

Article

Not peer-reviewed version

Subjectica: Sensory Circulation and Pre-Motor Readiness in Embodied Decision-Making

[Deyan Shopin](#) *

Posted Date: 5 January 2026

doi: 10.20944/preprints202601.0310.v1

Keywords: embodied cognition; body mapping; functional lateralization; neurophenomenology; sensory circulation; action readiness; hemispheric inhibition; cognitive orientation; subjectica; premotor readiness; neurophenomenology



Preprints.org is a free multidisciplinary platform providing preprint service that is dedicated to making early versions of research outputs permanently available and citable. Preprints posted at Preprints.org appear in Web of Science, Crossref, Google Scholar, Scilit, Europe PMC.

Copyright: This open access article is published under a [Creative Commons CC BY 4.0 license](#), which permit the free download, distribution, and reuse, provided that the author and preprint are cited in any reuse.

Article

Subjectica: Sensory Circulation and Pre-Motor Readiness in Embodied Decision-Making

Deyan Shopin

Independent Researcher; vseohvatbl@gmail.com

Abstract

The study of emotional body mapping has emerged as a critical tool for understanding the embodied mind, recently integrated into a tripartite framework comprising bottom-up physiological, top-down motor, and conceptual-metaphorical signals (Daikoku et al., 2025). However, current models remain largely descriptive, lacking a formalized account of functional lateralization as a predictive indicator of a subject's cognitive stance. This paper proposes an integration of the Subjectica model (Shopin, 2025) into the body mapping paradigm to address this operational gap. By conceptualizing the body as a lateralized interface—distinguishing between the Personally-Oriented Left Side (PO-LS) and the Socially-Oriented Right Side (SO-RS) — we provide a methodology for interpreting Asymmetric Neurobehavioral Signals (ANS) through body segmental (BS). This paper introduces the concept of Sensory Circulation (SC) — a continuous flow of sensory signals that determines the level of somatic awareness and engagement through attentional mechanisms. Within the Subjectica framework, sensory circulation is analyzed through the lens of functional lateralization: the PO-LS and the SO-RS. This synthesis enables the interpretation of body maps not as passive affective reports, but as indicators of the subject's active cognitive stance. This approach shifts the analytical focus from the static localization of affect to the dynamic mapping of cognitive orientation. We posit that lateralized embodied patterns serve as a quantifiable link between hemispheric specialization and observable kinematics. This synthesis offers a rigorous neurophenomenological foundation for cognitive science, enabling the objective analysis of the "cognitive alphabet" expressed through the body.

Keywords: embodied cognition; body mapping; functional lateralization; neurophenomenology; sensory circulation; action readiness; hemispheric inhibition; cognitive orientation; subjectica; pre-motor readiness; neurophenomenology

Introduction

The relationship between subjective experience and its somatic manifestation remains one of the most significant challenges in contemporary cognitive science. While traditional accounts have localized emotional states within specific neural circuits, the Subjectica model (Shopin, 2025) provides a necessary theoretical foundation for understanding these processes as a unified, lateralized, and embodied phenomenon. Central to this approach is the premise that the body does not merely react to cognitive states but functions as a dynamic interface where hemispheric specialization is translated into observable kinematics and sensory circulation.

Recent developments in the field have highlighted the efficacy of "body mapping" as a tool for capturing how individuals localize emotional sensations across the body (Daikoku et al., 2025). This tripartite framework integrates bottom-up interoceptive signals, top-down motor preparations, and conceptual-metaphorical mappings to explain the consistent patterns of affective topography observed across various populations (Nummenmaa et al., 2014; Volynets et al., 2020). However, despite the precision of these descriptive maps, current paradigms predominantly treat the body as a symmetrical entity, largely ignoring the functional asymmetry inherent in the human nervous system. This omission creates a significant "descriptive gap": while science can identify where a

sensation is felt, it lacks a formalized mechanism to interpret the cognitive stance—the intentional and functional orientation of the subject—based on that localization.

To address this gap, propose an integration of the Subjectica framework into the body mapping paradigm. We introduce the concept of Sensory Circulation (SC)—a continuous flow of sensory signals through the body that determines the level of somatic awareness and attentional engagement. Within this model, the body is conceptualized as a lateralized interface: the Personally-Oriented Left Side (PO-LS) reflects right-hemispheric intuitive and self-referential processes, while the Socially-Oriented Right Side (SO-RS) reflects left-hemispheric normative and socio-contextual regulation.

The synthesis of these concepts allows for the identification of the Asymmetric Neurobehavioral Signal (ANS) — Operationally, is defined as the joint distribution of lateralization (PO-LS/SO-RS), BS activation, and circulation density at a given temporal window. By applying BS Decomposition to traditional body maps, researchers can move beyond the static localization of affect toward a predictive analysis of the subject's cognitive orientation. This paper argues that by accounting for lateralization and sensory circulation, cognitive science can decode the "cognitive alphabet" of the body, transforming body mapping from a retrospective reporting tool into a proactive methodology for analyzing the dynamic architecture of consciousness.

From Emotional Topography to Cognitive Orientation: A Lateralized Interpretation

While the tripartite framework proposed by Daikoku et al. (2025) offers a comprehensive account of how bodily maps of emotion may emerge from physiological, behavioral, and conceptual sources, it remains largely agnostic with respect to functional asymmetry. Within most body-mapping paradigms, the human body is treated as a unified representational surface. However, decades of neurobiological and neuropsychological research demonstrate that cognition, action preparation, and attentional control are fundamentally lateralized processes.

This asymmetry is not merely anatomical but dynamically regulated through interhemispheric mechanisms. Indeed, several neuroscientists have proposed that a primary function of the corpus callosum is not the transfer of information per se, but the inhibition of one hemisphere by the other (Hoptman & Davidson, 1994; Chiarello & Maxfield, 1996). Contemporary interpretations articulated by (McGilchrist, 2015), supported by split-brain and interhemispheric competition studies, emphasize the corpus callosum as an inhibitory regulator that limits interference between hemispheric modes of processing rather than serving as a simple conduit for signal exchange. This interpretation is consistent with McGilchrist's broader account of hemispheric asymmetry as a regulator of world-orientation rather than information processing, an argument further developed in applied socio-political contexts (Rowson & McGilchrist, 2018)

Within this view, hemispheric dominance emerges not through increased transmission of information, but through selective inhibition that enables the hemisphere most functionally suited to the task to guide action. Crucially, such inhibition is neither random nor symmetrical. It is systematically related to the motivational demands of the situation, the availability of relevant associative clusters within each hemisphere, and the functional appropriateness of a given hemispheric mode for organizing behavior. Dominance, therefore, reflects functional suitability rather than hierarchical superiority, with initial orientational cues typically arising from right-hemispheric integrative processes.

The omission of this inhibitory and lateralized mechanism in current body-mapping models substantially limits their explanatory and predictive power. Bodily asymmetries observed in affective maps may reflect not merely the localization of emotional sensation, but the active regulation of cognitive orientation through interhemispheric control.

The Subjectica framework (Shopin, 2025) addresses this limitation by introducing functional lateralization as a primary organizing principle of embodied experience. Within this model, bodily sensations are not treated as passive markers of affective states, but as expressions of an underlying cognitive orientation—that is, the subject's functional stance toward action, risk, and contextual

engagement. This orientation manifests asymmetrically through the body and reflects the dynamic balance between hemispheric specialization.

Subjectica distinguishes between two lateralized modes of embodied regulation. The Personally-Oriented Left Side (PO-LS), associated with right-hemispheric processing, reflects self-referential orientation, intrinsic motivation, and internally guided action. Sensory activation on this side is typically observed in contexts where behavior is guided by an internally coherent model of meaning or purpose rather than immediate social adaptation. In contrast, the Socially-Oriented Right Side (SO-RS), associated with left-hemispheric processing, reflects normative regulation, external coordination, and adaptive responses to social or situational constraints. Sensory activation on this side commonly accompanies states of heightened contextual vigilance, role-based behavior, or performance under uncertainty.

When applied to body-mapping data, this distinction enables a reinterpretation of existing findings. For instance, chest-centered or whole-body activations commonly interpreted as indicators of arousal or emotional intensity may carry different functional meanings depending on their lateral distribution. A left-lateralized chest activation may indicate internally coherent engagement, whereas a right-lateralized pattern may reflect socially mediated regulation or anticipatory control. Similarly, abdominal sensations associated with uncertainty or aversion can be differentiated according to whether they arise within a personally oriented exploratory stance or a socially constrained adaptive response.

To operationalize this approach, Subjectica introduces the concept of the ANS: a measurable pattern of lateralized bodily activation that reflects the subject's current cognitive orientation. By applying BS decomposition to standard body maps—analyzing not only the location of reported sensations but also their lateral distribution and relational configuration—researchers can move beyond descriptive affective cartography toward a functional interpretation of embodied cognition.

This integration reframes body mapping as a dynamic indicator of orientation rather than a static representation of emotion. Emotional experience, within this framework, emerges from the continuous regulation of sensory circulation across lateralized bodily channels. Consequently, body mapping becomes a methodological tool not only for documenting affective states but for inferring the orientational architecture from which perception, action, and meaning-making arise. In the following section, we formalize this interpretation by introducing Sensory Circulation as a regulatory mechanism linking lateralized bodily signals with attentional control and action readiness, thereby establishing a predictive bridge between embodied phenomenology and observable behavior.

Sensory Circulation as a Regulatory Mechanism of Cognitive Orientation

To move from descriptive body maps toward a predictive model of cognitive orientation, it is necessary to introduce a regulatory construct capable of linking lateralized bodily signals with attentional control and action readiness. Within the Subjectica framework, this role is fulfilled by the concept of Sensory Circulation (SC). Importantly, Sensory Circulation is introduced not only as an analytical construct, but as a formalized way of operationalizing the neurophenomenological dimension of embodied experience—specifically the aspect of experiential continuity that is traditionally cultivated through attentional training and contemplative practices in neurophenomenology (Lutz & Thompson, 2003).

Sensory Circulation refers to the continuous, dynamic flow of sensory signals across bodily segments, modulated by attentional allocation and functional lateralization. Unlike static representations of bodily sensation, SC captures how sensory information is actively distributed, amplified, or attenuated in accordance with the subject's current cognitive orientation. In this sense, SC corresponds to what neurophenomenological methodologies aim to stabilize through meditative and attentional training: the capacity to track ongoing sensorimotor and interoceptive dynamics as a coherent experiential field rather than as isolated perceptual events. It is this circulation—not isolated sensory localization—that determines whether bodily signals remain background noise, become salient experiential content, or are translated into action preparation.

Crucially, sensory circulation is not symmetrical. Its flow is constrained and shaped by functional lateralization, reflecting the ongoing balance between personally oriented and socially oriented modes of regulation. Within this model, the PO-LS and SO-RS function as distinct channels through which sensory circulation is organized. The PO-LS supports internally guided coherence, exploratory engagement, and meaning-driven action readiness, whereas the SO-RS prioritizes externally constrained regulation, contextual monitoring, and adaptive compliance. Variations in sensory circulation across these channels provide a measurable and phenomenologically accessible signature of the subject's cognitive stance, thereby bridging trained first-person observation with third-person bodily and kinematic data.

Sensory Circulation and Attentional Control

Within the Subjectica framework, attentional control is not conceived as a centralized executive function but as an emergent property of sensory circulation. Attention follows circulation density: bodily regions and segments that sustain coherent sensory flow become preferential sites of awareness, postural organization, and motor readiness. In this sense, attention is not imposed upon the body but arises from the way sensory signals are distributed and stabilized across it.

This distribution is critically regulated through interhemispheric inhibition. As discussed earlier, the corpus callosum functions primarily as a mechanism for limiting interference between hemispheric modes, allowing one orientational regime to dominate when functionally appropriate. Attentional focus therefore reflects not a neutral allocation of resources, but a selective stabilization of sensory circulation shaped by task demands, motivational context, and the availability of associative resources within a given hemispheric mode.

When sensory circulation is coherently organized within a lateralized channel, attentional control becomes stable, efficient, and resistant to distraction. Conversely, fragmented, oscillatory, or competing circulation patterns are associated with attentional instability, indecision, or elevated cognitive load. From this perspective, attentional disturbances are not merely cognitive deficits but manifestations of disrupted embodied regulation.

From Sensory Circulation to Action Readiness

Action readiness emerges when sensory circulation reaches a threshold of coherence sufficient to support motor preparation. Rather than being triggered by isolated stimuli or abstract decision processes, readiness for action is expressed through the alignment of sensory circulation, attentional focus, and BS activation. This alignment manifests in the body as coordinated, lateralized patterns of muscular tension, posture, and movement initiation.

Neurophysiological research on action initiation provides convergent support for this interpretation. Studies of the readiness potential (Bereitschaftspotential) demonstrate that motor preparation reliably precedes the conscious experience of intention by several hundred milliseconds (Libet et al., 1983; Haggard, 2008). These findings indicate that action readiness is established prior to reflective awareness, challenging models that locate decision-making at the level of explicit volition.

Within the Subjectica framework, this pre-conscious interval corresponds to the phase in which sensory circulation reaches a threshold of coherence sufficient to stabilize a lateralized pre-motor configuration. What is commonly reported as a "decision" is thus understood as the phenomenological registration of an already organized bodily state, rather than its causal origin. Sensory circulation provides the missing intermediate description between neurophysiological determinism and subjective experience, specifying how pre-motor readiness becomes embodied and experientially accessible.

Within body-mapping paradigms, reported sensations should therefore be understood not as retrospective accounts of emotional feeling alone, but as indicators of pre-motor organization. For example, sustained circulation through proximal segments on the Personally-Oriented Left Side (PO-LS) may signal readiness for self-initiated action, whereas distal activation on the Socially-Oriented

Right Side (SO-RS) may reflect anticipatory adjustment to external demands or social constraints. Without reference to lateralized sensory circulation, such patterns remain descriptively rich but functionally opaque.

This interpretation is consistent with contemporary deterministic accounts of behavior, such as those articulated by Sapolsky (2017, 2023), which emphasize the causal primacy of biological and contextual processes preceding conscious choice. However, while such accounts focus on explaining why alternative outcomes are unavailable, Subjectica addresses a complementary question: how these determining processes are structured, distributed, and expressed within the lived body.

In this sense, sensory circulation and lateralized pre-motor patterns constitute the observable embodiment of determinative processes that are otherwise described only at the neural or biochemical level. Subjectica does not contest biological determinism; rather, it provides a phenomenologically tractable and empirically accessible layer through which determinative dynamics can be observed, differentiated, and potentially regulated.

Integrating Body Mapping and Cognitive Orientation

By incorporating sensory circulation into body-mapping analysis, Subjectica provides a unifying interpretative layer that connects affective sensation, attentional dynamics, and behavioral potential. Body maps are no longer treated as static affective topographies, but as momentary snapshots of an ongoing regulatory process. Segmental and lateralized variations in reported sensation become indicators of how the subject is oriented toward a situation, rather than mere markers of emotional intensity.

A methodological consequence of this integration concerns the status of retrospective reporting in body-mapping paradigms. Although body maps are typically generated through post hoc self-report, they need not be interpreted as mere reconstructions of subjective narrative. Empirical evidence suggests that embodied reports preserve stable structural regularities even when conscious recall is incomplete or distorted (Nummenmaa et al., 2014; Volynets et al., 2020).

Within Subjectica, this relative stability is explained by the persistence of lateralized and segmentally organized sensory circulation patterns. While the experiential interpretation of sensation may be reconstructed after the fact, the asymmetric distribution of bodily activation reflects an underlying orientational state that precedes verbalization. As a result, body maps can function as indirect indicators of pre-reflective cognitive orientation, offering access to regulatory dynamics that are otherwise unavailable through introspective report alone.

This integration enables the identification of the ANS as a functional unit of analysis. ANS captures the combined pattern of lateralization, BS distribution, and circulation density that characterizes a given cognitive orientation. Unlike traditional affective markers, ANS is inherently dynamic, context-sensitive, and action-relevant, making it suitable for predictive applications in cognitive science and embodied AI.

In sum, Sensory Circulation functions as the missing regulatory link between embodied phenomenology and observable behavior. By formalizing how sensory signals are organized, constrained, and mobilized through lateralized bodily channels, Subjectica extends body mapping beyond descriptive reporting toward a functional architecture of cognition. This framework enables researchers to infer not only what a subject feels, but how they are oriented to perceive, act, and generate meaning within a given context.

In this respect, Sensory Circulation enables a shift from asking whether subjective reports are “accurate” toward analyzing how embodied regulation is organized at the moment of experience. By focusing on circulation patterns rather than narrative content, body mapping becomes less dependent on introspective fidelity and more sensitive to the functional architecture of cognition. This distinction allows Subjectica to integrate body-mapping data with established findings in motor neuroscience and decision-making research without conflating phenomenological description with causal explanation.

From this perspective, the ANS captures not a conscious decision, but a stabilized configuration of sensory circulation, attentional bias, and pre-motor readiness. ANS thus operationalizes the transition from biological determination to embodied orientation, providing a functional unit that links neural causation, phenomenological experience, and observable behavior within a single analytic framework.

Discussion

The present work proposes a functional integration of body-mapping research with the Subjectica framework, extending existing descriptive models toward a predictive architecture of embodied cognition. By introducing functional lateralization and sensory circulation as organizing principles, this approach addresses a central limitation of current body-mapping paradigms: their inability to interpret bodily asymmetries as indicators of cognitive orientation rather than mere affective localization.

The integration with the tripartite framework proposed by Daikoku et al. (2025) preserves its descriptive strengths while adding a regulatory layer that accounts for interhemispheric dynamics and pre-motor organization. In this sense, Subjectica does not replace existing models but complements them by specifying how bottom-up, top-down, and conceptual signals are selectively stabilized through lateralized sensory circulation. This allows bodily maps to be interpreted as functional snapshots of orientational architecture rather than static representations of emotional states.

Importantly, the framework remains compatible with deterministic accounts of action initiation (Libet et al., 1983; Haggard, 2008; Sapolsky, 2017, 2023). Rather than challenging biological determinism, Subjectica clarifies how determinative processes are embodied and organized prior to conscious awareness. The ANS thus serves as an intermediate analytical unit linking neural causation, phenomenological accessibility, and observable behavior.

From a broader perspective, this work contributes to ongoing efforts in cognitive science to bridge first-person and third-person methodologies. By grounding phenomenological accessibility in lateralized bodily regulation, Subjectica offers a way to operationalize neurophenomenological insights without reducing them to introspective narrative or abstract neural correlates alone.

Limitations and Future Directions

Several limitations of the present framework should be acknowledged. First, the current work is primarily theoretical and integrative in nature. While it draws on well-established empirical findings in body mapping, motor neuroscience, and hemispheric specialization, direct experimental validation of Sensory Circulation and ANS as operational constructs remains a necessary next step.

Second, body-mapping paradigms rely on retrospective self-report, which introduces potential distortions related to memory, language, and conceptual framing. Although the framework argues that lateralized and BS patterns preserve functional regularities independent of narrative reconstruction, empirical work is needed to quantify the reliability of ANS across repeated measurements and task contexts.

Future research should focus on experimental designs that combine body mapping with kinematic analysis, physiological measures, and real-time attentional tasks. Longitudinal and training-based studies—particularly those incorporating attentional or contemplative practices—may further clarify how sensory circulation can be stabilized, modified, or disrupted, and how such changes relate to behavioral flexibility and cognitive performance.

Additionally, the applicability of this framework to clinical populations and artificial embodied systems represents a promising avenue for extending its predictive and translational relevance.

Conclusion

This paper advances body-mapping research by integrating it with a lateralized, regulatory model of embodied cognition. By introducing Sensory Circulation and the Asymmetric Neurobehavioral Signal, Subjectica transforms body mapping from a descriptive tool into a functional methodology for inferring cognitive orientation and action readiness. This approach provides a principled bridge between neurophysiological determinism, phenomenological accessibility, and observable behavior, offering a unified framework for the analysis of embodied cognition in contemporary cognitive science.

Declarations

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: No new empirical data were generated for this study.

Conflicts of Interest: The author declares no conflict of interest.

AI Disclosure Statement: Artificial intelligence tools were used solely for structuring and editing the manuscript. All scientific content, interpretations, and conclusions were developed and shaped by Dejan Šopin, who bears full responsibility for the content.

References

1. Shopin, D. (2025). Subjectica: A Lateralized Embodied Model of Cognitive Stance. Preprints. <https://doi.org/10.20944/preprints202512.1226.v3>
2. Daikoku, Tatsuya & Minatoya, Maiko & Tanaka, Masaki. (2025). Mapping Emotional Feeling in the Body: A Tripartite Framework for Understanding the Embodied Mind. 10.48550/arXiv.2504.14865
3. Nummenmaa L, Glerean E, Hari R, Hietanen JK. Bodily maps of emotions. *Proc Natl Acad Sci U S A*. 2014 Jan 14;111(2):646-51. doi: 10.1073/pnas.1321664111. Epub 2013 Dec 30. PMID: 24379370; PMCID: PMC3896150.
4. Volynets S, Glerean E, Hietanen JK, Hari R, Nummenmaa L. Bodily maps of emotions are culturally universal. *Emotion*. 2020 Oct;20(7):1127-1136. doi: 10.1037/emo0000624. Epub 2019 Jul 1. PMID: 31259590.
5. Hoptman, M. J., & Davidson, R. J. (1994). How and why do the two cerebral hemispheres interact? *Psychological Bulletin*, 116(2), 195–219. <https://doi.org/10.1037/0033-2909.116.2.195>
6. Chiarello, C., & Maxfield, L. (1996). Varieties of interhemispheric inhibition: or How to keep a good hemisphere down. *Brain and Cognition*, 30(1), 81–108. <https://doi.org/10.1006/brcg.1996.0006>
7. McGilchrist, I. (2015). Divine Understanding and the Divided Brain. In: Clausen, J., Levy, N. (eds) *Handbook of Neuroethics*. Springer, Dordrecht. https://doi.org/10.1007/978-94-007-4707-4_99
8. Rowson, J., & McGilchrist, I. (2018). Divided brain, divided world. In J. Rowson (Ed.), *The Political Self* (1st ed.). Routledge. <https://doi.org/10.4324/9780429482762-5>
9. Lutz, A., & Thompson, E. (2003). Neurophenomenology: Integrating Subjective Experience and Brain Dynamics in the Neuroscience of Consciousness. In A. Jack & A. Roepstorff (Eds.), *Trusting the subject?* Vol. 1, pp. 31–52). Imprint Academic.
10. Libet, B., Gleason, C. A., Wright, E. W., & Pearl, D. K. (1983). Time of conscious intention to act in relation to onset of cerebral activity. *Brain*.
11. Haggard, P. (2008). Human volition: towards a neuroscience of will. *Nature Reviews Neuroscience*.
12. Sapolsky, R. M. (2017). *Behave: The Biology of Humans at Our Best and Worst*. Penguin.
13. Sapolsky, R. M. (2023). *Determined: A Science of Life Without Free Will*. New York: Penguin Press.

14. Nummenmaa, L., Glerean, E., Hari, R., & Hietanen, J. K. (2014). Bodily maps of emotions. PNAS.
15. Volynets, S., et al. (2020). Emotional body maps across cultures. Nature Human Behaviour.

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.