

Einstein's Spacetime and Space/Duration: A Heuristic Inquiry into Time as Measure Rather Than Constituent

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Abstract

This conceptual essay uses Einstein's spacetime as the point of departure for a heuristic inquiry into what becomes visible when time is treated as a measure rather than a constituent. Without revising Einstein's formalism, the proposal moves epistemologically from spacetime to space/duration. At the physical level, duration constitutes the continuity through which space conditions persist and change, while time measures intervals and rates of transformation. At the biocognitive level, duration is lived and organized through the contextual coemergence of embodiment, cognition, culture, and meaning. Internal Duration Setting (IDS) locates this organization within fast–slow and expansive–constrictive dimensions, while the Value Referent identifies its allocation toward self or otherness. Together, they provide a heuristic compass for evaluating lived duration before time is introduced as a measure or constraint.

Keywords: spacetime; space/duration; duration; time as measure; lived duration; Internal Duration Setting; Value Referent.

Introduction: The Heuristic Proposal

Einstein's spacetime formalism is not being revised or replaced in this inquiry (Einstein, 1905, 1916; Minkowski, 1909). My proposal uses it as the point of departure for a heuristic exploration of what becomes visible when time is treated as a measure rather than a constituent. The inquiry therefore does not alter the physics of spacetime; it explores the epistemological consequences of moving from spacetime to space/duration (Martinez, 2026).

Within space/duration, duration precedes its measurement. Physically, duration constitutes the continuity through which space conditions persist and change. Biocognitively, duration is lived and organized through the contextual coemergence of embodiment, cognition, culture, and meaning (Martinez, 2014). Time measures movement, change, and differences between durational conditions; it neither constitutes physical continuity nor explains lived organization. Treating time as a constituent can mistakenly assign causal force to the measure itself. Treating time as an affordance preserves its measuring function while allowing inquiry into both the physical continuity of space and the biocognitive organization of lived duration.

Duration as Constituent: The Physical Heuristic of Space/Duration

The physical heuristic distinguishes a space condition from its continuity. Space identifies the condition or configuration. Duration constitutes its persistence and becoming: persistence is the continuation of a condition, while becoming is its transformation into another condition. Movement expresses change between space conditions; time measures the interval and rate of that change.

Physical change therefore does not occur "in time" as though time were its container. It occurs through the duration of changing space conditions. Clocks quantify intervals and compare rates of transformation; they do not establish the measure as the cause or container of transformation.

Einstein's equations remain unchanged; only the heuristic interpretation of the temporal variable changes. Time quantifies transformation, while duration constitutes the continuity through which persistence and transformation occur.

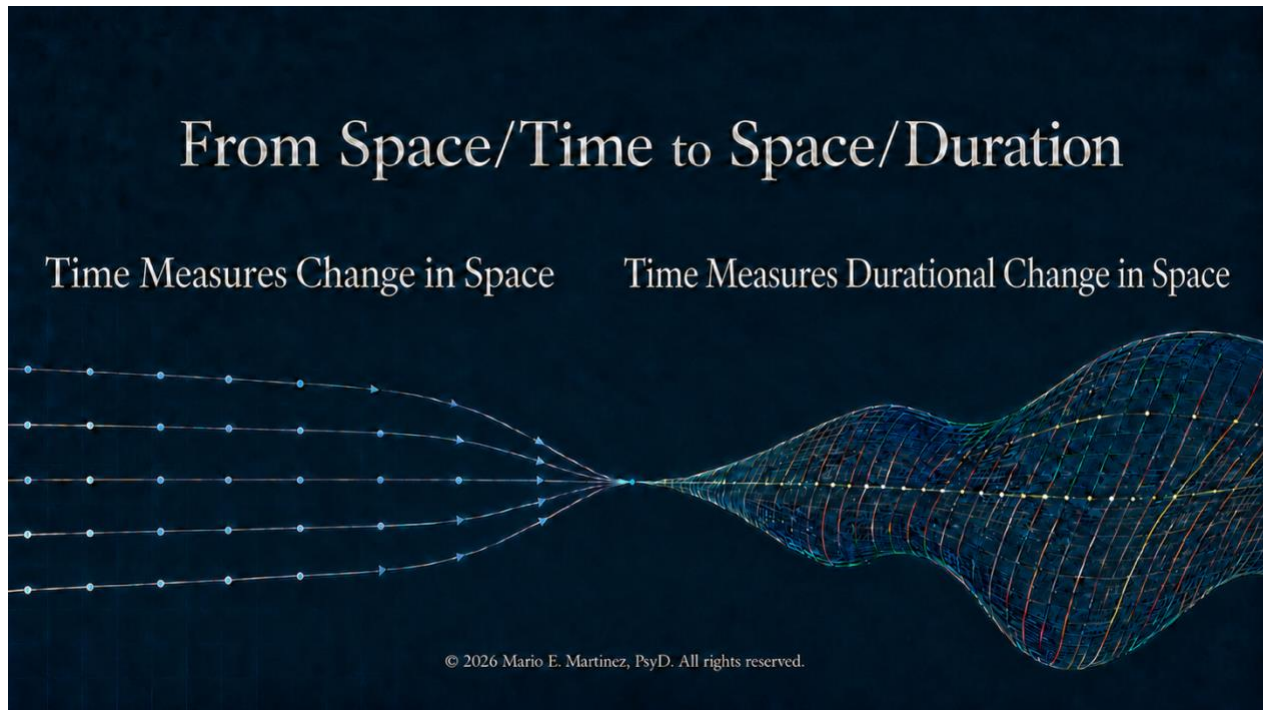


Figure 1. From Space/Time to Space/Duration. The figure presents the central heuristic distinction: time measures change in space, while duration constitutes the continuity through which space conditions persist and become other conditions. In space/duration, time remains the measure of durational change rather than the constituent or cause of that change. This epistemological reinterpretation does not alter Einstein's formalism.

From Constituent Duration to Biocognitive Organization

The physical heuristic establishes duration as the constituent continuity of space. Biocognition addresses a different level of inquiry: how that duration is lived and organized. This distinction neither reduces physical duration to subjective experience nor assigns cognition a causal role in physical continuity. Biocognition examines how embodiment, cognition, culture, and meaning contextually coemerge in the organization of lived duration. Bergson's *durée* provides an antecedent for lived duration; the present inquiry extends duration beyond subjective experience to the constituent continuity of space (Bergson, 1889/1910)

Internal Duration Setting (IDS) identifies this qualitative organization. Rather than measuring elapsed time or estimating how much time has passed, IDS locates lived duration at the intersection of two qualitative dimensions: expansive–constrictive and fast–slow. These conditions are contextual, dynamic, and non-evaluative. They are not produced by time; they express how duration is being organized.

Time can measure the interval and differences between durational conditions, but it cannot explain their organization. IDS therefore provides the navigational principle for lived duration within space/duration: the clock measures the interval, while IDS identifies how duration is organized and lived within it.

The Value Referent: The Allocation of Lived Duration

Within IDS, the Value Referent identifies the direction of lived duration: toward self or otherness, where otherness may be a person or a thing. This direction emerges from the terrain of meanings through which self is valued in relation to otherness.

At the deepest level of biocognitive organization, the Value Referent expresses where survival and meaning are being located within a context. It is not merely a preference or conscious decision; it reveals the contextual assessment from which the allocation of lived duration emerges.

An IDS location within the expansive–constrictive and fast–slow dimensions cannot be interpreted apart from this referent. The same qualitative condition may acquire different meaning depending on whether lived duration is directed toward self or otherness and the terrain of meanings informing that direction.

Time can measure how long an allocation continues, but it cannot reveal the terrain of meanings organizing its direction. Together, IDS and the Value Referent provide a navigational compass:

IDS identifies how duration is lived, while the Value Referent identifies where and why it is allocated.

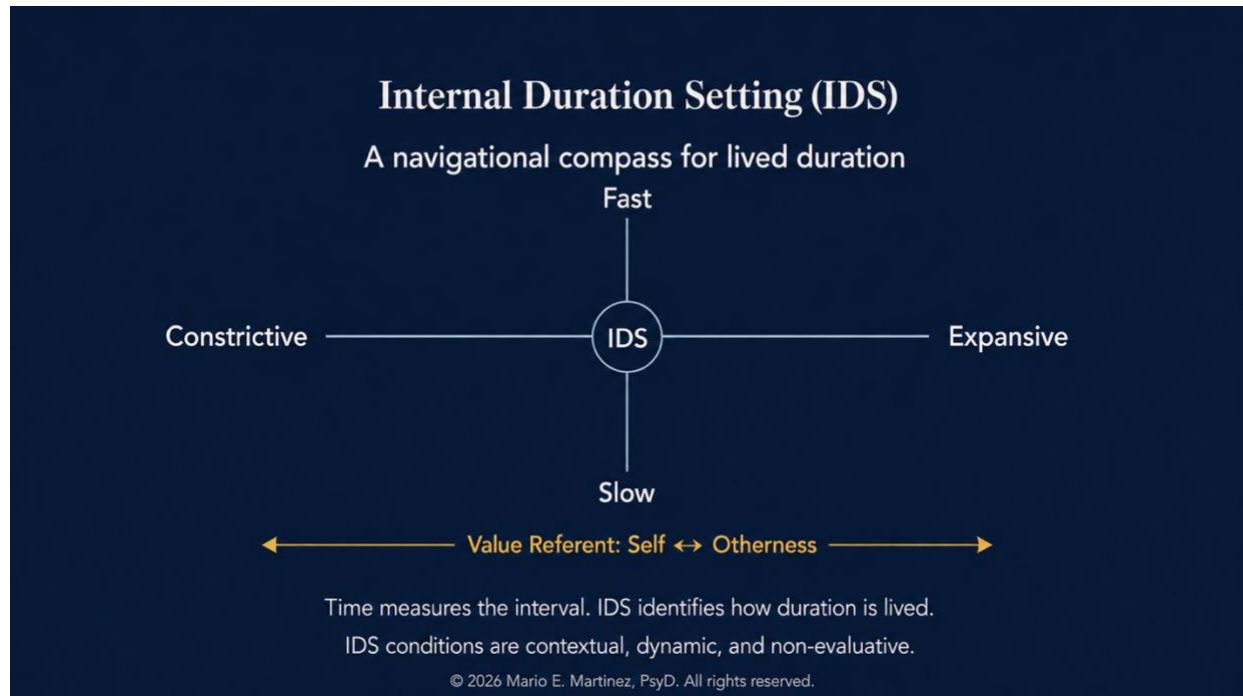


Figure 2. Internal Duration Setting (IDS): A Navigational Compass for Lived Duration. The fast–slow and expansive–constrictive axes locate the qualitative organization of lived duration, while the Value Referent identifies its allocation toward self or otherness. Their intersection represents a contextual, dynamic, and non-evaluative organization rather than a measure of elapsed time. Time measures the interval; IDS identifies how duration is lived, while the Value Referent identifies where and why it is allocated.

The Developmental Formation of the Value Referent

The Value Referent develops through the contextual coemergence of cultural editors and personal experiences participating in the formation of selfhood and individuation. Together, they coauthor the terrain of meanings from which survival and meaning are assessed. Its direction toward self or otherness is therefore neither solely culturally prescribed nor individually produced; it emerges through their developmental interplay.

The Value Referent expresses the contextual history through which lived duration is contextualized and allocated. Within IDS, its direction toward self or otherness intersects with the qualitative organization of fast–slow and expansive–constrictive. This intersection locates how duration is lived and where it is allocated within a particular context. Because this organization is contextual and dynamic, IDS functions as a heuristic compass for navigating lived duration within space/duration.

The Function of IDS: Evaluating Duration Before Time

Einstein’s spacetime provides the fundamental physical terrain for this inquiry, while IDS addresses the biocognitive organization of lived duration. Evaluating duration before time refers to the order of inquiry, not to a chronological sequence. An experience is first evaluated through how its duration is lived and allocated before elapsed time or a time constraint is introduced.

IDS makes this order navigable. It locates the experience within the qualitative conditions of fast–slow and expansive–constrictive, while the Value Referent identifies its direction toward self or otherness. The inquiry therefore begins with the durational condition and its contextual direction rather than with elapsed time.

Once the durational organization is understood, time can be introduced as a measure or constraint. IDS does not replace time; it prevents the measure from defining what it measures. By heuristically separating experience from its measurement, IDS allows the existential depth of an action—its contextual organization within survival and meaning—to be discerned before it is framed by time constraints.

An incidental discovery may occur through this inquiry. IDS can reveal durational conditions that have been maintained without their value having been assessed. Some may hold considerable

meaning, while others may have continued without meaning. IDS does not assign value in advance; it makes the distinction available for discernment through lived experience.

Conclusion: Duration as a Heuristic for Research

The significance of moving from spacetime to space/duration lies not in revising Einstein's formalism, but in untangling measurement from what is measured. Duration identifies the continuity through which physical conditions persist and transform; time quantifies their intervals and rates. This separation provides a heuristic for researching the physicality of duration without attributing constitutive or causal force to its temporal measurement.

In the biocognitive domain, the same distinction redirects inquiry from time management to experienced duration. IDS and the Value Referent allow investigation of how duration is organized and where it is allocated before asking how long it lasts. Across both domains, duration becomes the initial terrain of inquiry, with time introduced afterward as measure or constraint. What is measured is thereby no longer defined by its measurement.

References

- Bergson, H. (1910). *Time and free will: An essay on the immediate data of consciousness* (F. L. Pogson, Trans.). Swan Sonnenschein & Co. (Original work published 1889)
- Einstein, A. (1905). Zur Elektrodynamik bewegter Körper [On the electrodynamics of moving bodies]. *Annalen der Physik*, 322(10), 891–921. <https://doi.org/10.1002/andp.19053221004>
- Einstein, A. (1916). Die Grundlage der allgemeinen Relativitätstheorie [The foundation of the general theory of relativity]. *Annalen der Physik*, 354(7), 769–822. <https://doi.org/10.1002/andp.19163540702>
- Martinez, M. E. (2001). The process of knowing: A biocognitive epistemology. *The Journal of Mind and Behavior*, 22(4), 407–426. <https://www.jstor.org/stable/43854156>

Martinez, M. E. (2014). *The MindBody Code: How to change the beliefs that limit your health, longevity, and success*. Sounds True.

Martinez, M. E. (2026). *Changing the epistemology of spacetime: Toward a second-order science*. Biocognitive Monographs Series, BM-2026-10.

<https://www.biocognitiveculture.com/workingpapers-archive>

Minkowski, H. (1909). Raum und Zeit [Space and time]. *Physikalische Zeitschrift*, 10, 104–111.