

Cognitive Archiving: Integrating Biological, Digital, and Relational Systems in a Theory of Self-Continuity

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Abstract

Cognitive Archiving is a proposed theoretical framework for understanding the continuity of selfhood across emotional, biological, and informational domains. The model identifies three interdependent systems of identity preservation: (1) Biological encoding, in which affective experience and epigenetic processes inscribe emotion as molecular memory; (2) Digital encoding, where technological infrastructures store behavioral and informational traces of the self; and (3) Relational encoding, in which social cognition and emotional reciprocity allow others to mirror, remember, and co-archive aspects of one's identity. Together, these systems form a distributed and dynamic "living archive" of consciousness that reframes memory as an active, adaptive architecture of existence. Building on Frank Jackson's theory of qualia: the subjective experiential qualities of perception, and on recent developments in Integrated Information Theory and affective neuroscience, this framework bridges philosophical and cognitive perspectives on how subjective experience may be represented or reconstructed. Unlike notions of "digital immortality," Cognitive Archiving emphasizes authentic continuity rather than replication, situating consciousness within affective, social, and informational ecologies. Ethical and methodological challenges include the difficulty of quantifying subjective experience and the implications of preserving identity within technological or biological systems while protecting autonomy and authenticity. Cognitive Archiving seeks to open new dialogue between cognitive science, psychology, and archival theory by redefining memory as a site of both preservation and transformation across measurable systems, including social cognition, molecular processes, and digital behavioral data.

Keywords: cognitive archiving, self-continuity, digital identity, relational encoding, social cognition

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Introduction

Humanity has long questioned whether the self can exist beyond biological mortality. Cells in the body renew, and parts of a machine can be replaced, but what remains the original? This echoes the Ship of Theseus paradox (Plutarch, trans. 1936): when each piece is rebuilt, is the result still the same being or a copy? When applied to consciousness, the question becomes what defines the continuity of selfhood and prevents an empty replication. If unique markers of the self can remain constant, then perhaps the continuity of identity can be preserved not through replication, but beyond mortality or transformation.

Each person experiences the world through a singular perspective; a private stream of memories, emotions, and expressions. These cannot be replicated, yet measurable forms of the self can be expressed externally through art, language, behavior, and digital communication. Cognitive science often calls these inner textures of perception qualia, the “what it feels like” dimension of experience (Chalmers, 1995; Jackson, 1982). Qualia cannot be directly measured; they are only accessed indirectly through expressions that others perceive and interpret. When another person witnesses and remembers these expressions, a shared memory event is formed that also becomes a record of identity.

This mutual exchange between self and other provides the starting point for cognitive archiving, a theoretical framework proposing that selfhood is preserved through emotionally charged traces that bridge inner experience and external record. At the same time, information-based models of consciousness suggest that subjective experience may be represented through complex informational structures (Albantakis et al., 2023). Yet the central problem remains: subjective experience has no agreed-upon method of measurement.

Existing research shows that emotional experience can leave biological traces through epigenetic modifications (Schiele & Domschke, 2020; Yehuda & Lehrner, 2018), and that both negative and positive emotions influence how memories are encoded and reinstated (Pan et al., 2025; Pizzimenti & Lattal, 2015). At the same time, digital systems now preserve vast quantities of behavioral and communicative data, but those reconstructions are often described as hollow or lifeless copies rather than authentic selves (Albantakis et al., 2023; Derrida, 1996; Hoskins, 2018).

This leads to the central theoretical question in cognitive archiving: How can emotionally intense experiences (qualia) be archived and transmitted across biological, digital, and relational systems in ways that preserve identity continuity beyond memory alone?

This question is important to social psychology because identity is increasingly negotiated across online platforms, intergenerational processes, and relational networks, yet no single framework captures the full picture of the self in its multiple, complex dimensions. Understanding how emotional experience functions as an “archive” of selfhood can deepen theories of social cognition, memory, and self–other relations in a digitally mediated, trauma-aware world.

Philosophy of Mind, Qualia, and the Measurement Problem

Jackson’s (1982) “Mary the color scientist” thought experiment highlights the limits of physicalism. Mary knows every physical fact about color vision but has never seen color. When she finally sees red, she learns something new: what it feels like to see red. This suggests that

subjective experience contains information that is not captured by physical description alone. These irreducible aspects of experience (qualia) are central to any account of selfhood based on lived feeling rather than just behavior.

However, Jackson's argument is purely theoretical and does not offer empirical methods for measuring subjective, internal experiences. Chalmers (1995) similarly distinguishes between the "easy problems" of consciousness (explaining functions and behaviors) and the "hard problem" (explaining why experience feels like anything at all). Both authors agree that subjective experience is essential to understanding the mind, but they leave open how such experiences could be operationalized or recorded in real systems.

This is where cognitive archiving extends beyond purely philosophical accounts: it accepts the difficulty of measuring qualia directly, but asks whether their effects in biology, digital traces, and relational memory can be used as scaffolds for identity continuity.

Affective Neuroscience and Epigenetic Memory

To ground subjective experience in something measurable, cognitive archiving turns to affective neuroscience and epigenetics. Yehuda and Lehrner (2018) review evidence that traumatic experiences can alter gene expression through DNA methylation and histone modification, especially in stress-response systems such as the HPA axis. Holocaust survivors and their descendants show altered methylation in glucocorticoid-receptor genes, suggesting that emotional intensity such as fear, anxiety, grief can leave heritable molecular traces that influence stress reactivity and affective regulation. These findings imply that emotional experience can become biological memory, a form of archiving that persists beyond conscious awareness.

Schiele et al. (2020) expand this by introducing the idea of epigenetic plasticity. They summarize how psychosocial stress, but also psychotherapy and supportive relationships, can modify epigenetic markers associated with anxiety, depression, and trauma-related disorders. Importantly, they highlight early evidence that psychological interventions may partially reverse maladaptive epigenetic changes, suggesting that emotional and relational experiences do not just inscribe, but can also rewrite aspects of molecular identity. This aligns with cognitive archiving's emphasis on a dynamic, editable self rather than a fixed record.

Pizzimenti and Lattal (2015) further show that chronic stress and drug exposure produce enduring epigenetic changes in brain regions involved in fear and reward (e.g., amygdala, prefrontal cortex). These changes shape learning, extinction, and relapse in PTSD and addiction, suggesting that emotionally intense states (fear, craving, relief) become encoded as molecular memory. Pan et al. (2025) found that with positive affect, positive emotion enhances memory reinstatement and increases connectivity between the hippocampus and ventromedial prefrontal cortex during repeated learning. The fMRI results indicate that emotionally positive experiences are more likely to be vividly remembered and integrated into one's self-narrative.

Across these studies, a consistent theme emerges: emotion and memory are biologically intertwined. Intense experiences reshape gene expression and neural connectivity, creating a physical substrate through which identity can be shaped, maintained, or repaired. However, most work emphasizes trauma and pathology, with fewer studies exploring how positive or protective experiences might be archived at the molecular level. These gaps are crucial for

cognitive archiving, which aims to account for both destructive and restorative forms of emotional memory.

Digital Identity and Archival Science

While biology encodes affect in molecular form, digital systems preserve identity through data. Every message, image, and post contributes to a “digital self” that can outlive the physical person (Giannachi, 2016; Kitchin, 2014). Hoskins (2018) describes this as a kind of digital memory field, where platforms continually rewrite and surface past traces. Derrida’s (1996) notion of archive fever captures the anxiety that no matter how much is preserved, something essential will always be missing.

Scholars in media and archival studies argue that digital archives tend to preserve behavior and representation rather than felt experience (Garde-Hansen, 2011). Cifor and Gilliland (2016) emphasize that without context and affect, archives risk becoming de-personalized collections of data. Picard’s (1997) work in affective computing attempts to infer emotion from facial expressions, voice, or physiology, but even when such systems correctly classify emotional states, they remain external interpretations, not access to inner qualia.

For cognitive archiving, this literature shows both potential and limitations. Digital systems are powerful at capturing patterns and histories of behavior, but they struggle to preserve the “texture” of the self. They are closer to replicas than continuities. This motivates a model that does not treat digital traces as sufficient on their own, but as one layer of a larger, affect-driven archive.

Social Cognition and Relational Selfhood

Social psychology has long emphasized that identity is relational. According to social cognition theory, people understand themselves through how they are perceived, evaluated, and remembered by others (Fiske & Taylor, 2017). Mirror neuron research suggests that observing another’s actions or emotions activates similar neural circuits in the observer, enabling embodied simulation and empathic understanding (Gallese, 2009). This is a biological basis for the idea that parts of the self are co-encoded in the minds and bodies of others.

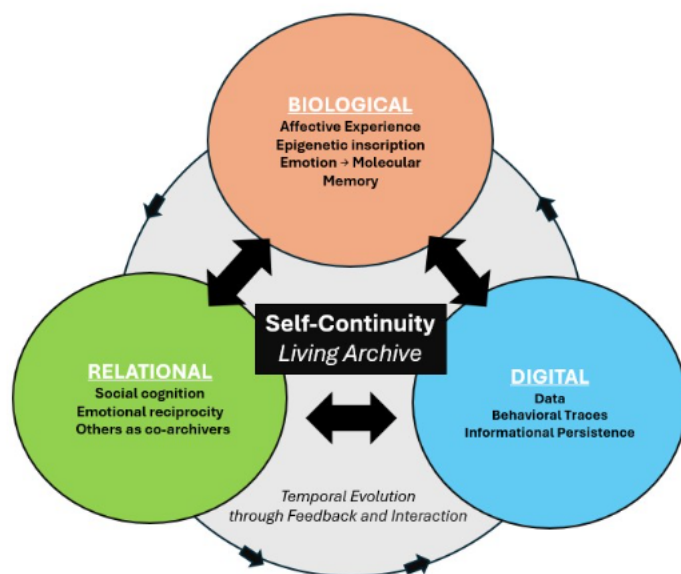
Narrative identity theorists argue that selfhood develops through stories we tell about ourselves and stories others tell about us (McAdams, 2011). Being seen, remembered, and emotionally held by others functions as a relational archive of who we are. These interpersonal records are not neutral; they are affect-laden, selective, and changing. That instability is also what makes them genuinely human.

In the context of cognitive archiving, social cognition provides the relational layer:

- Biological systems archive affect through epigenetic and neural changes.
- Digital systems archive behavior and expression as data.
- Social systems archive the self through emotional recognition, shared memory, and narrative.

Taken together, this suggests that the self “lives” not only in the brain or in data, but also in other people’s minds and bodies, as an ongoing, affective, social process.

Figure 1
Conceptual Model of Cognitive Archiving



Note. Cognitive Archiving conceptualizes self-continuity as emerging from interactions among biological, digital, and relational encoding systems. These systems form a dynamic “living archive” that evolves through feedback, interaction, and temporal processes.

Limitations Across the Literature

Across these domains, several shared limitations appear. Epigenetic studies (Pizzimenti & Lattal, 2015; Schiele et al., 2020; Yehuda & Lehrner, 2018) are often correlational. They show associations between emotional experience and molecular change but cannot fully isolate causality, especially in human populations. Most of the biological work focuses on trauma, stress, and pathology, with fewer empirical studies on positive emotion, safety, or love as epigenetic or neural archives (Pan et al., 2025 are exceptions but still limited in scope and time frame). Philosophical and theoretical models (Albantakis et al., 2023; Chalmers, 1995; Jackson, 1982) articulate why subjective experience matters but do not offer fully testable, widely accepted methods for measuring it. Digital identity work (Garde-Hansen, 2011; Giannachi, 2016; Hoskins, 2018; Kitchin, 2014) highlights how data strips away context and affect. While this literature diagnoses the problem, it rarely integrates with neuroscience or social cognition to propose integrative solutions. Lastly, social cognition and narrative identity research (Fiske & Taylor, 2017; Gallese, 2009; McAdams, 2011) shows how deeply relational selfhood is, but it does not typically connect to biological or digital layers of archiving. These gaps justify the need for a framework like cognitive archiving that explicitly synthesizes biological, digital, and relational perspectives as one system cannot measure or hold the complexity of consciousness and self alone.

Conclusion

Cognitive archiving as a theoretical framework brings together philosophy of mind, affective neuroscience, archival science, and social cognition to understand how identity continuity might be preserved. Rather than treating the self as located only in the brain, or only in data, cognitive archiving conceptualizes selfhood as distributed across three interacting systems:

1. Biological encoding – epigenetic and neural changes that inscribe affect as molecular memory (Pan et al., 2025; Pizzimenti & Lattal, 2015; Schiele et al., 2020; Yehuda & Lehrner, 2018).
2. Digital encoding – data traces that document behavior, communication, and expression over time (Giannachi, 2016; Hoskins, 2018; Kitchin, 2014).
3. Relational encoding – others' perceptions, memories, and narratives that emotionally hold and reflect the self (Fiske & Taylor, 2017; Gallese, 2009; McAdams, 2011).

For social psychology, this framework contributes in several ways. First, it reframes identity and memory as relational and multi-layered, rather than purely intrapsychic. It then suggests that phenomena like intergenerational trauma, online identity, and grief can be studied as forms of cognitive archiving, where emotional experiences are preserved and transmitted across biological, digital, and social channels. Furthermore, new empirical questions such as how positive relational experiences might buffer or rewrite epigenetic traces of trauma, or how social support and digital practices interact in the preservation of a loved one's identity after death open further discussion in future research.

Ultimately, cognitive archiving does not claim to solve the hard problem of consciousness. Instead, it offers social psychology a way to link subjective experience to measurable systems without reducing the self to any one of them. It invites future research to explore how emotions, relationships, and information technologies together shape the continuity of who we are and how parts of us may endure in the memories, bodies, and archives of others.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

The author declares that ChatGPT (OpenAI), an AI-assisted language model, was used during the development of this manuscript for brainstorming, conceptual discussion, organizational support, language refinement, and proofreading. The use of AI-assisted technology was limited to generating feedback, suggesting revisions, improving clarity, and assisting with the organization and presentation of ideas. The author reviewed, edited, and verified all content generated through these interactions.

The author further declares that all core concepts, theoretical arguments, interpretations, analyses, conclusions, and the Cognitive Archiving framework presented in this manuscript are the original work of the author. Responsibility for the accuracy, integrity, and final content of the manuscript remains solely with the author.

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