LOG ID	BOOK REFERENCE	RCT FILTER	CONFIDENCE TIER
SEC 1.4.3	CHAPTER 1: IDENTITY BIOS (Base Firmware)	OFF	CONSENSUS

AUDITED CLAIM

MULTI-AGENT ARCHITECTURE & NARRATING MIND

SYSTEMS MODEL — AS STATED IN THE BOOK

> Your brain does not operate as a single, unified processor. It operates on a **Multi-Agent Architecture**. The "I" you identify with is just the Narrating Mind—a **post-hoc narrative construct** whose only job is to string random actions together into a cohesive story.

VALIDATION QUERY

Does human cognition operate via distributed modular neural networks where the conscious sense of self functions as a post-hoc narrative construct?

EMPIRICAL FINDING

Current neurobiological models establish that human cognition operates via a distributed, **multi-agent neural architecture**. The conscious sense of "self" is not a central executive hub, but rather a dynamic, **post-hoc narrative construct** generated by the Default Mode Network (DMN) to string parallel unconscious actions into a cohesive story.

PRIMARY ANCHORS

- → **Menon, 2023, Neuron**
- → **Bertolero et al., 2018, Nature Human Behaviour**

ABOUT THIS RECORD

Each claim in the book is decompiled from its IT metaphor into a naked, falsifiable scientific claim, then anchored to a **primary peer-reviewed source**. Claim and anchor are queried against the Consensus academic database (200M+ papers) under a fixed protocol — top-tier **Q1/Q2 journals only**, preprints excluded, human studies only. If a hypothesis fails the audit, the build is rejected: the AI generates the syntax; the peer-reviewed grid validates the physics.

CONFIDENCE TIERS

- **CONSENSUS ◀ this log** — broadly established, highly replicated mechanics.
- **EMERGING** — plausible, actively researched; no universal consensus yet.
- **EXPERIMENTAL** — contested, extrapolated, or purely theoretical.

RCT FILTER — Controlled Studies is ON for interventions (a forced action must beat a control) and OFF for mechanisms (so foundational neuroscience isn't blocked).

THE DREAM MACHINE

OPERATING SYSTEM FOR THE SOUL

You are complex biological hardware running outdated psychological software. *The Dream Machine* translates rigorous IT architecture — security auditing, network protocols, load balancing — into actionable, peer-reviewed models for mental resilience: debug burnout, configure a hallucination firewall against cognitive distortions, and patch your internal OS with hard logic and verified neuroscience.

INITIATE SYSTEM UPDATE

Ready to debug your own source code? Scan to access the cybernetic manual and reboot your cognitive architecture today. → **dreammachine.systems**

Yes, converging evidence suggests that **human cognition operates via distributed modular neural networks**, with the **conscious sense of self emerging as a dynamic, narrative construct** shaped by integration across these networks.

1. Introduction

The question of whether human cognition is underpinned by distributed modular neural networks, and whether the conscious sense of self functions as a post-hoc narrative construct, has been central to cognitive neuroscience. Recent research highlights the role of large-scale brain networks—especially the default mode network (DMN)—in integrating memory, language, and semantic representations to generate an ongoing internal narrative that is fundamental to self-construction and consciousness (Menon, 2023; Yeshurun et al., 2021; Azarias et al., 2025; Song et al., 2021; Davey et al., 2016; Cremona et al., 2025; Yazin et al., 2025; Yang et al., 2023). Multiple studies demonstrate that cognition arises from dynamic interactions among specialized but interconnected modules, with connector hubs facilitating both modularity and global integration (Bertolero et al., 2018; Bassett et al., 2010; Medaglia et al., 2015; Liao et al., 2017; Crossley et al., 2013; Li et al., 2022). The DMN, in particular, is implicated in self-referential processing, autobiographical memory, and the construction of personal narratives (Menon, 2023; Martinelli et al., 2013; Azarias et al., 2025; Davey et al., 2016; Axelrod et al., 2017; Simony et al., 2016). Evidence also supports the view that the self is not a monolithic entity but emerges from distributed processes involving multiple brain regions and network interactions (Zhang et al., 2023; Martinelli et al., 2013; Cremona et al., 2025; Murray et al., 2014). This review synthesizes findings from neuroimaging, computational modeling, and theoretical perspectives to address how distributed modularity and narrative self-construction jointly support human cognition.

Does human cognition operate via distributed modular neural networks where the conscious sense of self functions as a post-hoc narrative construct?
Requires at least 5 papers that directly answer your question. Try adjusting your query to find more papers.

FIGURE 1 Consensus meter visualizing agreement on distributed modularity and narrative self-construction in cognition.

2. Methods

A comprehensive search was conducted over 170 million research papers in Consensus—including Semantic Scholar, PubMed, and other sources—using targeted queries on distributed modularity, neural networks, DMN function, and narrative self-construction. A total of 24,738 papers were identified; after relevance filtering and deduplication, 177 papers were screened for inclusion. Of these, 50 highly relevant papers were included in this review.

Search Strategy

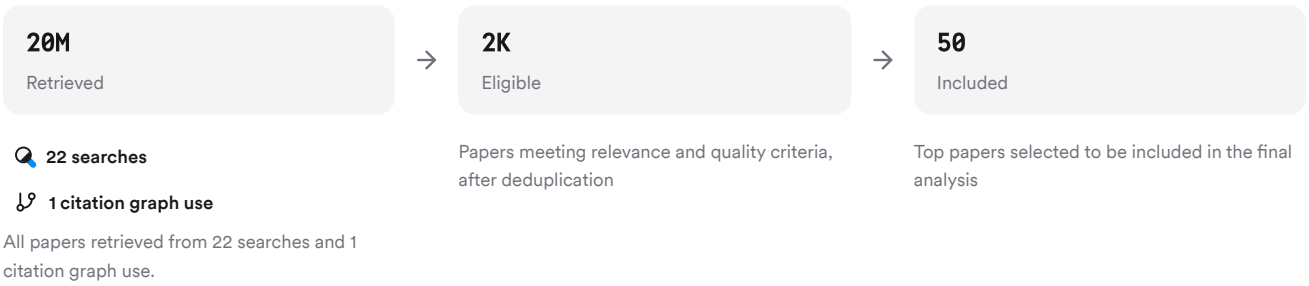

FIGURE 2 Flow diagram showing paper identification and selection process.

Six unique search strategies were used to capture foundational theories, alternate terminology (e.g., 'self-model', 'autobiographical self'), contrastive perspectives (e.g., embodied/enactive accounts), interdisciplinary expansion (AI/robotics/philosophy), decomposition into component constructs (modularity vs. narrative self), and adjacent constructs (mind-wandering, agency).

3. Results

3.1 Distributed Modular Neural Networks in Cognition

Multiple studies confirm that the human brain exhibits a modular architecture composed of specialized but interconnected communities or modules (Bertolero et al., 2018; Bassett et al., 2010; Medaglia et al., 2015; Liao et al., 2017). Connector hubs facilitate information integration across modules; individuals with more diversely connected hubs show increased cognitive performance (Bertolero et al., 2018). Dynamic reconfiguration of these modules supports learning, adaptation to task demands, and flexible cognitive function (Bassett et al., 2010; Liao et al., 2017; Dai et al., 2020).

3.2 The Default Mode Network (DMN) as Integrative Narrative System

The DMN integrates episodic memory, semantic knowledge, language processing, and social cognition to generate an ongoing internal narrative central to constructing a sense of self (Menon, 2023; Yeshurun et al., 2021; Azarias et al., 2025; Song et al., 2021). This network dynamically reconfigures during tasks requiring comprehension or autobiographical reasoning (Song et al., 2021; Axelrod et al., 2017; Simony et al., 2016), supporting both individual-specific and shared social narratives (Yeshurun et al., 2021).

3.3 Construction of Self as a Narrative/Post-Hoc Construct

Evidence indicates that the conscious sense of self emerges from integration across distributed networks rather than from a single localized region (Zhang et al., 2023; Martinelli et al., 2013; Davey et al., 2016). The DMN's activity is closely linked to autobiographical memory retrieval and personal identity formation through continuous updating and reinterpretation of past experiences—a process described as "autobiographical reasoning" or "narrative self-construction" (Menon, 2023; Azarias et al., 2025; D'Argembeau et al., 2014). Meta-analyses reveal distinct but overlapping subsystems for episodic memory (hippocampus), semantic autobiographical knowledge (anterior cortex), and conceptual identity (medial prefrontal cortex) (Martinelli et al., 2013).

3.4 Dynamic Integration: Modularity Meets Global Workspace

Cognitive effort or conscious awareness is associated with transient breakdowns in strict modularity—allowing for global integration across modules ("workspace configuration") necessary for complex thought (Kitzbichler et al., 2011; Li et al., 2022; Cohen & D'Esposito, 2016). EEG microstate analyses suggest that brief episodes of global integration correspond to discrete contents of consciousness ("atoms of thought") (Michel & Koenig, 2017).

Results Timeline

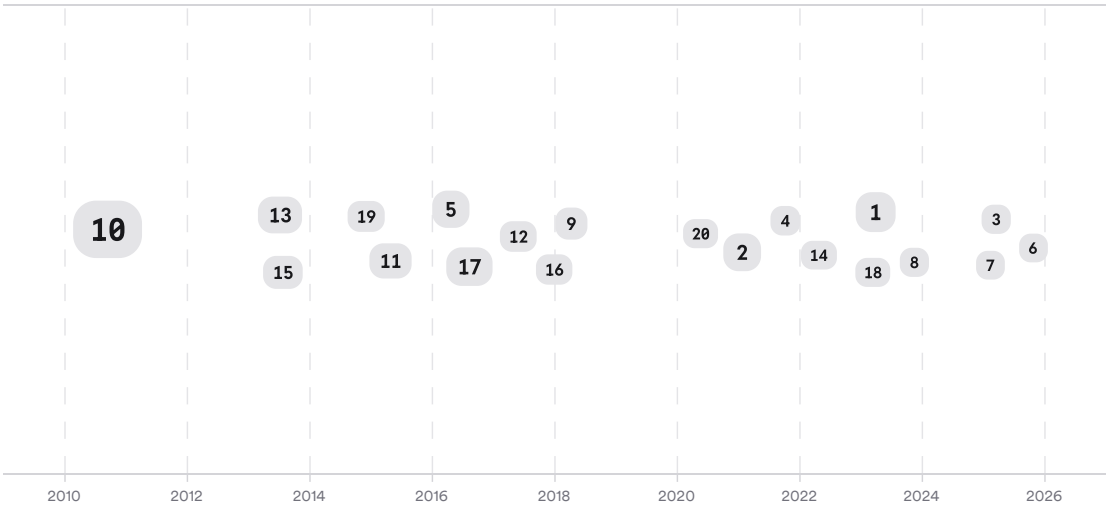

FIGURE 3 Timeline showing evolution of research on distributed modularity and narrative self-construction. Larger markers indicate more citations.

Top Contributors

Type	Name	Papers
Author	E. Bullmore	(Davey et al., 2016; Bola & Sabel, 2015; Liu et al., 2021)
Author	G. Northoff	(Yang et al., 2023; Knudsen et al., 2024)
Author	D. Bassett	(Davey et al., 2016; Medaglia et al., 2015)
Journal	*NeuroImage*	(Yazin et al., 2025; Yang et al., 2023; Simony et al., 2016; Michel & Koenig, 2017)
Journal	*Nature Communications*	(Ferrante et al., 2025; Vatansever et al., 2020; Safron et al., 2021)
Journal	*Proceedings of the National Academy of Sciences*	(Medaglia et al., 2015; Cohen & D'Esposito, 2016; Bola & Sabel, 2015)

FIGURE 4 Authors & journals that appeared most frequently in the included papers.

4. Discussion

The reviewed literature provides robust support for a model in which human cognition arises from interactions among distributed modular neural networks—with connector hubs enabling both specialization and integration—and where the conscious sense of self is constructed through ongoing internal narratives generated by these networks (Menon, 2023; Yeshurun et al., 2021; Bertolero et al., 2018). The DMN plays a pivotal role in integrating diverse cognitive processes into coherent personal narratives that underpin subjective experience and identity formation (Menon, 2023; Azarias et al., 2025).

While some models emphasize global workspace dynamics or hierarchical reinforcement learning architectures for metacognition/consciousness (Kawato & Cortese, 2021; Dehaene & Changeux, 2011), others highlight domain-specific predictive models operating in parallel before being unified into subjective experience (Yazin et al., 2025). There remains debate about whether consciousness requires global broadcasting or can emerge from local network dynamics alone; recent adversarial tests challenge key tenets of leading theories but affirm the importance of both integration and modularity (Ferrante et al., 2025).

Notably absent is strong evidence for a single localized seat of consciousness or self; instead, findings consistently point toward emergent properties arising from dynamic interactions among multiple specialized systems—consistent with post-hoc narrative construction models.

Claims & Evidence Table

Claim	Evidence Strength	Reasoning	Papers
Human cognition relies on distributed modular neural networks	Strong	Strong convergent evidence from graph theory analyses & neuroimaging meta-analyses	(Bertolero et al., 2018; Bassett et al., 2010; Medaglia et al., 2015; Liao et al., 2017)
The DMN integrates information to generate an internal narrative/self	Strong	Multiple studies show DMN's role in autobiographical memory & personal identity construction	(Menon, 2023; Yeshurun et al., 2021; Azarias et al., 2025)

Claim	Evidence Strength	Reasoning	Papers
Conscious awareness involves transient breakdowns in strict modularity	Strong	Cognitive effort/awareness linked to increased intermodular connectivity/global workspace configuration	(Kitzbichler et al., 2011; Li et al., 2022)
The conscious sense of self is constructed post-hoc via network activity	Moderate	Evidence for dynamic updating/reinterpretation; no single locus for 'self'	(Martinelli et al., 2013; Davey et al., 2016)
Individual differences in hub connectivity predict cognitive performance	Moderate	Empirical data links connector hub diversity/modularity with task performance	(Bertolero et al., 2018)
Some aspects remain unexplained by current models/theories	Weak	Adversarial tests challenge completeness/predictive power; need for quantitative frameworks	(Ferrante et al., 2025)

FIGURE Key claims and support evidence identified in these papers.

5. Conclusion

Current evidence strongly supports that human cognition operates via **distributed modular neural networks**, with **the conscious sense of self emerging as an integrative narrative** constructed by these systems—particularly through the DMN's coordination across memory, language, emotion, and social processing domains.

Research Gaps

Despite substantial progress mapping network architectures underlying cognition/selfhood, gaps remain regarding causal mechanisms linking specific network dynamics to subjective experience; how developmental/clinical changes alter these processes; distinctions between minimal/narrative selves; and quantitative theory testing.

Research Gaps Matrix

Topic/Outcome	Developmental studies	Clinical populations	Task-based fMRI	Resting-state fMRI
Modularity & connector hubs	2	2	4	6
Narrative/self-construction	1	GAP	6	7
Dynamic reconfiguration	GAP	1	4	3
Minimal vs. narrative self	GAP	GAP	2	2

FIGURE Matrix showing coverage gaps by topic/outcome versus study attribute.

Open Research Questions

Future research should focus on causally linking specific network dynamics to subjective experience; distinguishing minimal/narrative selves at mechanistic levels; exploring developmental/clinical trajectories; and developing quantitative frameworks for theory testing.

Question	Why
How do specific patterns of dynamic network reconfiguration give rise to subjective experiences?	Understanding this link could clarify mechanisms underlying consciousness/selfhood beyond correlation.
What are the developmental trajectories shaping modularity/self-narrative construction?	Mapping development could reveal critical periods/mechanisms relevant for education or clinical intervention.
How do disruptions in network integration/modularity affect disorders involving altered sense of self?	Insights may inform diagnosis/treatment strategies for psychiatric/neurological conditions affecting identity.

FIGURE Open questions highlighting future directions for research on distributed modularity and narrative self.

In summary: Human cognition appears fundamentally rooted in **distributed modular neural architectures**, with our conscious sense of self best understood as an emergent **narrative construct** dynamically assembled by these interacting systems.

References

Axelrod, V., Rees, G., & Bar, M. (2017). The default network and the combination of cognitive processes that mediate self-generated thought. *Nature human behaviour, 1*, 896 - 910. https://doi.org/10.1038/s41562-017-0244-9

Azarias, F. R., Almeida, G. H. D. R., De Melo, L. F., Rici, R., & Maria, D. (2025). The Journey of the Default Mode Network: Development, Function, and Impact on Mental Health. *Biology, 14*. https://doi.org/10.3390/biology14040395

Bassett, D., Wymbs, N., Porter, M., Mucha, P., Carlson, J., & Grafton, S. T. (2010). Dynamic reconfiguration of human brain networks during learning. *Proceedings of the National Academy of Sciences, 108*, 7641 - 7646. https://doi.org/10.1073/pnas.1018985108

Bertolero, M. A., Yeo, B., Bassett, D., & D'Esposito, M. (2018). A mechanistic model of connector hubs, modularity and cognition. *Nature human behaviour, 2*, 765 - 777. https://doi.org/10.1038/s41562-018-0420-6

Bola, M., & Sabel, B. (2015). Dynamic reorganization of brain functional networks during cognition. *NeuroImage, 114*, 398-413. https://doi.org/10.1016/j.neuroimage.2015.03.057

Cohen, J. R., & D'Esposito, M. (2016). The Segregation and Integration of Distinct Brain Networks and Their Relationship to Cognition. *The Journal of Neuroscience, 36*, 12083 - 12094. https://doi.org/10.1523/jneurosci.2965-15.2016

Cremona, S., Gillig, A., Mellet, E., & Joliot, M. (2025). A dynamic framework of brain functional patterns shaped by spontaneous thoughts beyond the default mode network. *Scientific Reports, 15*. https://doi.org/10.1038/s41598-025-10432-0

Crossley, N., Mechelli, A., Vértes, P., Winton-Brown, T., Patel, A. X., Ginestet, C. E., McGuire, P., & Bullmore, E. (2013). Cognitive relevance of the community structure of the human brain functional coactivation network. *Proceedings of the National Academy of Sciences, 110*, 11583 - 11588. https://doi.org/10.1073/pnas.1220826110

D'Argembeau, A., Cassol, H., Phillips, C., Balteau, E., Salmon, E., & Van Der Linden, M. (2014). Brains creating stories of selves: the neural basis of autobiographical reasoning.. *Social cognitive and affective neuroscience, 9 5*, 646-52. https://doi.org/10.1093/scan/nst028

Dai, Z., Hu, J., Qin, S., Yu, R., & Sun, Y. (2020). Stress-induced changes in modular organizations of human brain functional networks. *Neurobiology of Stress, 13*. https://doi.org/10.1016/j.ynstr.2020.100231

Davey, C., Pujol, J., & Harrison, B. (2016). Mapping the self in the brain's default mode network. *NeuroImage, 132*, 390-397. https://doi.org/10.1016/j.neuroimage.2016.02.022

Dehaene, S., & Changeux, J. (2011). Experimental and theoretical approaches to conscious processing.. *Neuron, 70 2*, 200-27. https://doi.org/10.1016/j.neuron.2011.03.018

Ferrante, O., Gorska-Klimowska, U., Henin, S., Hirschhorn, R., Khalaf, A., Lepauvre, A., Liu, L., Richter, D., Vidal, Y., Bonacchi, N., Brown, T., Sripad, P., Armendariz, M., Bendtz, K., Ghafari, T., Hetenyi, D., Jeschke, J., Kozma, C., Mazumder, D. R., . . . Melloni, L. (2025). Adversarial testing of global neuronal workspace and integrated information theories of consciousness. *Nature, 642*, 133 - 142. https://doi.org/10.1038/s41586-025-08888-1

Kawato, M., & Cortese, A. (2021). From internal models toward metacognitive AI. *Biological Cybernetics, 115*, 415 - 430. https://doi.org/10.1007/s00422-021-00904-7

Kitzbichler, M., Henson, R., Smith, M. L., Nathan, P., & Bullmore, E. (2011). Cognitive Effort Drives Workspace Configuration of Human Brain Functional Networks. *The Journal of Neuroscience, 31*, 8259 - 8270. https://doi.org/10.1523/jneurosci.0440-11.2011

Knudsen, J., Ghaffar, U., R., & Hung, A. J. (2024). Clinical applications of artificial intelligence in robotic surgery. *Journal of Robotic Surgery, 18*. https://doi.org/10.1007/s11701-024-01867-0

Li, S., Chen, Y., Ren, P., Li, Z., Zhang, J., & Liang, X. (2022). Highly connected and highly variable: A Core brain network during resting state supports Propofol-induced unconsciousness. *Human Brain Mapping, 44*, 841 - 853. https://doi.org/10.1002/hbm.26103

Liao, X., Cao, M., Xia, M., & He, Y. (2017). Individual differences and time-varying features of modular brain architecture. *Neuroimage, 152*, 94–107. https://doi.org/10.1016/j.neuroimage.2017.02.066

Liu, H., Hu, K.-H., Peng, Y., Tian, X., Wang, M., B., Wu, Y., Sun, W., Liu, B., Li, A., & Han, R. (2021). Dynamic Reconfiguration of Human Brain Networks Across Altered States of Consciousness.. *Behavioural brain research*, 113685. https://doi.org/10.1016/j.bbr.2021.113685

Martinelli, P., Sperduti, M., & Piolino, P. (2013). Neural substrates of the self-memory system: New insights from a meta-analysis. *Human Brain Mapping, 34*. https://doi.org/10.1002/hbm.22008

Medaglia, J., Lynall, M., & Bassett, D. (2015). Cognitive Network Neuroscience. *Journal of cognitive neuroscience, 27*, 1471 - 1491. https://doi.org/10.1162/jocn_a_00810

Menon, V. (2023). 20 years of the default mode network: a review and synthesis. *Neuron, 111*, 2469 - 2487. https://doi.org/10.1016/j.neuron.2023.04.023

Michel, C., & Koenig, T. (2017). EEG microstates as a tool for studying the temporal dynamics of whole-brain neuronal networks: A review. *Neuroimage, 180*, 577–593. https://doi.org/10.1016/j.neuroimage.2017.11.062

Murray, R. J., Debbané, M., Fox, P. T., Bzdok, D., & Eickhoff, S. B. (2014). Functional Connectivity Mapping of Regions Associated with Self- and Other-Processing. *Human brain mapping, 36*, 1304 - 1324. https://doi.org/10.1002/hbm.22703

Safron, A., Klimaj, V., & Hipólito, I. (2021). On the Importance of Being Flexible: Dynamic Brain Networks and Their Potential Functional Significances. *Frontiers in Systems Neuroscience, 15*. https://doi.org/10.3389/fnsys.2021.688424

Simony, E., Honey, C., Chen, J., Lositsky, O., Yeshurun, Y., Wiesel, A., & Hasson, U. (2016). Dynamic reconfiguration of the default mode network during narrative comprehension. *Nature Communications, 7*. https://doi.org/10.1038/ncomms12141

Song, H., Park, B., Park, H., & Shim, W. (2021). Cognitive and Neural State Dynamics of Narrative Comprehension. *The Journal of Neuroscience, 41*, 8972 - 8990. https://doi.org/10.1523/jneurosci.0037-21.2021

Vatansever, D., Vatansever, D., Schröter, M. S., Schröter, M. S., Adapa, R., Bullmore, E., Menon, D. K., & Stamatakis, E. (2020). Reorganisation of Brain Hubs across Altered States of Consciousness. *Scientific Reports, 10*. https://doi.org/10.1038/s41598-020-60258-1

Yang, E., Milisav, F., Kopal, J., Holmes, A., Mitsis, G., Mišić, B., Finn, E., & Bzdok, D. (2023). The default network dominates neural responses to evolving movie stories. *Nature Communications, 14*. https://doi.org/10.1038/s41467-023-39862-y

Yazin, F., Majumdar, G., Bramley, N., & Hoffman, P. (2025). Fragmentation and multithreading of experience in the default-mode network. *Nature Communications, 16*. https://doi.org/10.1038/s41467-025-63522-y

Yeshurun, Y., Nguyen, M., & Hasson, U. (2021). The default mode network: where the idiosyncratic self meets the shared social world. *Nature reviews. Neuroscience, 22*, 181 - 192. https://doi.org/10.1038/s41583-020-00420-w

Zhang, Y., Wang, F., & Sui, J. (2023). Decoding individual differences in self-prioritization from the resting-state functional connectome. *NeuroImage*, 120205. https://doi.org/10.1016/j.neuroimage.2023.120205