary processes which are the real foundation for our ability to think and act for reasons. Deliberation, they argue, might for instance refocus attention to deal with distraction, call to mind relevant information to deal with lack of inspiration, promote neglected facts that have not recently come to conscious attention, or sequence the stages of a difficult problem.

Even if we accept that mind-wandering can change attitudes in ways that are non-deliberative yet reasons-responsive, we need not accept that non-deliberative, non-voluntary processes are foundational in Arpaly and Schroeder’s sense and that deliberation merely serves to remove barriers. There is room for an intermediate view on which deliberation is allowed a more substantial and independent role. For instance, even if we accept that some intentions are acquired unintentionally, we have reason to believe that others are intentionally formed through acts of deciding, specifically, when we are uncertain or unsettled about what to do—and if the intentions to decide are themselves acquired unintentionally, there is no regress (Mele, 2003, Chap. 9). Nothing we have said rules out that various acts of deliberation still play a substantial role in, say, forming intentions in the face of uncertainty, explicitly and critically evaluating reasons, or changing attitudes in accordance with rational norms. In explorative mind-wandering, we have identified a non-deliberative process that is poised to change our attitudes and how we act—possibly sometimes even in a reasons-responsive, rational way—thus further vindicating the existence and significance of such processes. Yet, this does not replace deliberation so much as supplement it.

Since we can distinguish mind-wandering from deliberative processes, this account also seems broadly compatible with the distinction between unconstrained and constrained modes of thought proposed by the dynamic framework of thought (Christoff et al., 2016). An additional element in our account is that these modes interact as seen by the contributions mind-wandering makes to planning and deliberation.

How does the suggestion that mind-wandering is a non-deliberative process relate to neural evidence that mind-wandering is regulated by executive areas (Turnbull et al., 2019) known to be involved in deliberative processes (Botvinick & An, 2009)?<sup>3</sup> To be regulated by executive areas is not sufficient to make mind-wandering an act of deliberation. Deliberation is initiated with the goal of settling an open issue with which the agent is faced. As one deliberates one’s thoughts are guided toward the completion of this goal. As pointed out in Section 4.1, such a thought process is not a form of mind-wandering even on existing accounts of intentional mind-wandering. Since the kind of executive regulation in question is not sufficient to make

<sup>3</sup>Specifically, Turnbull et al. (2019) have shown that the dorsolateral prefrontal cortex (dlPFC) is involved in regulating mind-wandering in a context-dependent manner. Their proposal is that the dlPFC prioritizes task-relevant information by monitoring signals from internal and external sources and when external task-demands are high, the dlPFC suppresses mind-wandering. When demands are low, the dlPFC prioritizes mind-wandering by reducing the processing of external task-relevant signals and decoupling attention from external signals in order to facilitate efficient processing of self-generated information. We would like to thank a reviewer for bringing this to our attention.

mind-wandering intentional and guided in the way required for deliberation, the evidence is compatible with the view that mind-wandering is non-deliberative.

## 8 | CONCLUSION

We have argued that mind-wandering-based reconsideration should be a rare occurrence. Rather than prompting and rationalizing reconsideration, mind-wandering is more likely to help us fill out partial plans or think of new reasons for doing as we already intend. If this is the case, mind-wandering is unlikely to threaten intention stability. Another possibility is that mind-wandering could lead to gradual drifts in our beliefs over time that makes it rational to regularly reconsider our intentions. However, given reasonable thresholds for rational reconsideration and rationality-friendly models of belief acquisition, updating, and storage, mind-wandering is unlikely to induce drifts in our belief sets to an extent that makes regular reconsideration rational. Finally, we have tried to clarify the relationship between mind-wandering and active deliberation and shown that while the two serve similar functions and might interact, they remain distinct processes.

## ACKNOWLEDGMENTS

We extend our sincere gratitude to Malte Hendrickx, Victor Lange, and Damiano Ranzenigo for their helpful comments on earlier drafts of this article. This material was presented to audiences at Lund University, Duke University, Oslo University, Copenhagen University, Ruhr University Bochum, and the 30th Conference of the European Society for Philosophy and Psychology Conference in Prague. We are grateful for the comments we received on these occasions. Special thanks to Olle Blomberg, Denis Buehler, Felipe De Brigard, Aaron Glasser, Zachary Irving, Lia Kvavilashvili, Eric Mandelbaum, Agnes Moors, Joshua Shepherd, Matthew Talbert and the members of the CoInAct Research Group for helpful discussions and encouragement.

## DATA AVAILABILITY STATEMENT

There is no data available.

## ORCID

Frederik Tollerup Junker  <https://orcid.org/0000-0001-9785-6793>

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**How to cite this article:** Junker, F. T., & Grünbaum, T. (2024). Is the wandering mind a planning mind? *Mind & Language*, 1–20. <https://doi.org/10.1111/mila.12503>