
Embodied Simulation Theory: Imagination and Narrative

Commentary by Vittorio Gallese (Italy)

The timely and thought-provoking essay by Siri Hustvedt provides a fascinating account of the relationship between imagination and memory and discusses this relationship against the background of different disciplines like psychoanalysis, cognitive neuroscience, and phenomenology. Hustvedt sheds new light from the inside on the process of artistic creativity by emphasizing that the bodily affective self is at the roots of the narrative self. In the present commentary, I present and briefly discuss recent scientific results corroborating Hustvedt's thesis and propose how embodied simulation theory can account for many aspects of the relationship between artistic production and its aesthetic experience.

Keywords: aesthetic experience; embodied narratology; embodied simulation; imagination; mirror neurons

The fascinating paper by Siri Hustvedt addresses a crucial problem for a variety of disciplines like psychoanalysis, neuroscience, and narratology. This problem

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deals with the relationship between imagination and memory. The thesis put forward by Hustvedt is that memory and imagination partake of the same mental process, since they are both bound with emotion and often assume the form of narrative. Capitalizing upon Augustine, Vico, and Merleu-Ponty, Hustvedt convinc-

ingly argues that both memory and imagination are embodied. She aptly reviews how memory and imagination might be conceived for and treated by novelists, psychoanalysts, and neuroscientists, showing that their epistemology and henceforth their approaches—and conclusions—are different.

However, a common feature of memory and imagination is their emotional contour, a contour that resurfaces even when memory and imagination are reordered within a narrative structure. Hustvedt concludes her essay by stressing how novel writing—but one could easily apply her conclusions to any form of artistic creativity—stems from the same faculty that “transmutes experience into the narratives we remember explicitly, but which are formed unconsciously.” Fiction consists of the re-elaboration of unconscious memories together with their emotional tones and of their translation into a meaningful narrative. This means that creating an imaginary world would be equivalent to remembering what never happened.

In the present commentary, I focus on the relationship between fiction and imagination viewed first and foremost from the point of view of embodied simulation theory (Gallese, 2001, 2003, 2005, 2009, 2011). It has been proposed that our brain–body systems are equipped with a pre-rational, nonintrospective process—embodied simulation—generating a physical, and not simply “mental,” experience of the mind, motor intentions, emotions, sensations, and lived experiences of other people, even when narrated. Such physical experience can be described as Feeling of Body (FoB; see Wojciewski & Gallese, in press). Capitalizing upon what we are currently learning on intersubjectivity by means of the neuroscientific approach, I posit that the narrative reconstruction of real or imaginary life events, such as those characterizing fiction as we read it in novels, or the relationship between patient and analyst within the psychoanalytic setting, can be approached by an embodied narratology.

Embodied simulation and the world of others

In the second half of last century more and more scholars from different disciplines emphasized the role played by the body in our cognitive life. In 1987, the cognitive linguist George Lakoff wrote: “Thought is embodied, that is, the structures used to put together our conceptual systems grow out of bodily experience and make sense in terms of it; moreover, the core of our conceptual systems is directly grounded in perception, body movements, and experience of a physical and social character” (p. xiv). Such a statement doesn’t

sound particularly new to psychoanalysis, since one of the cornerstone upon which Freud built his theory is the body. In *The Ego and the Id* (1923), Freud wrote that “The Ego is first and foremost a body-ego” (p. 26). Lakoff’s embodied take on the human mind anticipated what cognitive neuroscience was about to discover just few years later.

Among such discoveries is that of mirror neurons in the macaque monkey premotor cortex and the ensuing research showing the presence of a similar mirror mechanism in the human brain. The mirror mechanism maps the sensory description of others’ actions, emotions, and sensations onto the perceiver’s own motor, visceromotor, and somatosensory representations of those actions, emotions, and sensations (Gallese et al., 2011). It has been proposed that such mapping enables one to perceive others’ actions, emotions, and sensations as if performing those same actions or experiencing those same emotions and sensations. Embodied simulation (ES) theory is an attempt to provide a coherent theoretical framework to these neuroscientific findings (Gallese, 2003, 2005, 2007; Gallese & Sinigaglia, 2011).

According to ES theory, individuals reuse their own mental states or processes in functionally attributing them to others (Gallese, 2009, 2011; Gallese & Sinigaglia, 2011). The extent and reliability of such reuse and functional attribution depend on the simulator’s repertoire and its being shared with the target’s repertoire. Brain and cognitive resources typically used for one purpose are reused for another purpose. For example, witnessing someone else expressing a given emotion (e.g., disgust, pain) or undergoing a given sensation (e.g., touch) recruits some of the visceromotor (e.g., anterior insula) and sensorimotor (e.g., second somatosensory area, SII; ventral premotor cortex) brain areas activated when one experiences the same emotion (Botvinick et al., 2005; Jackson, Meltzoff, & Decety, 2005; Wickers et al., 2003) or sensation (Blakemore, Bristow, Bird, Frith, & Ward, 2005; Ebisch et al., 2008; Keyzers et al., 2004), respectively. Other cortical regions, though, are exclusively recruited for one’s own and not for others’ emotions (Jabbi, Bastiaansen, & Keyzers, 2008), or are activated for one’s own tactile sensation, but they are actually deactivated when observing someone else being touched (Ebisch et al., 2011).

ES is mainly intrapersonal—that is, it pertains to the mental states or processes that an individual undergoes both when planning actions or experiencing emotions and sensations and when observing someone else’s actions, emotions, and sensations. A further distinguishing element of ES is its bodily format.

Mental representations can differ not only for their content, but also for their format. According to the classic mind-reading cognitive account, a given action, emotion, or sensation is mentally represented with a propositional format. ES theory complements this view by holding that the actions, emotions, and sensations of others can also be mentally represented with a bodily format.

ES theory holds that one way of making sense of others' behaviors consists of mapping these behaviors by reusing mental states and processes involving representations that have a bodily format. The reuse of our neural and cognitive resources is a constitutive part of our perception and making sense of others. Thus, by enabling the functional attribution to others of mental states or processes in bodily format, ES can play an important constitutive role in mind-reading. The novelty of this approach consists in conceiving of mind-reading as not necessarily and exclusively requiring the explicit attribution of mental representations in propositional format. If this is true, a substantial aspect of intersubjectivity can be conceived of as mainly dependent upon intercorporeity.

A further interesting recent contribution of cognitive neuroscience is the discovery that when we read or listen to narratives we literally embody them by activating a substantial part of our sensorimotor system (for review, see Glenberg & Gallese, 2011; Pulvermüller, 2005). The activation of motor representations in the brain of the reader or listener has been demonstrated at the phono-articulatory level, as well as during the processing of action-related linguistic expressions (words and sentences) and of morpho-syntactical aspects of language. This evidence, although widely discussed, points to a causal role of ES in language processing and understanding.

The import of such evidence for psychoanalysis—the “talking cure”—should be obvious. As Freud wrote in his monograph on aphasia, a word “acquires its *meaning* by being linked to an ‘object-presentation’. . . . The object-presentation itself is . . . a complex of associations made up of the greatest variety of visual, acoustic, tactile, kinaesthetic, and other presentations” (1915, Appendix C, p. 213). As recently pointed out by the psychoanalyst Ana-Maria Rizzuto, the analyst’s intention to fully listen to the patient as a “total self” (2008, p. 746) relies upon the patient’s prosody and the emotional history of the employed words.

The late Italian psychoanalyst and neuroscientist Mauro Mancía repeatedly emphasized the relevance of the affective bodily quality of communication within the analytic relation. According to Mancía (2006), to fully grasp the total dimension of transference one can-

not neglect the infraverbal components of communication between patient and analyst. These components, according to Mancía “include the rhythm, tone, timbre and musicality of a sentence, as well as the syntax and tempi of speech. All this constitutes, in the analytic encounter, the ‘musical dimension’ of the transference” (2006, p. 91).

As Hustvedt aptly points out, the research of Daniel Stern (1985) has revealed “the intersubjective music of early life, the preverbal melodies of the first human interactions.” These emotional spatiotemporal contours, these “forms of vitality” (Stern, 2010), do not exclusively characterize early life, but continue to guide our experience of the many realities we encounter and of our interpersonal relations. Hence, the relationship between analyst and patient with its transference dimensions can be viewed, studied, and discussed from a bodily perspective. Cognitive neuroscience and ES theory can shed new light not only on the implicit, preverbal aspects of psychoanalytic interpersonal dynamics, but also on the language-mediated ones.

Imagination, the world of fiction, and its experience: *liberated* embodied simulation

The mirror mechanism is one instantiation of ES: the simulation process is triggered by a perception, as when observing someone performing an action, expressing an emotion, or undergoing a somatosensory stimulation. However, embodied simulation can also occur when we *imagine* doing or perceiving something. When we imagine a visual scene, we activate the same cortical visual areas of our brain normally active when we do perceive the same visual scene. Similarly, mental motor imagery and real action both activate a common network of cortical and subcortical motor centers such as the primary motor cortex, the premotor cortex, the supplementary motor area (SMA), the basal ganglia, and the cerebellum (for review, see Wojciewowski & Gallese, in press). Thus, visual and motor mental imagery are not exclusively symbolic and propositional. They both rely on and depend upon the activation of sensorimotor brain regions. Visual imagery is somehow equivalent to simulating an actual visual experience, and motor imagery is somehow equivalent to simulating an actual motor experience. In other words, motor and visual imagery do qualify as further forms of ES. When indulging in visual or mental motor imagery, we reuse our visual or motor neural apparatus to imagine things and situations we are not actually perceiving or doing.

If viewed from a neuroscientific perspective, the border separating real and fictional worlds appears thus much less sharp and clear than what humans thought for centuries. This aspect is particularly interesting when referred to artistic creativity and its fruition. The artist through her imaginative creativity gives birth to a fictional world that not only shares many features with the real one, but also some of the underpinning neural processes. Our relationship with fictional worlds is double-edged: on the one hand, we pretend them to be true, while, on the other, we are fully aware they are not. Suppose you enter an art museum and head toward your beloved Cezanne. A powerful multiple framing effect is at work here: you are in a special context, an art museum, where the images hanging on the wall are supposedly all art works. You behold the painting, one of the many versions Cezanne painted of Montagne St. Victoire, immerse yourself into it, leaving its surrounding frame behind. But the frame is still fully present—both physically and metaphorically—at the periphery of your visual field. You see the painted mountain and simultaneously relate it to the real mountain. As the Italian philosopher Alfonso Iacono put it, you are experiencing a sort of “tail of the eye” vision, which, according to him, characterizes all of our relationships with the “intermediate worlds” of fiction (Iacono, 2005, 2010). Capitalizing upon William James, Gregory Bateson, and Donald Winnicott, Iacono stresses that our appreciation of art means to inhabit intermediate worlds where territory and map do overlap. As he writes, “It can happen in dreams, in *trompe-l’oeil*, at the theater, at the cinema, in reading, in virtual reality, in stadiums during concerts or sport events. One enters the picture through the frame forgetting about having entered. This process, which takes place while being in an emotional state and which can be ritualized (actually it is necessary for rituals), is at the origin of the process of naturalization – that is, that process that makes the artificial, historical and changeable events appear natural, eternal and unmodifiable” (2010, p. 84).

In spite of the fact that at the core of our perceptions, of our understanding and of our imagination is the body, the relationship with fictional worlds is still mainly explained, following Coleridge, in terms of “suspension of disbelief”—that is, in purely cognitive terms.

I always found this explanation overly reductive and, at best, partial. Furthermore, it betrays the diffident attitude displayed by some quarters of classic cognitivism and analytic philosophy toward literature and fiction narratives. As (incredibly) argued by Hilary Putnam (1976), “The Greek dramatists, Freudian

psychology, and the Russian novel are all supposed . . . to embody knowledge-knowledge about man. . . . No matter how profound the psychological insights of a novelist may seem to be, they cannot be called knowledge if they have not been tested” (pp. 487–488).

Is suspension of disbelief all there is in our relationship with the intermediate worlds of fiction? I suspect not. It has been proposed (Wojciehowski & Gallese, in press) that ES can be relevant to our experience of fictional worlds, like those narrated in novels, for two reasons: First, because of the FoB evoked by narrated characters and situations with whom we identify by means of the mirroring mechanisms they activate; in such a way, ES generates the peculiar attitude informing our aesthetic experience. Second, because of the bodily memories and imaginative associations the narrated material can awake in our readers’ minds, without the need to reflect upon them explicitly.

Furthermore, there is a context-dependent aspect characterizing our relationship to narrated stories, both when we read them in novels and when we tell them or listen to them within the psychoanalytic setting. This aspect deals with our distancing from the unrelated external world, which remains at the periphery of our attentional focus, very much like the frame surrounding Cezanne’s painting. Such distancing, this temporary suspension of the factive grip on our daily occupations, liberates new simulative energies. Our experience of narratives, more than a suspension of disbelief, can be thus interpreted as a sort of “liberated embodied simulation.” When we relate to a narrated story (but also when attending a theatrical play or a movie), our ES becomes liberated—that is, it is freed from the burden of modeling our actual presence in daily life (Gallese, 2010; Wojciehowski & Gallese, in press). Through an immersive state in which our attention is focused on the narrated virtual world, we can fully deploy our simulative resources, letting our defensive guard against daily reality slip for a while.

Finally, it should be added that the contextual bodily framing normally accompanying our reading of a novel—our being still—additionally boosts our ES. When reading, we not only entirely focus our attention on the literary work, but our being still simultaneously enables us to fully deploy our ES resources at the service of the immersive relationship with the narrated characters, thus generating a powerful feeling of body. The particularly moving experience generated by reading novels is thus likely also driven by this sense of safe intimacy with a world we not only imagine, but also literally embody.

In conclusion, I enormously enjoyed reading this paper since it offers multiple stimuli to neuroscience,

to psychoanalysis, and to the dialogue between these disciplines, which I personally see as timely and potentially fruitful for both disciplines. Hustvedt's paper implicitly suggests that both neuroscience and psychoanalysis can converge when dealing with the world of fiction, in that they both envisage the body as the common playground for imagination. I fully agree and think that this is a very interesting topic that cognitive neuroscience should thoroughly investigate.

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