

# Resampling (Narrative) Stream of Consciousness: Mindwandering, Inner Speech, and Reading as Reversed Introspection

**Abstract:** This article promotes the idea that current cognitive models of mind wandering and inner speech can help us better understanding the phenomenological constituents of what Joyce calls “the mystery of the conscious” as simulated by modernist literary investigations. We will rework a model of perceptual decoupling (or how attention disengages from perception) and peripheral awareness (the interplay of focus and periphery in perception). On the other hand, we argue that modernist introspective explorations can challenge, correct and update cognitive models. We also reflect on reading as a process reversing authorial introspective quests (presenting a model of *reading as reversed introspection*).

**Keywords:** Mind Wandering; Inner Speech; Stream of Consciousness; Virginia Woolf; James Joyce

## The “Mystery of the Conscious”: *How Can We Know About That?*

Around 1918, the English painter Frank Budgen and the Irish writer James Joyce were chatting and physically wandering the streets and cafeterias of Zurich, where Joyce was living and where he was halfway through the writing of *Ulysses*. They were debating arts, literature and then-contemporary cognitive science – that is, Freudian psychoanalysis. Budgen reports how, in one of these conversations, Joyce criticised the psychoanalytic focus on unconscious processes as a too quick dismissal of the enigma of conscious inner life: “Why all this fuss and bother about the mystery of the unconscious? What about the mystery of the conscious? What do they know about that?” (qtd. in Ellman 436)

Thanks to the headway made in neuroscience, psychology and phenomenological research, today we do have more sophisticated models of the conscious mind. Progress in cognitive science in the past few decades has advanced our understanding of the qualities of conscious experience that modernist authors, often on the heels of Joyce, have aesthetically explored. One focus of recent research has been on cognitive processes that are not tied to specific tasks or goals, typically collected under the rubric of ‘mind wandering’ (Callard et al.), in which the focus of consciousness is construed as oscillating between externally-focused cognitions and perceptions on the one hand, and self-generated cognitions on the other. Research in this area has been given a particular impetus by the development of new paradigms for assessing self-

generated thought (Smallwood and Schooler; Gruberger et al.; Mooneyham and Schooler) and by a growth of interest in the 'resting state' of the brain, particularly patterns of highly organised connectivity among neural systems that are evidenced when participants are not engaged in any particular task (Andrews-Hanna et al.; Buckner et al.).

Another area of growing research interest concerns the phenomenon of inner speech, where researchers have addressed the forms and functions of the covert, self-directed speech that characterizes many people's experience (Alderson-Day and Fernyhough). Research in the last two decades has shown that inner speech fulfils varied cognitive, emotional and motivational functions and takes a variety of forms that relate to its proposed developmental emergence from social dialogues (Fernyhough, *The Voices Within*).

Despite this growth of research into mind wandering and inner speech, there has been little attention to date in the human neurosciences on the relation between these two very common, if not entirely ubiquitous, phenomena. Many episodes of resting-state cognition have a verbal character (Delamillieure et al.). Some researchers have proposed that verbal mind-wandering may represent an abstract or condensed form of inner speech, while more task-oriented verbal self-talk may take a more concrete or expanded form (Perrone-Bertolotti et al.; Alderson-Day & Fernyhough). This is congruent with Fernyhough's ("Alien Voices") model in which inner speech takes different forms according to the extent to which it is condensed or abbreviated relative to external speech.

In contrast to this fairly recent scientific recognition, modernist literary narratives had already made of these processes a target of sustained exploration. Narrative theory has accordingly risen to the interpretive challenge posed by these works relatively quickly. Foundational studies as early as the 1960s recognised the relevance of wandering minds and inner verbalizing in modernist narratives. Robert Humphrey's 1965 seminal study on the *Stream of Consciousness in the Modern Novel*, for instance, dedicated insightful pages to mindwandering episodes, albeit under the rubric of 'free association' (a terminological forerunner of contemporary 'mindwandering'). Dorrit Cohn's still superb 1978 work *Transparent Minds* on the presentation of consciousness in fiction, on the other hand, had isolated yet innovative remarks on the fictional rendering of inner speech (88-98). Both these studies were also (lightly, but beyond surface levels) in interdisciplinary dialogue with psychology, from William James to Lev Vygotsky.

This early interdisciplinary interest in the narrative presentation of the wandering mind and inner speech as specific processes, however, had been sidelined for decades, until a recent resurgence of interest in cognitive literary studies (see Cuddy-Keane; Colm Hogan; Sotirova). This has been due partly to the dominance of exceptionally technical and groundbreaking works on the stylistic devices for consciousness presentation (see, e.g., Leech and Short; Semino and Short); and partly to the demoting of consciousness as an

eminently inner phenomenon (Palmer), and modernism as an aesthetic 'inward turn', with cognitive narratological works redirecting the focus to distributed traces of consciousness in outer actions (Herman, "Re-Minding"). This resulted in a conceptual hiatus for narrative mind wandering and inner speech, often dominated by the unproblematic acceptance of William James' image of consciousness as a 'stream' (thus ignoring James's own doubts and suggestions regarding its dynamic, penumbral composition, to which we shall return; see also Bernini, "A Panting Consciousness"). As a result, literary mindwandering and inner speech remained somewhat under-theorized, and confusion arose on what any particular critic meant both by consciousness as a phenomenon and by its streaming quality as a dynamic feature.

In his innovative *Fictional Minds*, Alan Palmer neatly summarises this ambiguity where "most emphasize the random, associative, illogical, and seemingly ungrammatical free flow of thought, others mention more controlled and directed thought; non-conscious, but also conscious thought; verbal, but also non-verbal thought." (24). To add ambiguity, "other theoretical definitions refer to a completely separate issue: the techniques of thought and consciousness presentation in the discourse" (24). This confusion, it must be said, is somehow true to the origins of the conceptual mystery, since William James himself was puzzled by the heterogeneous composition of the stream, and he famously defined in his *Principles of Psychology* consciousness as a multifarious aggregation of several experiential "units", claiming that "our mental states are *compounds*" of different "mind stuff" (145). Mindwandering and inner speech are, if not core units, key dynamics animating the interactions of units and attentional shifts within mental compounds (Kam et al.). One ambition of this article is to promote the idea that current cognitive models of mind wandering and inner speech can help us better understanding the phenomenological constituents of "the mystery of the conscious" as rendered and simulated by modernist literary investigations. They can provide new ground for a clearer model of the narrative stream of consciousness, able to account for modernist insights into the mysterious nature of the conscious as a simultaneously fragmented *and* unified mental realm. In particular, we will rework a model of perceptual decoupling (or how attention disengages from perception; see Schooler et al.) and peripheral awareness (the interplay of focus and periphery in perception; see Gennaro, *The Consciousness Paradox*, 116-126; "Representationalism") to interpret modernists' rendition of mindwandering episodes, textured by and interspersed with condensed inner speech. This aim thus aligns with an ambition in cognitive science to specify processes that combine to constitute conscious experience, thus creating distance from insufficiently precise terms such as 'thinking' and 'thought' (Fernyhough, "What Do We Mean By Thinking?"; *The Voices Within*).

This is what we claim narrative theory and studies on modernist literature, can gain from cognitive science. But what about literature's relevance for

contemporary research on mind wandering and inner speech? Our argument is that the novel in general, and modernist literature in particular, has developed its own modeling strategies to investigate these processes. Research findings from modernist narratives can thus help to enrich or correct scientific frameworks, building towards a more nuanced and phenomenologically accurate conceptualization of the mystery of the conscious. On the one hand, the simplifying power of contemporary cognitive models of mindwandering and inner speech – rooted in experimental constraints around what can and cannot be empirically tested – makes them powerful tools for cutting through the chaotic mystery of narrative stream of consciousness. This selective simplicity, however, has to be challenged if we are to avoid losing phenomenological soundness. This is our second and equally (if not more) important ambition in this article: to argue that modernist exploratory findings can return the favor by offering resistance or ‘intractable data’ to scientific models, notably on the dynamic relation between mindwandering and inner speech.

Another legitimate question then presents itself: how can literary authors have a say in cognitive modeling? We concede that, *pace* Ian McEwan’s attempts in *Saturday*, literature has little to say on or gain from the working of ‘neurocorrelates’ of conscious states (the brain counterpart to our experiences). These are beyond the realm of experience, so they are impossible to access through human metacognition. When it comes to the experiential level of inner life, however, our answer is that the creation of narrative worlds should be considered as an extended process of introspection (see Bernini, “Affording”; *Beckett and the Cognitive Method*), which reached in modernism an unprecedented methodological boost.

After the disavowal of introspective methods during and beyond behaviorism’s heyday, cognitive science has recently come to reevaluate the potentialities and workarounds to the limitations of introspection as a method. The main problem of introspection is still the circularity tying the observer and the observed phenomenon (the *explanans* is part of the *explanandum*; see Bermudez). In William James’ words, introspection (etymologically conceived as a ‘looking within’) attempts the impossible separation of the unity of experience into a subject and an object – an inner looking which disrupts the phenomenon it intends to capture, like “turning up the gas quickly enough to see how the darkness looks” (244). The inseparability of the observer and the observed (which is the problematic ground for all theories of self-knowledge; see Gertler) remains at the core of current debate on introspection (see, e.g., Shear and Varela; Butler). How can literary authors have a privileged stance or methodology in investigating and then representing the finding of introspective analysis?

We flesh out this question and our answer to it in our final section, where we will claim that creative, authorial introspection has unique protocols,

methods and horizons which generate 'data' that science should take seriously in the modeling of cognition in general, and mindwandering and inner speech in particular. Literary authors, in fact, do not just have to 'look inside' themselves to grasp how the conscious minds works, but they do so in order to simulate these conscious processes as running into another fictional consciousness (what one of us has called elsewhere *introspection for simulation*; Bernini, *Beckett and the Cognitive Method*, "Preface"). To the introspective moment, therefore, literary writers have to couple the running of mental simulations to test if their representation works and can be re-constructed by the reader. In so doing, they have been able to sustain and stabilize introspective access through the technology of writing, as a tool for extended introspection (Bernini, "Affording"). In the final section, we will reflect on reading as a process reversing this authorial quest, transforming the fragmented encoding of conscious processes back into a phenomenologically flowing experience (thus presenting a model of *reading as reversed introspection*).

If twenty-first century in the science has been defined as "the era of mindwandering" (Callard et al.), the first half of twentieth century literature should be considered as its aesthetic golden age. The time is thus ripe for resampling 'the mystery of the conscious' in a way that bridges humanities and scientific periodization. We submit that this interdisciplinary approach can change not only what we know about the mystery of the conscious, but *how* can we know about that. We shall use James Joyce and Virginia Woolf as the usual suspects when it comes to the search for core innovators, although we identify comparative differences between the two in the final section. The bi-directional scope of this article (from cognitive models to literary modeling, and vice versa) should hopefully provide ground for further, cross-period reflections on the narrative modeling of mindwandering and inner speech in previous periods. A limitation of our broader theoretical focus is that we will lack space for deep dives into stylistic presentational technicisms (e.g., direct vs indirect or free indirect presentation of consciousness) which have already received considerable attention (see Cohn; Palmer; Sotirova). Rather, what we propose here can easily be complemented by, or foster updates on, such approaches.

### **Narrating Penumbra: Perceptual Decoupling and Peripheral Awareness**

The difficulty in defining mindwandering comes from its being somehow conceptually indistinguishable from the working of the conscious mind in general. This is why Smallwood and Schooler, two of the more active researchers in the science of mindwandering, begin their critical review on the topic with a general remark about the dynamicity of consciousness, of which mindwandering is for them an 'illustration': "Conscious experience is fluid; it rarely remains on the topic for an extended period without deviation. Its

dynamic nature is illustrated by the experience of mind wandering, in which attention switches from a current task to unrelated thoughts and feelings” (“The Science of Mind Wandering” 487).

There are numerous potential problems that we shall address later in trying to pin down the specificity of mind wandering in its being “task-unrelated” (since modernist mind wanderers have affective forces and concerns that *relationally* magnetize, as a task would do, their wandering trajectory out of their immediate perceptual present). Smallwood and Schooler also partly reject this task-related definition focusing on the ‘what’ of mindwandering in favor of categorizing it as a mode for ‘how’ consciousness behaves in what they call “self-generated thought”. Self-generation, they say, “emphasizes that the contents of experience arise from intrinsic changes that occur within an individual rather than extrinsic changes that are cued directly from perceptual events occurring in the external environment” (490). While this definition has the benefit of accommodating different forms of mind wandering, from deliberate (e.g., intentionally remembering an autobiographic episode or a song) to spontaneous (a personal memory or an earworm intruding), and from task-related (e.g., planning the soundtrack of a party while writing to guests) and task unrelated (e.g., thinking about holidays while peeling potatoes), it establishes too strong a divide and mutual independence between the wandering mind and its external environment. We shall see how this stark wedge is challenged by modernist renditions, where mindwandering episodes are much more dynamically generated by circuiting perceptual and cognitive loops between self and world, inner states and environmental conditions.

The most effective and uncontroversial of qualifiers for mind wandering to is that of a process involving *perceptual decoupling*: a term which suggests that “during periods of self-generated thought, attention is disengaged from perception” (Smallwood and Schooler 500). A classic example of perceptual decoupling is the experience of driving, where our perceptual sensory-motor apparatus remains attuned to the road while our attentional resources are directed to inner thoughts or images. Perceptual decoupling shows how consciousness does not equal attention (see Montemayor and Haroutioun Haladjian 2015); it is rather constituted by the combinatory coupling and uncoupling of attention and perception. Whenever we are attentionally engaged with outer stimuli, attention and perception converge into a feeling of externally focused concentration. More often than not, however, they happily divorce when attention is turned inwardly, and the wandering state begins. The concept of perceptual decoupling is also useful to distinguish mind wandering from external distraction, such as when we are distracted by our mobile phone when talking to someone (here both perception and attention are converging towards another perceptual stimulus). We think that, if characterizing mind wandering in terms of tasks or independence from the environment is reductive at best when looking at modernist representations of

narrative wandering streams (see next section), the less controversial concept of perceptual decoupling can have good interpretive purchase in narrative analysis of modernist innovations, Joyce's *Ulysses* (1922) at the forefront.

The idea of 'wandering' and its semantic field are heavily present in Joyce's novel. A lapsed Christian and a Jew, Stephen Dedalus and Leopold Bloom are, spiritually and historically, part of a community still of 'wanderers on Earth to this day' (15). In a secularization of their spiritual fate, they are physically wandering through Dublin in multi-sensory explorations. In addition, their minds constantly wander or, in Joyce's words, are "unsteady" ("His (Stephen's) mind was not exactly what you would call wandering but a bit unsteady" 704). This unsteadiness accompanies many scenes when their eyes are continuously moving around, sometimes without a specific task or fixation point, as when Stephen is aimlessly listening to Bloom's speech at the cabman's shelter near Butt Bridge. This is just one of the many examples in which one of the two protagonists' attention detaches perception, inaugurating a mindwandering episode. The decoupling is ignited by Bloom enumerating to Stephen the moral virtues of work:

Over his unstable apology for a cup of coffee, listening to this synopsis of things in general, Stephen *stared at nothing in particular*. He could hear, of course, all kinds of words changing colour *like those crabs about Ringsend in the morning* burrowing quickly into all colours of different sorts of the same sand where they had a home somewhere beneath or seemed to. Then he looked up and saw the eyes that said or didn't say the words the voice he heard said, if you work.

—Count me out, he managed to remark, meaning work.

(747; emphasis added)

This moment can indeed be described by building on a cognitive model of perceptual decoupling quite easily. Maybe too easily. The problem with the model, in fact, is that it describes only two possible combinations of perception and attention: either perception and attention can be coupled on the same external object; or perception can be directed to an external object and attention to an internal object (thoughts or mental imagery). Interpreting even a relatively simple mind wandering episode as this one according to the model shows the extent to which Joyce re-presents a greater dynamism and combinatorial possibilities. To say that here Stephen's attention just disengages from external perception for a while and then comes back would be like describing the source and delta of a river without accounting for its bends or currents, and without sampling its water.

The uncoupling of Stephen's attention is neither neat nor absolute. First, Stephen's attention only gradually uncouples from visual perception, due to

the unchallenging tedious moment in the conversation (here matching the idea that mind wandering often initiates over unchallenging present tasks; see Smallwood and Schooler). Then it focuses only on sounds (a weak example of perceptual decoupling). But then the sounds soon become synesthetic analogical triggers for internal images (more firmly marking increases in attentional inwardness), thus becoming the external background for an inner chain of images from Stephen's morning. Even when scanning inner memories, however, Stephen's attention keeps shifting in scale and space, from a panoramic field (about a more holistic view of Ringsend) to close-ups on the crabs' and sand's colors.

Joyce here presents a graduation and fluidity that is only partly accounted by the somehow static and dichotomic description of the co-work of attention and perception in terms of coupling and decoupling. Joyce's novel asks us to rework the model of perceptual decoupling towards a more nuanced and dynamic capability for wandering streams. This can be done by updating further modulations in the decoupling mechanism, as well as nuances in the decoupled state.

We think that advances can be made by following analytic philosopher of mind Rocco Gennaro's theory (as formulated in *The Consciousness Paradox* 116-126) that each conscious state has both *peripheral* (inattentive) and *focal* (attentive) awareness, which can be each and independently "directed at the outer world or directed back to one's own mental states" (117). This way we end up, as Gennaro elaborates, with four possible combinations: a conscious state can be (1) *outer focal / outer peripheral* (OFOP), such when we are in conversation with a friend in a café, yet peripherally aware of people chatting or moving in the near table; it can be (2) *inner focal / inner peripheral* (IFIP), such as when we are introspectively focusing on a specific visual memory, yet peripherally aware of other images, thoughts, sensory mental events or feelings surrounding, preceding or paralleling that image; or it can be (3) *inner focal / outer peripheral* (IFOP), such as in the standard mind wandering state, where focal attention 'zones out' because directed to internal thoughts, images or sounds without the subject's becoming perceptually insensitive to her environment; or it can be (4) *outer focal / inner peripheral* (OFIP), such as when we are engaged in publicly telling a story, playing a piano or rapping over a beat with a peripheral inner sense of what has to follow or how embarrassed we feel.

As already noted, according to the perceptual decoupling model only the third condition would count as mindwandering. By adding focal and peripheral awareness into the mix, we reach instead a more fine-grained spectrum for a water analysis of the conscious stream. This should be evident if we take a sample from the opening page of another milestone in modernist consciousness novels, Virginia Woolf's *Mrs Dalloway* (1925). Together with showing the interpretive potential of Gennaro's model of focal and peripheral



awareness, however, Woolf's text seems to challenge it by calling for two more possible states. We apologize for introducing quite barbarically Gennaro's acronyms within Woolf's text for easier reference in the analysis that will follow:

[OFIP] What a lark! What a plunge! [IFIP] For so it had always seemed to her, when, with a little squeak of the hinges, which she could hear now, she had burst open the French windows and plunged at Bourton into the open air. How fresh, how calm, [OFIP] stiller than this of course, [IFOP] the air was in the early morning; [IFIP] like the flap of a wave; the kiss of a wave; chill and sharp and yet (for a girl of eighteen as she then was) [IIFIOP] solemn, feeling as she did, standing there at the open window, that something awful was about to happen; looking at the flowers, at the trees with the smoke winding off them and the rooks rising, falling; standing and looking [IOFIIP] until Peter Walsh said, "Musing among the vegetables?" — [was that it? — "I prefer men to cauliflowers" — was that it? He must have said it at breakfast one morning when she had gone out on to the terrace — Peter Walsh. [IFOP] He would be back from India one of these days, June or July, she forgot which, for his letters were awfully dull; it was his sayings one remembered; his eyes, his pocket-knife, his smile, his grumpiness and, when millions of things had utterly vanished — how strange it was! — a few sayings like this about cabbages. (1)

We open the threshold of the novel in synchrony with Mrs Dalloway opening her window in London. In doing so, Clarissa is pleasantly assaulted by perceptual feelings of excitement (marking an outer focus), suddenly awakening a background of analogical, superimposing memories from her past. These are still in the shadow of her present sensory-motor pleasure, only surfacing at the level of an inner peripheral awareness. This initial segment therefore classifies as OFIP. The magnetizing affective power of the memories, though, soon decouples her attention from external perceptions, and turns it inwardly, initiating a mind wandering episode. This inward wandering state, however, displays both focal attention (to the whole action of opening the window in her past at Bourton) and a peripheral zone of awareness (the squeaking hinges, sensorily presentified at the periphery of the memory). Here we have a case of IFIP, which already shows how the simple idea of perceptual decoupling is not fully accounting for the richness of a single temporal slice of the wandering state.

Limitations become even more evident when we follow the dynamic unfolding and looping between inner and outer worlds in Clarissa's wandering mind. After the first wandering segment with focal and peripheral awareness both converging in her past, in fact, she compares the air of the memory scene in Bourton with her present perception of London (a focal return to her perceptual present marked by the indexical "stiller than *this*"). Here the previously uncoupled attention of her wandering state momentarily fluctuates

back, with the memory scene regressing to the periphery of awareness (OFIP). This fluctuation is extremely brief, and attention immediately goes back to Clarissa's inner world, like a kite which had just suffered gravity for a second, and which is pulled again forcefully by the wind of affects and images. This inward flection, however, shows a curving progression: first with an inversion of the comparative arrow about present and past airs, where London's atmosphere recedes back to an inattentive perceptual background for how the air *was* in Bourton (IFOP); then both focal and peripheral of awareness jointly direct to the past, this time with Bourton's air falling in the periphery of the memory, and Clarissa's remembering attention in London drifting into analogical equivalents between Bourton's air and the sea (IFIP).

So far, our expanded model that updates perceptual decoupling by adding shifts in focal and peripheral awareness seems to be performing quite well in sampling Clarissa's wondering stream. And yet, an unaccounted fifth case emerges. After the analogical comparisons that the remembering Clarissa casts over the remembered memory of Bourton's air, we are fully relocated in Clarissa's viewpoint as a girl, looking outside of the past window while experiencing inner feelings of solemnity and ominousness towards the outer landscape. Here we are experiencing from within a past experiential stream, with its own *past* inner focus (subjective prescient feelings) and inner outer periphery (gazing at the landscape). This is therefore a complex state of outer focal and inner peripheral awareness that is *nested* in the overall inner envelope of the wandering trajectory. This state should therefore be acronymised with as IIFIOP (inner inner focus/inner outer periphery). Within this nested subjective past state, then Peter comes at the window in Bourton and magnetizes her attention back to the outer environment (yet still an innerly experienced outer focus), with her dreading feelings shifting to the periphery. Clarissa's inner wandering however keeps framing this remembered reversal of focal attention and peripheral awareness, thus leading to a sixth case of IOFIIP. Then it is Peter's name that prompts Clarissa's inner remembering frame to break back to the present, where London is again the outer peripheral background (where Peter "would be back from India") of inner focal thoughts and images about Peter.

Even by resorting to unwieldy analytical acronyms, it took us three paragraphs to account for the spectrum of modulations explored by Woolf in less than twenty lines. If we would have stopped to a definition of mind wandering as a process that is simply "task-unrelated", we would have ended with a quite impoverishing interpretation: Clarissa's task is almost for the entire novel just to organise a party, therefore most of her inner happenings would equally count as static blocks of task-unrelated mind wandering. Perceptual decoupling allows to account for some dynamism in her mind wandering, yet with only two possibilities accounted for. Gennaro's model of focal and peripheral awareness, on the other hand, introduces something that

William James himself (*Principles* 258) theorised as fundamental: the idea that each conscious state as a “nucleus or kernel” (in Clarissa’s inaugural episode that would be the dominant focus of her life in Bourton) always escorted by a “*psychic overtones, suffusion, or fringe*” (the peripheral perceptions, feelings, thoughts and proprioception, either internally or externally oriented). For James, the peripheral fringe of consciousness and the transitional gaps between one state and another are what he also calls a “penumbra” (255): a key constituent area of the state’s phenomenological whole, and “a part of consciousness as much as the joint is a part of a bamboo” (240). Gennaro’s model of focal and peripheral awareness seems more capable of illuminating the interplay and dynamic shifts between lit and penumbral areas. And this seems a necessary quality for a model willing to account for mind wandering’s dynamic nature.

Woolf, however, goes deeper and requires further updates to the model, capable of illuminating nested interplays when memories are not just witnessed, but relived within perspectival, “experiential viewpoints” (Dancygier 108) in mind wandering states. *Mrs Dalloway*, as *Ulysses*, is not only an optimal fit for mind wandering research, but offers a resistance of unfitting data that should expand, question and nourish current scientific frameworks on the wandering mind. In arguing this we are aligned with cognitive literary scholars like Melba Cuddy-Keane, the first to promote an interdisciplinary account of Woolf’s treatment of mind wandering, who claims that to take Woolf’s presentation of mind wandering “seriously is of course to assume that writing (both fiction and life-writing) can tell us something about real-world cognition” (17).

Likewise, Patrick Colm Hogan, in his excellent work on *Ulysses and the Poetics of Cognition*, has claimed that an author might have “captured something in the nature of human psychological processes” (hence his work can be illuminated by cognitive models), while his work maintains “its own independent validity” and “should contribute to our understanding of those processes. In short, the relations between neuroscience and psychological realism should be, in some degree, mutual” (101). In a forthcoming monograph, one of us (Bernini, *Beckett and the Cognitive Method*) has theorised such mutuality in terms of a “co-modeling of cognition”, whereby authorial, narratological, philosophical and scientific models are reciprocally updated, constrained, and challenged. The present article makes the case for the potentiality of such practice in the interdisciplinary co-modeling of mind wandering and inner speech.

The benefits and necessity of an interdisciplinary co-modeling of these processes, guided by and tested on literature’s own modeling explorations, become even more salient if we look at the relationship between mind wandering and inner speech. As anticipated in the introductory section, this is still under theorized by cognitive sciences, whereas modernist literary

narratives have once more reached a sophisticated presentation of their entanglement and constitutive relation.

### **Consciousness Condensation: Inner Speech and/in the Wandering Stream**

Since the seminal 1934 study by Russian psychologist Lev Vygotsky on *Thought and Language*, inner speech (the silent articulation of language within our mind) has been featured in scientific accounts as a key component of consciousness. Some, indeed, have proposed that it is a nearly universal phenomenon, coloring practically every aspect of our conscious experience. As the neuroscientist Bernard Baars puts it, “we are a gabby species. The urge to talk to ourselves is remarkably compelling, as we can easily see by trying to *stop* the inner voice as long as possible [...]. Inner speech is one of the basic facts of human nature” (75).

Vygotsky’s developmental thesis was that inner speech represents an internalized form of children’s early dialogues with caregivers. From an initial stage of outer spoken engagements in primordial conversations and dialogic exchanges with parents and caregivers, children first turn social speech into private speech (i.e., talking to themselves out loud to guide or accompany their actions), which is then progressively internalized into a silent form of inner talk. Crucially for Vygotsky, this internalized form maintains the dialogic structure of external conversation, with the self entertaining silent conversations with itself or with imagined interlocutors from the individual’s life. Importantly, the degree of awareness of our inner speech can greatly vary, often taking place in the penumbral areas of our conscious states.

Building on Vygotsky’s developmental model, and following his insights about the condensation of such speech, Fernyhough (2004) suggests a further differentiation of inner speech into “expanded” and “condensed” inner speech. Both are internalized forms of speech, but expanded inner speech still “retains many of the acoustic qualities and turn-taking properties of the external dialogue from which (developmentally speaking) it was derived” (Fernyhough and McCarthy-Jones 90). Phenomenologically, this form of internalization is closer to a conversational interaction with “an exchange between voices in the head” (Ibid.). Condensed inner speech, on the other hand, is “speech that has been fully internalized and therefore fully subjected to the transformational processes proposed to accompany internalization” (90), such as the abbreviation of syntax and the stratified density of personal meaning as opposed to public ones.

As an additional move, Fernyhough claims that the developmental sequence (external–private–expanded–condensed) can be, at times, reversed, so that flexible transitions among levels in inner and outer speech are possible in adulthood. If the more fragmented level of condensed inner speech, as Fernyhough and McCarthy-Jones put it, can be considered to be “the default

setting of inner speech”, under specific conditions such as “stress and cognitive challenge”, “condensed inner speech can be ‘re-expanded’ into the developmentally more primitive form of inner speech, namely, expanded inner speech” (91). This further distinction between two types of inner speech seems to be phenomenologically confirmed by empirical studies showing how people sometimes report only fragments of words (condensed) in their inner experience, and other times more complex (re-expanded) sentences (see Hurlburt et al.). The idea of condensation and re-expansion will be central to our analysis of modernist renditions of inner speech, as well as to our model of reading such narrative encodings.

Cognitive science’s recognition of a high frequency of both mind wandering and inner speech would predict an inevitable co-occurrence, if not a functional relation, between these two processes. Surprisingly, however, cognitive models of both inner speech and mind wandering, with few exceptions (see Antrobus), only cursorily note the occurrence of verbal elements in mind wandering, and appear even less sensitive to the dynamics of ‘wandering’ in inner speech. As a result, a series of questions on the mysterious dance between these two processes remains open. Is inner speech punctuating, commenting, enhancing or even generating mindwandering events? If we look at Joyce’s and Woolf’s texts, these questions can find answers or hypotheses that can and should challenge scientific models.

As we have seen in the previous section, mind wandering is a dynamic process that demands to be understood in the context of its temporal unfolding. This is exponentially true if we also want to sample inner speech’s dynamic patterns in the wandering mind, challenging us to consider a ‘thicker’ slice of narrative stream. The following long passage from *Ulysses* should contain enough interplays and loops to make the case for the fine-grained resolution of Joyce’s modeling of these processes. Here we are with Bloom, in the warmth of June 16<sup>th</sup>, halting at the window of the Belfast and Oriental Tea Company. His mind soon starts wandering, in a chain of images triggered by the outer perception of an advertisement of tea brands coming from the Far East. Together with reproducing Gennaro’s acronyms again to signal shifts in focal and peripheral awareness, we are marking in bold units we will analyze as possibly articulated in inner speech:

[OFOP] So warm. His right hand once more more slowly went over his brow and hair. Then he put on his hat again, relieved: and read again: **choice blend, made of the finest Ceylon brands.** [IFOP] **The far east. Lovely spot it must be: the garden of the world,** [IFIP] big lazy leaves to float about on, cactuses, flowery meads, **snaky lianas** they call them. **Wonder is it like that.** Those Cinghalese lobbing about in the sun **in dolce far niente**, not doing a hand’s turn all day. Sleep six months out of twelve. Too hot to quarrel. Influence of the climate. Lethargy. Flowers of idleness. The air feeds most. Azotes. Hothouse in Botanic gardens.

Sensitive plants. Waterlilies. **Petals too tired to.** Sleeping sickness in the air. Walk on roseleaves. Imagine trying to eat tripe and cowheel. **Where was the chap I saw in that picture somewhere?** Ah yes, in the dead sea floating on his back, reading a book with a parasol open. Couldn't sink if you tried: so thick with salt. Because **the weight of the water, no, the weight of the body in the water is equal to the weight of the what? Or is it the volume is equal to the weight?** It's a law something like that. Vance in High school cracking his fingerjoints, teaching. The college curriculum. Cracking curriculum. **What is weight really when you say the weight? Thirtytwo feet per second per second. Law of falling bodies: per second per second.** They all fall to the ground. The earth. It's the force of gravity of the earth is the weight. (86)

This is a cognitively dynamic, formally complex, and temporally extended mindwandering event in *Ulysses* that encapsulates all the problems and aspects we have covered so far. The outer warmth of day constitutes a peripheral background for the perception of the tea advertisement (OFOP), which loops back, affects and envelops the further mental travelling to the deadly hot Far East. Then Bloom's attention only progressively uncouples from outer perceptual stimuli (IFOP) and starts to focus on inner images and thoughts, which pop into focus and then rapidly recede to the mental periphery (IFIP). These images and thoughts are a tight mixture of folk knowledge about the far east ('the garden of the world'), foreign cultural commonplaces ('dolce far niente') and more specific botanic information about plants, which in turn trigger more personal memories ('Where was the chap I saw in that picture somewhere?') about a picture Bloom has seen of a guy bathing in the Dead Sea; the latter subsequently prompting a confused rehearsal of laws of gravity and weight, which in turn brings Bloom's mind back to high school images; then Bloom's attention goes back to gravity again.

This mindwandering chain, syntactically so tight that approximates a feeling of parallel or overlapping mental units (see Colm Hogan, "Parallel Processing"), shows how mindwandering can be both triggered by (the advertisement) and escorted by (the felt warmth of the day) outside perceptions and embodied proprioception. It also shows how, once attention and perception have both become internal (IFIP), previously focused inner images (e.g., the physical theory of weight and gravity) can become a peripheral ground for a new focused image (High school), before returning to focus again.

The passage therefore not only challenges current accounts of mindwandering in terms of a binary perceptual decoupling, but also in terms of "self-generated" thoughts or images (Smallwood and Schooler). Instead of stressing autonomy and independence, Joyce explores how mind wandering emerges from, and is textured by, relational and causal cognitive vectors or currents: each element in the chain, starting with outer perception, prompts and somehow orients the following unit. Joyce also explores how the mindwandering trajectory can be affected by contingent elements (the warmth

of the day) or even more remote background conditions (e.g., the relation that can be traced between the emergence of Dead Sea images and gravity with the funeral Bloom will have to attend, or with his gravitation around memories of his dead father). The affecting and affective circulation between wandering inner states and the outer world as rendered by Joyce is, as for Woolf, once more aligned with contemporary accounts in cognitive literary studies that see fictional minds as embodied, enactive and distributed in the environment (see, e.g., Anderson, Garratt, and Sprevak).

The old label of '*free association*' to describe mind wandering in narrative (see, e.g., Humphrey) and everyday cognition also seems to be questioned by Joyce's relational approach to mental units. Causal relations, albeit penumbral, are explored as guiding forces in what might look instead as Bloom's "unguided thought" (as Zachary and Thompson define mind wandering). William James himself invested considerable theoretical effort in trying to define these relations between "flights and perchings" in the stream of consciousness. He distinguishes between "transitive parts" (for relational flights) and "substantive parts" (for resting perchings). If the substantive parts are "resting places", usually "occupied by sensorial imaginations of some sort, whose peculiarity is that they can be held before the mind of an indefinite time", transitive parts are what he calls "thoughts of relations". These are flickering conative arrows; and yet it is their work that structure the dynamics of the stream so that "our thinking tends at all times towards some other substantive part than the one from which it has just been dislodged" (243). James does not talk specifically about the role of inner speech in this relational play, but as we have seen he seems to put a prize on mental images for the substantive parts, as images that can be contemplated in the resting place. If we look at Joyce's narrative threading of the wandering stream, however, inner speech seems potentially serving both flighting connections and perching rests.

At the cost of stating the obvious, we need to signal the necessary ambiguity and limitations of written narratives in differentiating between verbal and visual imagery, especially in modernist representations of the mind where textual markers for thinking (e.g., 'Bloom thought that...') or imagining (e.g., 'he was picturing in his mind that...') actions are eliminated. When mental units are merely named (e.g., "cactuses"), it is often hard to assess in Joyce whether the character is silently verbalizing the word or if the name stands for an emerging, wordless image. Open to possible errors and future corrections, in the above passage we have signaled in bold all the lines that we think we can safely assume to be silently articulated by Bloom through inner speech.

For instance, the "dolce far niente" or, even more securely, the "snaky lianas" appear to be bits of inner speech in Bloom's wandering mind, given he takes the latter as the verbal transitive object of linguistic reflection ("snaky lianas, they call them"). Further, the questions that Bloom frames in his mind in advance of answering them ("Wonder is it like that", "What was the chap..."),

“Or is it the volume...”, “What is the weight...”) give the strong sense of having been verbally articulated, in the dialogic fashion typical of the social nature of inner speech, whereby the self takes itself as an addressee. The wacky rehearsal of the law of gravity also has to be innerly spoken, since we can see Bloom’s focalizing on the accuracy of its articulation, with echolalic repetitions of a mantra (“per second per second”).

As for the truncated texture of inner speech in the wandering mind, here Joyce, in line with developmental models of inner speech, seems to navigate between different *degrees* of condensation. Sometime he renders moments in which inner speech gets more expanded: this is expressed through caging verbal units in a paratactic syntax and punctuation, yet without crippling the grammatical sense of the sentence (e.g., “The Far East”). Other times he renders a condensed phenomenology through higher formal condensations, such as when he drops the first-person pronoun (“Wonder is it like that”) or the transitive object of verbs (“Petals too tired to.”).

Given that condensation, in different degrees, is the key strategy used by Joyce for the *entire* wandering state, however, it is often difficult to discern whether a formally condensed unit renders a verbal phenomenon or a bit of mental imagery (e.g., are “Azotes” or “Waterlilies” silently articulated words or semiotic tokens standing for surfacing images?). This interpretive ambiguity, however, is a tell-tale sign of how much we find, as readers and analysts, a phenomenological possibility that images and inner speech in mind wandering can be equally present, equally possible, and at times indiscernible because both sharing phenomenological condensations. This is in itself a modeling success on Joyce’s part, and a finding that challenges some empirical studies suggesting that that inner speech and mental images are negatively correlated (i.e., unlikely to be both present) in mind wandering (see Stawarczyk 204).

The fact that both images and inner words share condensation (phenomenologically in life, and formally in Joyce) also makes it difficult to discern what, in James’ terms, are faster “transitive parts” in this sampled stream, and which the contemplated “substantive” units. What seems safe to assume for Joyce is that, in his creative exploration, he found that (unlike in James’ tentative intuition about substantive parts being visual images) both functions can be covered *either* by images or speech. If sometimes images appear like resting places, innerly contemplated by Bloom (such as the Cinghalese lobbing about in the sun or the plants in the Botanic Garden), at other times attentional contemplation is directed towards inner speech, as in the temporally substantive rehearsal of the law of gravity. Equally important, Joyce’s modeling also shows how transitive and substantive parts are in constant dynamic turn-taking, and that transitional elements are key to the constitution and understanding of the whole substance and trajectory of a conscious state (even more if that conscious state is highly kinetic, as in mind wandering).



This is not a minor achievement, since transitive parts are volatile, penumbral and hardly accessible in cognition. In our daily acquaintance with our conscious life, as James notes, “it is very difficult, introspectively, to see the transitive parts for what they really are. If they are but flights to a conclusion, stopping them to look at them before a conclusion is reached is really annihilating them.” (243). Today, introspection has new methods, such as DES (‘Descriptive Experience Sampling’; see Hurlburt and Schwitzgebel), where a random beeper prompts subjects (who have been trained in the process) to record inner experience. DES seems capable of capturing the floating and flying particles of transitive inner units. Methods like DES have certainly allowed access to a wider spectrum of elements composing the inner stream (with thoughts being captured on a par with visual imagery, inner speech, emotions, proprioceptive feelings, and more). James’ worry, however, still applies to these new sampling technologies. What is captured by DES, in fact, is (programmatically, as a scope of the method) too isolated from the stream: mental units are abstracted from its temporal flow, thus making it difficult to retain the moving direction of a transitive part, or the resting sense of a substantive pause. If new introspective technologies gain higher resolution for the transitive parts (and for the degrees of condensation and expansion of inner speech in conscious states), they annihilate their transitive force by setting them aside from the temporal flow and dynamic relations with substantive units. In short, they are able to capture the fleeting condensed nature of speech and images, but not their streaming relations. Once again, Joyce seems to have something to offer here: a more capable modeling strategy that renders condensation in the multisensory variety of mental units without losing dynamic flow.

To go back to a question already raised in the introductory section: how is it possible for a literary writer to access these raw yet flowing complexity? How have writers like Joyce or Woolf been able to produce narrative renditions that both fit and challenge contemporary cognitive models of inner speech and/in the wandering mind? Narratologist Dorrit Cohn already framed this question, when she firstly noted similarities between Vygotsky’s account of inner speech as condensed private speech and Joyce’s creative findings. Cohn asked “What are we to make of these remarkable correspondences? We can hardly suppose that Joyce listened to children talking to themselves.” (97). Her answer is very much in line with our view that sees writing as an introspective technology (Bernini “Affording”; *Beckett and the Cognitive Method*), when she claims that “if we assume that Joyce, like Faulkner, Freud, or other great pioneer psychologists, had extraordinary power of introspection, we may suppose that he might well have derived from self-observation the conception of inner speech that Vygotsky deduced from his experiments with children” (97). Our scope in what’s left is to perfect this hypothesis of writers as introspectors by using the idea of condensation and re-expansion from inner speech models,

and to apply it to the introspective authorial encoding and readers' interpretive reconstruction of narrative stream of consciousness.

### **Consciousness Re-Expansion: Reading as Reversed Introspection**

The limits of introspective technologies like DES are importantly close to the limits of narrativity and narrative understanding. If an introspective method captures only the raw material in what Hurlburt calls "pristine experience" (Hurlburt and Schwitzgebel), the temporal flowing of relations is lost. When transitional and substantive parts are indistinguishable, the stream simply stops moving. Likewise, if in encoding narrative stream of consciousness a writer were to report purely raw and static mental units without a sense of temporal dynamism, narrativity would be lost. Narrativity, in fact, is a scalar function of a text, admitting of degrees; and the less the reader is able to process a text as an *unfolding* narrative, the lower the ratio of narrativity (see Herman who takes Joyce's *Finnegans Wake* as a border case; *Story Logic* 91). Even in a novel, then, if all the units were equally raw, emptied of their transitive and substantive qualities, the narrative engine would stall. Roland Barthes here meets William James, when in his foundational 1966 *Introduction à l'analyse structurale des récits* ("An Introduction to the Structural Analysis of Narrative") places at the core of narrativity a similar dynamic interaction between what he calls "catalyses" (narrative transitional parts) and "nuclei" or "cardinal functions" (key events in the story that are "areas of security, rest, or luxury", 248). When a story is the story of a narrative stream of consciousness, its psychological value would reside in capturing the catalytic parts of the stream in their conative, relational force with more substantive nuclei. The problem, for creative introspectors such as Joyce or Woolf, then, is how to control the trade-off between objectivity (i.e., capturing a wide variety of mental units in their raw, variously condensed form) and phenomenology (how to preserve their relational flowing). Too much condensation and we have discontinuity (and zero narrativity), with the temporal flow being lost. Too much expansion, and the objective value of the investigation is diluted in the illusory continuity of merely substantive parts.

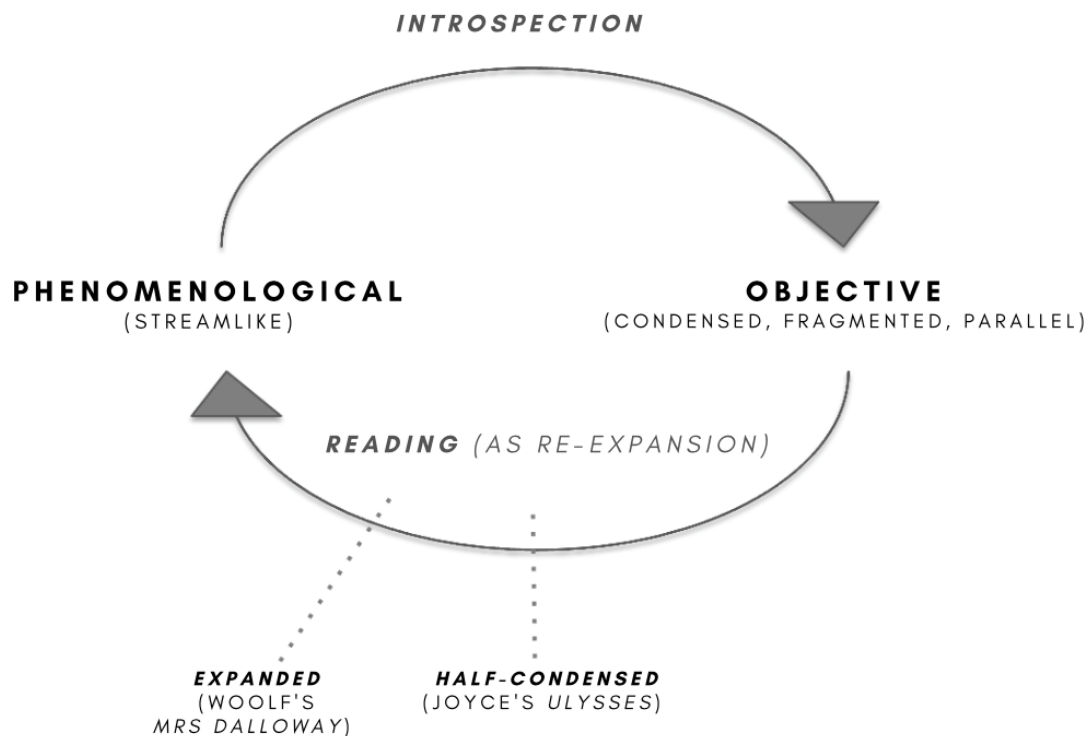
When it comes to consciousness, cognitive scientists and literary authors therefore navigate a similar tension between objectivity and phenomenology. As Owen Flanagan, in his important commentary on James in *Consciousness Reconsidered*, puts it: "Phenomenologically, consciousness is a stream. Objectively, it is less streamlike" (170). This trade-off between objective discontinuity and phenomenological flow links to the so-called 'binding problem' in consciousness studies (Revonsuo 1999), or how distributed processes on the neuronal level become subjectively unified in the life of the mind. As DES shows, however, the objective level within the mind also is fragmented in its pristine state, before becoming unified into a flowing stream.

The binding problem at the mind level therefore concerns how disparate, fragmented, parallel bits of conscious processes (e.g., focal and peripheral images, sounds, thoughts, embodied feelings) on the objective level nevertheless feel bounded together in a unified phenomenological stream (see also Bayne). Interestingly, the most prominent critic of the stream metaphor, Daniel Dennett, takes Joyce as representative of what he calls the objective “parallel pandemonium” (253), and sees the brain as a “Joycean machine” (225). Partly contra Dennett, here we want to argue instead that Joyce’s introspective practice and modeling strategy of the mind (not of the brain), while aiming at the messier objective level, still wanted to preserve a phenomenological, flowing, streamlike and life-like quality for consciousness.

This is because, unlike cognitive scientists, Joyce has a reader within his laboratory and research horizon. His research into the mystery of the conscious would have failed if his findings had been impossible to process by the reader as a (narrative) stream. What he condensed and unbound, the reader has to re-expand and phenomenologically *re-bind*. Building on the idea that inner speech, by default, is condensed (at the objective level), but can be re-expanded (acquiring phenomenological flow), we suggest that this navigable axis of condensation and re-expansion can account also for Joyce’s introspective encoding and for the reader’s decoding of inner speech and wandering states. We argue, however, that for these phenomena Joyce did not aim for full objectivity, but for a compromise form at the boundary between the objective and the phenomenological.

If writing as an introspective practice enabled Joyce to access the objective level of experience (as in DES), he reworked these raw data to write *half-condensed formal re-presentations of conscious units*, thus bringing the reader as close as possible to the border beyond which experiential and temporal intelligibility would be lost. Thanks to this half-condensed narrative form, the reader can *reverse the introspective process and re-set in motion mental unit and relations, thus re-experiencing the phenomenological level in its stream-like quality*. This is what we argue in our conclusive model of *reading as reversed introspection*. We hope it is clear by now that by “reversed” introspection, however, we do not mean that reading fictional minds is the “opposite” of introspection, but only that reading is a re-binding of creatively acquired and aesthetically encoded introspective data (a process of reception that actually can be a training for readers towards introspective awareness).

## READING AS REVERSED INTROSPECTION



Screenshot

This model should not be valid only for Joyce, naturally. Different authors who have explored the mystery of the conscious stream can be placed in a spectrum of different degrees of condensation (leading to different needs for re-expansion by the reader). In addition, different readers might find Joyce's finding more or less reversible. Indeed, Woolf's reading of Joyce is a case in point. It is well-known how Virginia Woolf made a call for new narrative forms able to go beyond conventional narrative representations of the conscious stream – thus aligned in principle with Joyce's approximating access to objective levels. Woolf rejected previous distorting representations of the mind that were limited to the undisturbed, comforting flow of substantive units. She wanted instead narrative to sample "an ordinary day of an ordinary mind", and to encode the "myriad impressions—trivial, fantastic, evanescent, or engraved with the sharpness of steel" ("Modern Fiction" 150). Importantly, she argues that we should "record the atoms as they fall upon the mind, in the order in which they fall, let us trace the pattern, however disconnected and incoherent in appearance, which each sight or incident scores upon the consciousness" (151). This was Woolf's introspective and aesthetic mission. As we have seen in the second section, she fulfilled this promise and managed to

record and encode a great dynamism in Clarissa's wandering state, in ways that can challenge and nourish contemporary models of mind wandering.

And yet, as a reader of Joyce, Woolf found *Ulysses'* introspective condensation too extreme. While publicly recognizing its importance (in her essay in "Modern Fiction"), in her diary she writes how she has "finished *Ulysses*, & think it is a mis-fire. Genius it has I think; but of the inferior water. The book is diffuse. It is brackish. It is pretentious. It is underbred, not only in the obvious sense, but in the literary sense." (199). It seems that to her Joyce went beyond the threshold of readability and narrativity, by approximating too much the mind's raw state. For Woolf, the aesthetic encoding of mental units or atoms had to be less condensed or unbounded, not conventional but still more literary, because "When one can have cooked flesh, why have the raw?" (188-189). Accordingly, she went for less condensed forms of presentation. These are equally if not more capable than Joyce's of accounting for the interplay of focal and peripheral thoughts, perceptions, and affects; and yet they feel nonetheless more distanced from the objective, condensed nature of processes like inner speech. As a result, the reader has a shorter route to traverse in reversing Woolf's introspective process towards a phenomenological stream. The price to pay, however, is that we feel more distant from the tighten, fragmented, almost parallel feeling of the objective level disclosed by Joyce.

A model has to be judged according to what it captures as well as what it misses, and the same applies to literary narrative models of consciousness. Woolf's modeling of mind wandering is exceptionally dynamic, but seems less capable of rendering the condensed form of consciousness in general, and of inner speech in particular (even if other passages presenting Septimus Smith's fragmented stream might count as exceptions). Woolf does capitalize on the power of narrative to condense and expand the temporality of outer and inner events (and condensation and expansion are core qualities of narrative treatment of time; see Genette's seminal chapter on 'duration' in *Narrative Discourse*). She decides, though – in line with her own reading taste and experience – to go for less condensed solutions, with the benefit of a higher narrativity, but with lower degree of accuracy for the objective level. This is why we have placed her novel slightly closer to the phenomenological end in the spectrum of condensation.

Together with offering comparative insights on how modernist authors have been able to model mind wandering and inner speech with different degrees of condensation, we hope that a model of reading as reversed introspection can apply to a further range of authors and texts across different periods and cultures. The idea that literature can be used as an introspective technology should not be limited to the modernist golden age. Even when texts on the surface appear rooting for a more conventional, continuous presentation of consciousness, their modeling strategy and introspective findings should be

assessed in relation to what they have been able to capture, and for the kind of work they ask their readers to perform (an analyst should be conscious of period-specific and culture-specific presentational conventions; see McHale). We therefore hope that our model might be taken up beyond modernism, to add new challenges and resources to contemporary scientific models, towards a broader, transhistorical co-modeling of the mystery of the conscious.

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