Exploring Inner Perceptions: Interoception, Literature and Mindfulness[1]

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The assumption that reading literature brings cognitive benefits has been entertained for a long time, certainly since the novel managed to establish itself as a leading cultural force in the nineteenth century, and it has gathered pace with recent empirical studies (such as the notion that fiction reading increases empathy) and the development of procedures in bibliotherapy and more popular self-help literature. At the same time, the cognitive sciences are investigating the links between cultural practices and well-being through another cultural practice, namely mindfulness meditation, and the ways in which it manages the perception of inner bodily states (that is, interoception). Even though interoception is arguably central to narrative prose and even though it could be therefore as beneficial in reading literature as in practicing mindfulness, the phenomenon has not been discussed in the research on literature and its cognitive benefits so far.

In this article, I propose to discuss how research on interoception and mindfulness meditation can be developed into a research programme centred around interoception for the study of literature and its relation to well-being, as well as suggestions for empirical methods through which these hypotheses could be tested. I will begin by introducing interoception and discussing how it is represented and evoked *within* the embodied language of the literary text in section 1. Here, and throughout the article, I will rely on a detailed reading of the novel *My Year of Rest and Relaxation* (2018) by Ottessa Moshfegh. In section 2, I will develop a speculative account of how readers might experience an exceptional inversion of the usual balance between exteroception and interoception while they read. It might be the case that the reading process itself enables a trade-off stabilising exteroception to make interoception more explorative. In sections 3 and 4, I will address which elements of the embodied, interoceptive language of the literary text might facilitate these inner explorations posited. I conceptualise the particular integrations between the embodied reader and the literary text during the reading process through "interoceptive attunement" (namely, the progressive coordination between readers' interoception and the interoceptive embodied language of the text) and "interoceptive anchors" (namely, points which link readers' interoceptive explorations and remindings to literary texts). These mechanisms give rise to a number of hypotheses concerning the impact of literary reading on well-being through interoception in section 5.

1. Inner Perceptions and the Modern Novel

Let me begin by outlining how I relate interoception to the novel. Interoception includes a whole range of "inner perceptions" from the physical measure of the heart rate and rhythm of breathing to emotional signatures and to conscious awareness. In a recent survey article, Quadt, Critchley and Garfinkel (2018) distinguish between four different levels along which empirical investigations in interoception have been conducted:

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(1) brain-to-body signalling
(2) neural encoding, representation and the integration of information concerning the body state
(3) influence of such inner perception on other cognition (including feelings and emotions)
(4) conscious perception of bodily states

At first glance, literature seems to be limited to the "conscious perception of bodily states", because only the fourth level is potentially verbalisable in narration. Nevertheless, narrative prose could also evoke the second and third level through embodied language that traces inner body states for characters, focalisers and narrators and links feelings and emotions to body states.

The research literature in psychology relates interoception in particular to the construction of emotions and to sense of self. Lisa Feldman Barrett in *How Emotions Are Made* (2017) argues against the traditional take that there is a limited number of innate, essential emotions. Emotions, rather, come to be understood as interoceptive states that are conceptualised (and named) in culturally different ways. More particularly, these inner states are different from the inner state of the body at rest (see Seth 2014; Seth and Friston 2016; Barrett and Simmons 2015 formalise this in the EPIC model of emotions). When the inner body state comes to be perceptible, for example through higher muscle tension and higher blood pressure than usual, we might experience this as "anger". Interoception, Barrett argues, reveals to us a far greater range of inner states than the traditional accounts of basic emotions could capture (see Ekman 1992). She underlines that different languages and cultures find different concepts for grasping and communicating these inner states that are different from the body at rest.[2] Barrett discusses such balance in terms of a "body-budgeting", where certain areas in the brain send predictions to estimate what bodily resources are necessary and trigger the spending of such energy on the basis of predictions. When you get up in the morning, Barrett writes, "your body-budgeting regions also make you breathe more deeply to get more oxygen into your bloodstream and dilate your arteries to get that oxygen to your muscles more quickly so your body can move. All this internal motion is accompanied by interoceptive sensations, though you are not wired to experience them precisely. So, your interoceptive network controls your body, budgets your energy resources, and represents your internal sensations, all at the same time" (2017, 70). Seth and Friston (2016), in turn, speak of the role of emotions in redressing the physiological homeostasis of the expected bodily state. Emotions and feelings indicate moments when the "body budget" is affected positively or negatively in this model. Interoception, in particular as it relates to feelings and emotions (level 3 in Quadt et al.) and to the conscious perception of bodily states (level 4 in Quadt et al.), is also central to the style and narrative of the modern novel.

When it comes to the novel, the issue of perceptions of inner states have been discussed in terms of realism and media of individuality (such as Crusoe's diaries and the letters of Richardson in Watt [1957] 1990), in terms of developments in focalisation (Mander 1999) and in terms of a new language of feeling, especially for *Lettres portugaises* where a nun reflects deeply on the power dynamics of relationships (Ballaster 1992). The modern novel, as it emerges in the late seventeenth and early eighteenth centuries, clearly foregrounds inner experience, but this inner experience is also profoundly embodied. A detailed broader historical investigation is necessary, but from the evidence of individual texts it emerges that what changes with the recognisably modern novel is the introduction of interoceptive aspects

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[2] Seth and Friston (2016) relate explicitly to the James-Lange model and the appraisal theory of emotions, while Barrett underlines significant differences based on her rejection of essentialist notions of emotions (2017, 160-162).

of embodiment in narrative prose (see Kukkonen 2019). Inner experience is felt on the pulses of these characters and narrators.

Ottessa Moshfegh's *My Year of Rest and Relaxation* (2018) is a perfect incarnation of what one might dub the business model of the modern novel. A young woman decides to sleep through an entire year and tells the story of this project in the first person. A profound exploration of interoception emerges as she struggles to sleep, mind-wanders, falls asleep and eventually emerges as a seemingly new person at the end of the year. The unnamed first-person narrator brings her inner experience to the fore in her effort to withdraw into herself so completely that she reaches clarity about who she ultimately is. The prominence of inner experience and the personal self places Moshfegh's narrator into a line with Defoe's Robinson Crusoe, the narrator of *Lettres portugaises*, Marivaux's Marianne, Richardson's Pamela and Goethe's Werther. The narrator's inner experiences comes to the fore in her reflections. About midway through the novel, she attends the funeral of her friend Reva's mother and is reminded of her own parents' funerals:

> The memory should have rustled up some grief in me. It should have reignited the coals of woe. But it didn't. Remembering it all now in Reva's bed, I felt almost nothing. Just a slight irritation at the lumpiness of the mattress, the loud swish of the sleeping bag whenever I turned over (2018, 140)

Moshfegh's narrator details the kind of embodied response one "should" have in bereavement with the metaphors "rustled up" and "reignited" outlining the interoceptive signatures of the emotions. "Grief" and "coals of woe" indicate the expected range of emotions in such situations; "irritation" is not it. Indeed, at the end of the passage, Moshfegh shifts from interoception to exteroception (through the "loud swish of the sleeping bag"), underlining her narrator's detachment from her inner states at this moment.

When cognitive literary study addresses embodiment, scholars often refer to the perception of movement, emotional expressions, etc. from the outside. Bodies are seen and heard. In mirror neuron studies, the observation of another's movement leads to an embodied simulation of that movement in our own bodies (see Gallese et al. 1996; Gallese and Wojciehowski 2011), and in linguistic studies, similarly, reading about a character's movement in a third-person perspective (such as, "Isabella opened the drawer"; see Gallese and Glenberg 2012) leads to such embodied simulations. Literary narratives, however, rarely relate embodiment in outside perception, or, exteroception, alone. Already the textual examples used by Gallese and Wojchiehowski (2011) include both exteroception and interoception, and this is certainly true for textual examples addressed throughout cognitive literary studies (see, for example, Caracciolo 2014; Kuzmičová 2014; Bolens 2012).

The distinction between interoception and exteroception does not fall back into a Cartesian distinction between the mind and the body; rather, here the mind is linked to the perception of both inner and outer states of the body. The argument has been made as early as Antonio Damasio's *The Feeling of What Happens* (1999), and in recent years research in psychology in interoception with respect to the bodily self, sense of agency and mental health has exploded, as the collection of articles in *The Interoceptive Mind* (2018) indicates. The beating of the heart, the rhythm of the breath and muscle tension all fall under the category of interoception. It is thus distinguished from exteroception, such as vision and hearing, but the distinction is not particularly sharp. You can, for example, hear your own voice inside your body (especially, when your ears have fallen shut on the plane). When we perceive the world, indeed, the interoceptive and exteroceptive tracks of perception are usually aligned (see Seth 2014; Tsakiris 2017). The passage from Moshfegh's novel, however, also shows that literary texts feature moments of shifting between interoception and exteroception and from presenting one of these tracks only in the potential.

Very generally, I propose the following scheme for how interoceptive and exteroceptive embodied language are related to each other in literary fiction, along with informed guesses about what effects on the reader may be:

(1) Interoception and exteroception are integrated, as in this passage:

> I truly hated her in that moment, watching her navigating the icy roads, craning her neck to see over the dash from the sunken seat of the car. (2018, 123)

The inner perception of the emotion of hatred interlaces with what the narrator perceives visually. Such an integration of interoception and exteroception tends to evoke a sense of "presence", as has been indicated in the discussion in cognitive science (Seth 2014), but also by cognitive literary studies in different terms (see Kuzmičová 2014).

(2) Exteroception dominates

> I'd get two large coffees with cream and six sugars each, chug the first one in the elevator on the way back up to my apartment, then sip the second one slowly while I watched movies and ate animal crackers and took trazodone and Ambien and Nembutal until I fell asleep again (2018, 1)

The passage involves traces of interoception in the gustatory modality (with the cream and sugar) and the elevator ride (shading into proprioception). However, exteroception dominates here. As the actions, movements and objects involved do not translate into inner perceptions or thoughts, I propose that this arguably creates a sense of detachment from the process of taking rather large quantities of sleeping pills and going to sleep.

(3) Interoception dominates

> I was going to sleep now, I hoped. I tried to surrender. But I would not sleep. My body refused. My heart shuddered. My breath caught. Maybe now is the moment, I thought: I could drop dead right now. Or now. Now. But my heart kept up its dull bang bang, thudding against my chest like Reva banging on my door. (2018, 229)

In a passage where interoception is dominant, arguably a sense of disorientation tends to be provoked, which is dispelled in the passage above when the pounding is related to Reva's knocking on the door and exteroception is introduced again.

Note how also emotions are related to interoception in Moshfegh's novel. When the narrator remembers her parents' funerals, she expects to experience "grief" and the "coals of woe". In this situation, a certain inner state is predicted, and the cultural outlines that we give to these concepts give a sense of such an inner state. These predictions are not necessarily very precise, but we know that "irritation" relates to a different state that is unexpected and inappropriate. These concepts relating to predictions develop through the learning of language (see Barrett 2017), but arguably also through the cultural learning of embodied habits and practices (see Roepstorff, Niewöhner and Beck 2010), which underlines the cultural specificity of how interoception is conceptualised and communicated. When comparing novels from different cultures, one might well investigate how interoceptive embodied language relates to the emotion language which characters and narrators use. For my present concerns, I will discuss interoception more generally in what follows but it is worth noting that this dimension of embodiment is profoundly situated in cultural and historical contexts.

2. Interoception and the Embodied Reader

Actual readers engage in a diverse range of practices, while the embodied reader is a model reader, proposing a template for conceptualising how empirical results from second-generation cognitive sciences, like the mirror-neuron studies and cognitive linguistics, configure into a likely constellation in the reading process. A primary outline of the model (Kukkonen 2014) was developed in dialogue with Wolfgang Iser's "implied reader", and it is not a moment-by-moment description of how real readers experience the text. The model is developed from research in how embodied cognitive processes contribute to the comprehension of language and written texts, ranging from motor resonances in the brain when body parts are mentioned (Pulvermüller 2013), priming of motor responses when reading about movement directly (Glenberg and Kaschak 2002) or in metaphorical contexts (Gibbs and Coulston 2012; Barsalou 2016). It also draws on results in predictive processing for how we predict the outcome of a movement before executing it (for example, when we run through the movements for a throw but only release the ball the second time we perform the movement; see Friston et al. 2010). Predictive processing provides in this context the means for the model to discuss how embodiment plays out in time and across different levels of reliability in narrative. The model of the embodied reader itself makes no empirical claim, but the hypotheses of the model, derived from empirical research, could be testable.

How then would we study interoception in reading empirically? In a much-cited study, Sarah Garfinkel et al. (2015) distinguish between interoceptive accuracy, interoceptive sensibility and interoceptive awareness. Interoceptive accuracy refers to whether you have a correct sense of your interoceptive signals. Can you recognise your own heart-beat from a different kind of rhythm? It seems that this is not a given (see Garfinkel et al. 2015). Interoceptive sensibility, on the other hand, refers to your subjective sense of inner states. How well are you in tune with yourself? Or rather, how well do you *think* you are in tune with yourself? It seems that the differences between interoceptive accuracy and interoceptive sensibility are enough to warrant a third category for Garfinkel et al., which is interoceptive awareness, namely, the correlation between the accuracy and confidence you have in knowing your inner perceptions. Interoceptive accuracy is measured empirically through heart-rate detection measures and interoceptive sensibility is measured through a self-evaluation in the form of questionnaires (most prominently, the so-called body perception questionnaire BPQ; Porges 1993). Interoceptive awareness, then, emerges from the comparison of these two sets of data. If your interoceptive accuracy and your interoceptive sensibility are both low, then you nevertheless have high interoceptive awareness. If your interoceptive accuracy is low, however, and your interoceptive sensibility is high, then you have low interoceptive awareness. You think you are in tune with yourself, when, objectively speaking, you are not.

Before going into the details of how the embodied reader is likely to respond to literary texts, we can use Garfinkel et al.'s distinctions to ask whether regular readers have a particular signature with respect to their interoceptive accuracy, interoceptive sensibility and interoceptive awareness? It is likely that there are large individual differences when it comes to interoception, and the question arises whether interoceptive traits are affected by the practice of reading. Are readers of literature better or worse than average? To my mind, both hypotheses are equally feasible: Readers might get an accurate sense of their body states (that is, high interoceptive awareness) because they spend a lot of time exploring them in the special context that the text gives. Alternatively, however, readers might have an inaccurate sense of their body state, because they attune with the interoceptions presented in literary texts. And such low interoceptive accuracy of their own body state might then correlate with a high degree of interoceptive sensibility. Confounding factors remain, of course, in that it might well be people with a particularly high degree of interoceptive accuracy and/or

interoceptive sensibility that like reading and therefore do a lot of it. While Farb et al. (2015) report a range of studies for interoceptive traits in mindfulness practioners (15), none such studies have been conducted for readers. Testing undergraduates in literature studies or members of a book club with the measures proposed by Garfinkel et al. (2015) and comparing to the results from a group of infrequent readers would be one way to establish a baseline between reading and interoception and their likely co-occurence in terms of a trait.

What about readers' own bodies, as they sit still and follow the printed text with their eyes? How can the discrepancy between the actual posture and embodied resonances while reading be integrated into my account? Let me approach the comparison from an oblique angle, namely, through the so-called "dark room problem" in discourses around "predictive processing" (Clark 2013, 193). The model of "predictive processing" posits that cognition strives towards "prediction error minimisation", namely, either explaining away prediction errors through adjusting the predictions in perceptual inference (for example, identifying the interoceptive state as "anger") or through removing the prediction error in active inference (for example, breathing slowly to reduce the anger that you feel). Barrett (2017), who also draws on predictive processing, operates with a "body budget" that needs to be kept in balance. Why, however, do we then not go into a comfortably heated room, shut the door and turn the lights off? Such an approach would minimise prediction errors very effectively and keeps the "body budget" in balance. Andy Clark formulates the problem as follows, when he outlines the philosophical stakes of predictive processing, "How can a neural imperative to minimise prediction error by enslaving perception, action and attention accommodate the obvious fact that animals don't simply seek a nice dark room and stay in it? Surely staying still inside a darkened room would afford easy and nigh-perfect prediction of our own unfolding neural states?" (2013, 191).

Quite a few responses have been brought forward. In one of these, Pezzulo, Rigoli and Friston (2015), the argument for the seeming paradox of the imperative of prediction error minimisation and human beings' explorative nature is devised through the homeostatic relationship between interoception and exteroception. Pezzulo, Rigoli and Friston observe that we tend to keep our interoception stable. And because of the homeostasis between the inner and the outer, Pezzulo, Rigoli and Friston suggest that we can be explorative, creative and adventurous, when it comes to exteroception. Manos Tsakiris surveys a range of studies about the relationship between exteroception and interoception and observes that the exteroceptive dimension is malleable, while the interoceptive dimension is geared towards stability (2017, 344). Tsakiris discusses the way in which these two sensory tracks relate on the level of the bodily self (located on a fairly high level of embodied perception), however, the malleability of exteroception and the stability of interoception appears to apply more generally, and this is relevant for modelling the embodied reader.

Reading literature offers a significant contrast to the scenario of flexible exteroception and stable interoception described in Pezzulo, Rigoli and Friston (2015). When we read a novel, it is our exteroception that we keep comparatively stable. We tend to sit still, prefer a quiet environment with few distractions, and we pay attention to a visual stimulus which unfolds in great regularity and in the low-bandwidth format of only 26 printed letters (at least in the case of the Roman alphabet). If the logic of a homeostasis in a balance between exteroception and interoception applies, then reading a literary text allows readers to be explorative, creative and adventurous when it comes to their inner perception. In other words, if we sail the oceans, measure the world and delight in exploring new parts of the city because interoception is kept comparatively stable, then we can similarly probe our inner states, reflect on our feelings and mental pathways with a particular range and depth whenever we keep exteroception stable. The interoceptive workings of the perception of body states, their appraisals and adjustments in emotions, become exceptionally accessible for the embodied

reader. Given that it is thought to underlie the "bodily self" (Tsakiris 2017; Seth 2014), interoception might even be extended into inner thought decoupled from the environment like mind-wandering.

While introducing the notion of interoception in the previous section, I have foregrounded how interoception is represented and evoked *within* the embodied language of the literary text. In the present section, we have moved to an (admittedly speculative) account of how readers' exteroception of the written literary text and their interoception in the reading process might be related. It might be the case that the reading process itself enables a trade-off stabilising exteroception to make interoception more explorative, which will in turn have an impact on the traits of regular readers when it comes to interoceptive accuracy, sensibility and awareness. In the next section, I will address which elements of the embodied, interoceptive language of a literary text might facilitate the inner explorations we have posited here. I propose to conceptualise the particular integrations between the embodied reader and the literary text during the reading process through "interoceptive attunement" (namely, the progressive coordination between readers' interoception and the interoceptive embodied language of the text) and "interoceptive anchors" (namely, points which link readers' interoceptive explorations and remindings to the literary texts).

3. Interoceptive Attunement

Reading is a process which extends through time. As a literary text develops, readers get "into" it, familiarise themselves with the patterns and the feel of its interoceptive dimension. We could call this process "interoceptive attunement", since it relates to the (almost musical) linking between the moves and rhythms of the text (in its syntax, repetitions of sounds, etc.) and the moves and rhythms of readers' interoception (in pulse, breathing and coordinated movement). There is certainly much anecdotal evidence of such a phenomenon, but is it possible to study the process and textual signatures of interoception that facilitate such attunement more precisely? For poetry, where rhythm and metre is a more central concern, a number of pioneering studies have taken physiological measures of pulse and facial muscles and related them to words in the text pertaining to mood and atmosphere (Jacobs et al. 2016).

For developing some proposals related to literary fiction in prose and to the specifics of interoception, let us consider again the interoception-dominant example from *My Year of Rest and Relaxation*:

> I was going to sleep now, I hoped. I tried to surrender. But I would not sleep. My body refused. My heart shuddered. My breath caught. Maybe now is the moment, I thought: I could drop dead right now. Or now. Now. But my heart kept up its dull bang bang, thudding against my chest like Reva banging on my door. I gasped. I breathed. I'm here, I thought. I'm awake. I thought I'd heard something, a scratching sound at the door. Then an echo. [...] It was the sound of blood rushing to my brain. My vision cleared. I went back to the sofa. (2018, 229)

The first-person narrator of Moshfegh's novel attempts and fails (again) to fall asleep. The embodied language of the text, which provides the places for readers' bodies to link to meaning-making, is highly interoceptive. She refers to her heart, her breath and the "sound of blood rushing to my brain". The beating of her heart is enacted with the figure of her friend Reva, banging on her door, but also through the repetition of works like "now, now", "bang bang". The rhythm of the syntax, with its stop-and-start sentences syncopated by the first person pronoun, seems to parallel her breath that "catches". Research on the embodied dimension of literary language (as I have outlined at the beginning of the previous section) would suggest that readers would similarly feel the narrator's interoceptive experience on their

own bodies.

When we want to investigate the development of such interoceptive embodied responses while reading, a number of empirical methods can be deployed, from questionnaires asking how participants felt to inviting readers to indicate on a body map where they felt an impact of the text (Kuijpers and Miall 2011). The temporal dimension of attunement could be measured through the heart rates and breathing rates of readers, a measure to my knowledge rarely used in the empirical study of reading. Does readers' breathing follow the syncopated syntax in the passage above? Does their heart beat come to correspond to the rhythm of the sentences? What is the relationship between these two measures in reading? Garfinkel et al. (2016) underline that the cardiac dimension, predominantly investigated in the study of interoception, does not always correlate with the respiratory dimension in the studies that have been done. One might have high cardiac interoceptive accuracy but only poor respiratory interoceptive accuracy. (This would be the case with a certain kind of anxiety patient). An empirical study of interoceptive attunement in reading might well study both the cardiac and the respiratory dimension of interoception, to see (1) whether either the cardiac or the respiratory dimension is more easily attuned to the text, or (2) what the role of textual rhythm is in relation to either dimension (which is in particular relevant with respect to subvocalised reading and the respiratory dimension).[3]

Even though we can describe the language used by Moshfegh analytically in terms of rhythm and syncopation, readers read at different speeds. We get close to an objective measure, however, if we use eye-tracking to follow the eye-movements of readers from word to word. Then, it should be possible to check whether the speed of the text, or rather the speed at which readers read it, coordinates itself with the speed of the heart rate and the breathing rate. My example here is one of fictional prose narrative, none the least because that is the form in which most read literature today. Poetry and verse, however, offer important comparisons to investigate whether an interoceptive attunement between readers and text takes place. Reading out loud in a social setting or hearing the text through an audiobook would be another interesting comparison case, where arguably interoceptive attunement would function significantly different from holding a paper copy of *My Year of Rest and Relaxation* in your hands.

Ellen Esrock (2004) has made the intriguing suggestion that readers might use their "somato-viscero-motor system (SVM) for a non-imitative activity" that she calls "re-interpretation", where these capacities are translated across modalities. Esrock gives the example of a reader deploying their breathing to experience the expanse of a long-reaching cloud. Breathing, a bodily activity that is felt through interoception, stands in for exteroception, in this case, visual perception, in order to render a fully embodied experience in reading. Indeed, this link between exteroception and interoception which Esrock locates in readers and texts respectively, also seems to be built into the prose of the modern novel. Moshfegh's *My Year of Rest and Relaxation*, like the modern novel in general, features both the inner and the outer perceptual tracks and modulates their relation. The way in which the embodied reader walks the line between interoception and exteroception and how she uses one mode to supply (or "re-interpret") the other mode, stands much to gain from empirical investigation.

If we take Friston and Frith's (2015) idea that communication depends on a "synchronisation of predictions" as a model for the reading process, then readers develop shared predictions with the text and suppress awareness of their own body states in sensory

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[3] Subvocalisation refers to the internal speech made when reading. While in particular novice readers "sound out" words, expert readers do not seem to resort to it. However, it has been argued that subvocalisation underlies all processes of reading (see Baddeley, Eldrige and Lewis 1981).

attenuation (see Kukkonen in press). These observations link to empathy, conceptualised in cognitive literary studies as readers' aptness in taking another's perspective and feeling for them (see Oatley 2016).This is not necessarily the same as the alignment of predictions that I consider the basis of interoceptive attunement. Interoceptive attunement does not mean that readers simply imitate the interoceptive states made available through the text. While their own body states are muted to enable an encounter with the embodied signature of the text, it nevertheless continues to inform how the individual reading process turns out. In the process of interoceptive attunement, in other words, a balance is struck between the embodied signature of the text and readers' own body state. Such a balance would also inform the degree of empathy we feel for characters.

Interoception complicates the classical debate around literature and empathy in a number of ways. If regular readers are good interoceptors, this does not yet mean that they have high empathy, because they might simply be in tune with their own body states rather than with those of others (see Palmer and Tsakiris 2018). High interoceptive sensibility, at the same time, is no guarantee that this corresponds with an actual awareness of interoception. The multiple issues here allow us to take a more diversified stance on the classical equation "reader of fiction = good perspective-taker = high empathy" that many studies attempt to establish (see Kidd and Castano 2013 for one that garnered a lot of public attention). Reading literary texts might or might not entrain a swift interoceptive attunement between reader and texts, even though interoceptive attunement is a phenomenon that should be investigated for its constituent elements and for the textual features that tend to foster it. The next question then would be how readers move from such an embodied encounter with the text to linking this to the conscious experience of "relating" to the text.

4. Remindings, Mind-Wandering and Interoceptive Anchors

If readers indeed attune their interoception to the interoceptive language offered by the text, then it seems more likely that texts guide readers in the exploration of inner states. However, such an exploration is not limited to a mere following of the textual signal. Interoceptive attunement, that is, the coordination of readers' interoception with the embodied interoceptive cues that the text provides, is only one component of the exploration of inner states to which literary reading might give rise. It is in particular related to the embodied, pre-conscious dimension of interoception. When reading literary texts, however, readers also engage in more conscious explorations and reflections of inner states (their own or that of characters), which relates to the fourth level of interoception in Quadt et al (2018): "consciously accessible psychological expression". I propose another example from *My Year of Rest and Relaxation* to guide our deliberations. Here the narrator takes her last sleeping pill, just before the end of the year:

> I began to drift into the darkness, descending at first slow and steadily, I felt I was being lowered by pulleys – by angels with gold-spun ropes around my body, I imagined, and then by the electric casket lowering device they used at both my parents' burials, and so my heart quickened at that thought, remembering that I had parents once, and that I'd taken the last of the pills, that this was the end of something, and then the ropes seemed to detach and I was falling faster. (2018, 274)

Interoception unfolds along the arc of descent, in a single, beautifully crafted sentence. The narrator is "descending at first slow and steadily", then her heart "quickened" and then the fall is suddenly accelerating toward the very end of the sentence. The arc of interoception, however, embeds a number of departures from the here and now, as the narrator imagines the

"gold-spun ropes", and as she remembers her parents' funerals and taking the last pill. These moments when characters remember or imagine might be moments where also readers engage in processes of mind-wandering, letting their thoughts stray from the immediate events in the novel and relating them to their own lives. The suggestion is admittedly speculative. It is a proposal for the textual aspects that are likely to serve as starting points for mind-wandering while reading. Such second-order mind-wandering, following the mind-wandering of characters into one's own imagination and into memory, could arguably lead to the kind of mind-wandering called "tuning out", that widens the scope of mental investigation and remains related to the stimulus (see Fabry and Kukkonen 2019).

As the narrator remembers her life, referring back to earlier moments in the novel when she took her sleeping pill (just a couple of pages before) and when she remembers the funerals of her parents (more than one hundred pages earlier), readers might also choose these moments to begin mind-wandering and to relate what they read more or less closely to their own life, establishing personal relevance (Kuzmičová and Bálint forthcoming). The phenomenon has been studied under the name "remindings", and it falls under self-referential ways of reading which can be more or less closely tied to the text. Remindings were first studied in relation to reading (see Larsen and Seilman 1988; Seilman and Larsen 1989). In these experiments, participants were asked to read a literary text and mark in the margins where they were reminded of things in their personal lives, and then after reading, they were interviewed by the researchers to detail these remindings. Miles and Berntsen (2015) present a series of studies in which they continue the research started by Larsen and Seilman and compare remindings in reading and writing tasks. They find that reading tasks will generate more personal remindings than writing tasks, and suggest that it might be due to the "boredom" in reading, which tends to elicit mind-wandering. Since Miles and Berentsen do not indicate whether the remindings in the reading condition were related to the texts which readers read, it seems a little too simple to assume that these remindings come through boredom. It might be a positive property of the literary text to offer places to establish self-relevance which has been studied in many different guises in empirical literary studies (see again Kuzmičová and Bálint forthcoming for an overview). Neither Larsen and Seilman nor Miles and Berntsen are very specific about the textual features that are likely to provoke such remindings.

I have proposed above that readers begin mind-wandering when characters or narrators begin their own mind-wandering in remembering or imagining. The suggestion leaves open whether such remindings are necessarily relevant to establishing personal relevance in the text or whether they lead readers further away from the text. It is also not decided whether readers necessarily experience the same kind of reminding as the character. Kuzmičová and Bálint note that establishing personal relevance does not only depend on thematic saliency but also on emotional valence (forthcoming, 24). It might also be worth an empirical investigation to see whether readers follow characters and narrators into similar kinds of mind-wandering. When Moshfegh's narrator remembers something, do readers also remember, and when she imagines, do readers also imagine or project? The specifics of the literary text could be central to identifying the dynamics of thought that reaches from interoceptive attunement to modes of mind-wandering

Another question arises in relationship to readers' remindings. How do readers get back into the text after thinking of their own lives? What is the contact point at which they orient themselves again? The research on mind-wandering is relevant for our discussion of reading, because rather often reading texts (including literary texts) is taken as a task in empirical studies. When readers are not paying attention to the text anymore, and when they cannot remember what they have just read, mind-wandering ensues in a relatively easily measurable fashion. There are a number of issues with these studies (see Fabry and Kukkonen 2019). It has been frequently investigated how readers tune out (mind-wander while aware of

it) and zone out (mind-wander without awareness; see Smallwood and Schooler 2015 for an overview). The question of how readers find their way back into the text, however, is to my knowledge not addressed. It might be the case that the interoceptive embodied dimension of the text has something to do with it. The sentence in our example above spans a continuous arc of embodied, interoceptive language, from which the narrator (and perhaps readers) launch into mind-wandering and remindings. My proposal is that "interoceptive anchors" allow readers to pick up the thread of the narrative again after their minds wander.

For the empirical study of such mind-wanderings, it might be possible to draw again on eye-tracking to identify moments when the mind-wandering begins. Also the micro-phenomenological method of interviewing practitioners, which has been used for meditation (Petitmengin et al. 2017), probing deeply into the experience, would be a possibility to find out more about anchors where the mesh between reading and mind-wandering is linked. Moshfegh gives readers strongly embodied cues before the imagining ("I felt as if my body was lowered by pulleys") and before the memory ("my heart quickened") along the downward trajectory of the sentence, ending the flashback as the downward journey accelerates with the detached ropes. These strongly embodied, interoceptive cues along the trajectory of the sentence would provide "interoceptive anchors" for the embodied reader. The hypothesis to be investigated would be that readers begin to mind-wander with the narrator and then find their way back through interoceptive anchors, which, if Moshfegh's text is a reliable indicator, will stand in the text a little before the mind-wandering cue.

Such studies would further help us explore the links between interoception and the meta-cognitive dimension of so-called "deep reading". Deep reading describes the phenomenology of reading as it is experienced in particular with literary texts, an absorbed, yet attentive state (see Wolf 2008). If it is right that readers ride on the back of characters' mindwandering into their own reflection, and if it is right that interoceptive anchors bring them back into following the progress of the text, then we could find a way for discussing this seemingly self-contradictory cognitive experience in more detail and with greater precision. Such a combination between enacting and reflecting depends, I would argue, on the literary form. The sensory flow of embodiment in the literary text is designed, and literary form arguably enhances the potential for inner explorations. Indeed, Moshfegh's own formal mastery in prose-writing suggests that there is an important dimension of interoception that is closely tied to form. We have discussed the ways in which the rhythm of the sentences could support interoceptive attunement, and how the relation between interoceptive anchors and cues for mind-wanderings is deployed in her writing. It might very well be the case that in other examples such configurations of interoceptive attunement and interoceptive anchors are deployed without the mind of a character or narrator. Especially in instances such as the ones we discussed for Moshfegh's novel, however, form and content are entwined, and these are likely to yield the most powerful effects in the exploration of inner states because the enaction and the reflection occur at the same time, as we read about the heart-beat of the narrator and might be lead to enact it through the rhythm of the syntax.

5. Mindful Reading and Interoception

Moshfegh's *My Year of Rest and Relaxation* allows for a number of readings. The novel tells a story of profound disenchantment with the templates of societal success and self-optimisation, taking discussions about the need for sleep, deceleration and digital detox to their logical conclusion. "Rest and relaxation" comes to be a moment of total detachment. In this respect, the novel also relates to the current vogue for mindfulness. Mindfulness meditation is practiced in a variety of ways, but it centres around the attempt to come to rest and focus

attention inwards. Research on interoception and well-being in cognitive psychology[4] is heavily invested in mindfulness meditation (more specifically, mindfulness-based cognitive behavioural therapy, MBCT) and thus suggests a number of intriguing possible links between reading and meditation, especially in the context of investigations and interventions in issues of mental health.

In their introduction to a research topic on interoception and mindfulness in *Frontiers in Psychology*, Farb et al. (2015) outline the importance of linking the brain-to-body signals of interoception with the ways in which we assess and experience it. They underline, as we have in the first section of this paper, interoception as the immediate perception of inner bodily states and its links to emotions and feelings. The immediate perception of inner states and the emotions and feelings to which they are connected, are described as an "iterative process, requiring the interplay between perception of body states and cognitive appraisal of these states to inform response selection" (Farb et al. 2015, 2). Mental health issues can then be reconceptualised as imbalances in the relation between interoception and emotions (Tsakiris and Critchley 2016) or imbalances in the "body budget" (Barrett 2017). In particular, depression, anxiety and autism are prominent mental health problems discussed in the research literature along these lines.[5]

These multiple adjustments between body states, inner perception and appraisals are central to the discussion of interoception in relation to mental health. Interoceptive events are considered "bodily anchors of selfhood" (Quadt et al. 2018, 3). Also Seth (2014) argues that interoception and the ways in which we have habituated ourselves to respond to interoceptive prediction errors, constitute an "embodied self" defined as the body state "most likely to be me." Farb et al. (2015) refer to research indicating that life experience affects interoception and the appraisals that come with it. Since the relationship between interoception and cognitive appraisals is not fixed in this model, it is possible to affect it through cultural practices. Farb et al. (2015) think here of "contemplative practice". Through MCBT-related practices, Farb et al. (2015) argue, we gain the skill to draw percepetual inferences with relation to interoception, emotions and feelings. "While active and perceptual inference both seek to minimise the disparity between sensed and expected states, they differ in their means of reducing this disparity. Overt active inference is a process by which the organism acts to confirm/disconfirm attributed causes of unexpected interoceptive sensation, whereas perceptual inference acts to reduce the surprising nature of the sensation by broadening sensory expectations, reducing their inferential weight on the simulation layer" (2015, 8). Those practicing mindfulness meditation, in other words, gain the option to respond to the interoceptive signature of anger with a perceptual inference, à la "oh, this is me when I am angry." Through such perceptual inferences, mindfulness practitioners come to be more in

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[4] *Frontiers in Psychology* launched a research topic "Interoception, Contemplative Practice and Mental Health" in 2015, which has now assembled 27 articles. Tsakiris and Critchley report in the introduction to a special issue in *Philosophical Transactions of the Royal Society* that "Over the last 10 years, there has been a sixfold increase in the number of new publications on the topic of interoception" (2016, 2).

[5] In a recent survey piece, Quadt et al. (2018) detail for example that depression patients have a lower accuracy in detecting their own heart-beat, and that such interoceptive inaccuracy can account for the "numbness" experienced by these patients (10). For persons suffering from autism, research in interoception suggests (with not entirely consistent details) that "interoceptive accuracy may be impaired in autistic individuals and that this may be particularly coupled with emotion-processing difficulties" (ibid, 11). Finally, those suffering from anxiety disorders seem to overestimate their interoception in self-reports and have a skewed correspondence between what they think their interoception is like and what it is actually like (ibid. 12).

control of the trade-off between the perception of body states and the emotion prediction, as well as the motivation and pressure to respond to them in a particular way. Indeed, Farb et al.(2015) argue that perceptual interoceptive inference in mindfulness practice "frees higher order resources to allow metacognition" (16), and relates to "the idea that one's thoughts can be viewed as transient mental events rather than as cues to immediate action [which] is often referred to as *decentering* or *re-perceiving* in mindfulness literature" (ibid.).

      The investigation of literature through interoception gains an important link to the lifeworld in this respect. If my suggestions above are correct, then, literary reading is a cultural practice that enables us to explore inner bodily states, along with emotions and remindings connected to them, in a relatively controlled fashion through the design of the literary text. The embodied language of literary texts is carefully shaped across multiple and complexly entangled strands of meaning-making. Most relevant for the case I have made are the linguistic rhythms creating interoceptive attunement, and the dynamics of exploration between mind-wandering that evokes remindings and the interoceptive anchors that guide readers back into the text. Reading literature, as I have described it in section 2, would be comparable to mindfulness meditation in that it stabilises the exteroceptive side of the balance between interoception and exteroception. The term "mindfulness meditation" of course serves as an umbrella term for a great number of meditative practices, but especially MCBT tends to work towards a stabilisation of exteroception (see Williams and Penman 2011). This includes, for example, exercises where practitioners close their eyes or where they intently focus on a single thing in visual perception. The exploration of interoception, then, unfolds along a set of instructions (for beginning practitioners in any case) and is closely related to the calm perception of inner body states. Significant differences between reading literature and practicing mindfulness remain. These are to do with the rich stimulus that the literary text provides to the exploration of inner states in reading, and the rather poor stimulus that practitioners of mindfulness meditation are given.

      At this point, I can only offer theoretical suggestions for the possible mental health benefits of literary reading based on the argument of this article, but arguably, this opens a rather large field for empirical inquiry. It might link to work on the ways in which narrative leads to a "temporary expanding of the boundaries of self" and thereby mitigates the experience of a depletion of self (see Slater et al. 2014). In particular my observations on mind-wandering and interoceptive anchors could be relevant here to identify the textual features that are likely to be responsible for these effects on the reader. Both interoceptive attunement and interoceptive anchors support and guide readers' exploration of inner states in a relatively non-restrictive fashion. It traces a trajectory of interoceptive accuracy and interoceptive sensibility that might relieve readers from the imbalances in the "body budget" which seem to underlie mental health issues such as depression, anxiety and obsessive-compulsive behaviours. Reading is a practice in which most have been trained for several years, whereas mindfulness meditation is not part of general education and is usually learnt in adult life. Indeed, an argument might be made for (literary) reading to be emphasised in schools, because it offers not only practice in the most complex aspects of the central cultural skill of reading but also (potentially) significant benefits with respect to mental health.[6]

      This approach to literature and mental health is different from current models of bibliotherapy, which rely either on the thematic relevance of the text or on shared, guided discussions among readers. It also aligns with recent calls for a better understanding of the literary text and interpretation when claims about the literature and its benefits for well-being are developed. Exactly which constellations of text, reading situation and mental affliction are likely to be beneficial needs to be empirically investigated. For interoception alone profound

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[6] There are also proposals for a "contemplative" approach to education (see Zajonc and Palmer 2010), to which connexions can be made.

variations seem to emerge and different interoceptive constellations are related to different mental health issues (see Quadt et al. 2018). Indeed, as Emily Troscianko (2018) points out, we need to consider that texts featuring the particular affliction from which the reader suffers might have an adverse effect and that it might be other modes of relating in the reading process that actually help readers. Books like *The Novel Cure* (Berthoud and Elkins 2013) propose that certain novels make therapeutic reading for particular afflictions, taking a somewhat playful approach. In the practice of "shared reading" (Billington 2016), participants are guided through a short literary text, reading it out loud and reflecting on its impact. My argument through interoception now suggests that also the traditional mode of reading literature, silently and engrossed, might have positive effects on mental health and well-being.

These effects would arise if my account is correct, because the literary form of interoception shapes the interoceptive dimension in such a way that it enables the effortless exploration of inner states. Because of the inversion between interoception and exteroception in the relation between text and reader, the embodied reader does not simply simulate embodiment in the text but starts exploration. It is the designed sensory flow of the literary text that provides the interface (structured through interoceptive anchors) along which these explorations unfold. The aspects of interoception in reading even apply when we deal with characters who experience little mental well-being; a rather common occurence in literary narrative. Indeed, Moshfegh's narrator stands in a long line of disturbed minds, including Dostoevsky's Raskolnikov and Camus' Mersault. If it is interoceptive form and not simply embodied simulation that shapes reading, then readers also develop the mesh of involvedness and meta-cognition that is described as typical of deep reading, or, perhaps, mindful reading.

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Research on interoception and mindfulness meditation, I have argued, lays the foundation for a research programme centred around interoception for the study of literature and its relation to well-being. First, it needs to be established whether high interoceptive accuracy and/or high interoceptive awareness are traits (or trait-like features) of habitual readers. Then, attention should be turned to the ways in which interoceptive accuracy and awareness change while the reading process unfolds. On the one hand, behavioural measures need to establish these effects empirically, while on the other hand, literary studies need to identify an inventory of interoceptive anchors and their stylistic features, so that the effects in readers can be systematically related to the devices of literary texts. When a better understanding of the role that interoception plays in the reading process has been achieved, these results can then contribute to an investigation of the dynamics between interoceptive attunement and remindings and their relation to the alleviation of mental distress. Literature's role in well-being today could come to be investigated through a feature that literary critics have noted for the novel from its very beginnings: the exploration of inner perceptions.

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