LOG ID	BOOK REFERENCE	RCT FILTER	CONFIDENCE TIER
SEC A.1.2	DIRECTORY A: BACKEND SCHEMATIC (Multi-Agent Architecture)	OFF	CONSENSUS

AUDITED CLAIM

HEMISPHERIC ASYMMETRY (MASTER AND EMISSARY)

SYSTEMS MODEL — AS STATED IN THE BOOK

> Clinically, neuroimaging and behavioral studies confirm a functional asymmetry in hierarchical processing: the right hemisphere demonstrates a relative advantage for **global, configural data integration**, while the left hemisphere specializes in **local, featural, and categorical processing**.

VALIDATION QUERY

Does the right cerebral hemisphere specialize in holistic global processing while the left cerebral hemisphere specializes in analytical and localized categorical processing?

EMPIRICAL FINDING

Extensive behavioral and lesion research indicates a functional asymmetry in human hierarchical processing. Neuroimaging and lesion studies demonstrate that the right hemisphere shows a relative advantage for **global and configural data integration**, whereas the left hemisphere specializes in **local, featural, and categorical processing**.

PRIMARY ANCHORS

→ Fink et al., 1996, Nature

→ Yamaguchi et al., 2000, The Journal of Neuroscience

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).

Yes, **the right hemisphere tends toward global-holistic processing** and the **left toward local-analytic processing**, but not rigidly.

1. Introduction

Across visual cognition, the best-supported version of this claim is modest rather than absolute: many behavioral, lesion, ERP, PET, and fMRI studies find a **right-hemisphere advantage for global/configural information** and a **left-hemisphere advantage for local/featural information**, especially in hierarchical-figure tasks (Fink et al., 1996; Heinze et al., 1998; Yamaguchi et al., 2000; Kimchi & Merhav, 1991). Lesion work is an important anchor because right-hemisphere damage often impairs global processing, whereas left-hemisphere damage often impairs local processing (Chen et al., 2024; Volberg & Hübner, 2004; Oken et al., 1999). Behavioral visual-field studies also repeatedly report better global performance for left-visual-field/right-hemisphere input and better local performance for right-visual-field/left-hemisphere input, though the effects are often small and inconsistent across paradigms (Kleeck, 1989; Hübner, 1998; Christie et al., 2012).

The inconsistency is not noise alone. Several papers show that lateralization depends on **stimulus type, spatial frequency, response conflict, age, and individual differences**, and some well-powered studies challenge a simple “global-right/local-left” rule (Han et al., 2002; Volberg & Hübner, 2007; Chen & Davies, 2025; Gerlach & Poirel, 2019; Hausinger et al., 2025). Outside classic Navon tasks, the broader analytic-versus-holistic framing is even less universal: some semantic studies find little hemispheric difference, and some face or character-recognition studies show bilateral or task-dependent holistic processing rather than a fixed right-hemisphere monopoly (Mech et al., 2022; Liu et al., 2014; Chung et al., 2018).

Does the right cerebral hemisphere specialize in holistic global processing while the left cerebral hemisphere specializes in analytical and localized categorical processing?

N = 19

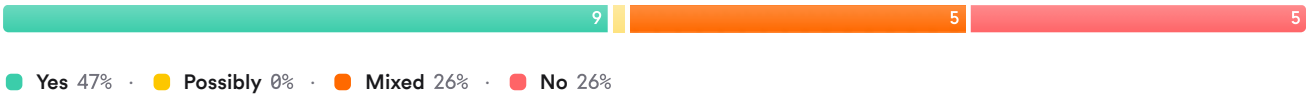

FIGURE 1 Research consensus on hemispheric global-local specialization

The meter should be read as **qualified yes**. The corpus supports a real asymmetry in global-local visual processing, but it does not support a strong claim that each hemisphere is exclusively or invariantly holistic versus analytic (Volberg & Hübner, 2007; Gur et al., 1992).

2. Methods

The search ran over more than 170 million research papers indexed in Consensus, drawing from Semantic Scholar, PubMed, and other academic sources. The workflow identified 149 unique relevant papers after screening and deduplication, and the 50 most relevant human studies were included for this deep synthesis. The corpus spans lesion studies, divided visual field experiments, ERP/EEG, PET/fMRI, developmental work, aging studies, meta-analytic work, and domain-transfer studies on faces, language, and character recognition.

Search Strategy

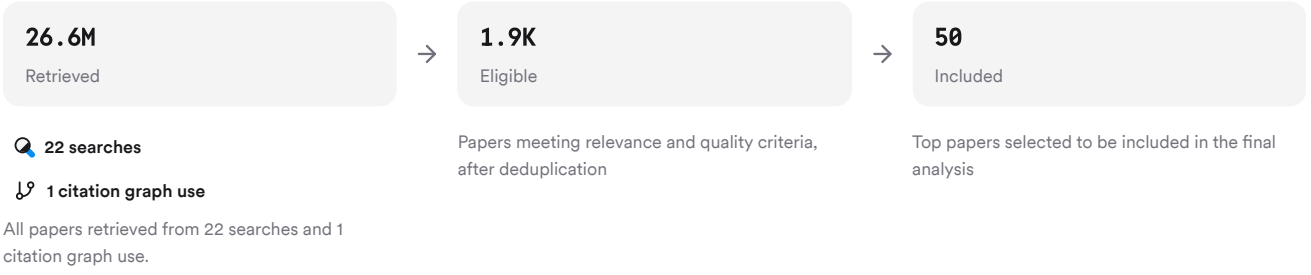

FIGURE 2 Study identification and screening workflow

Searches combined classic global-local terms with hemispheric lateralization, contrasting evidence, and methodological diversity across human studies.

3. Results

3.1 Key Papers

A small set of papers anchors the field because they link multiple methods to the same asymmetry. Fink et al. provided influential PET evidence, Heinze et al. and Yamaguchi et al. localized later ERP asymmetries, and van Kleeck's meta-analysis synthesized early mixed behavioral results into support for the canonical pattern (Fink et al., 1996; Heinze et al., 1998; Yamaguchi et al., 2000; Kleeck, 1989).

Paper	Summary
(Liu et al., 2014)	PET shows **right global** and **left local** occipital bias (Fink et al., 1996)
(Hübner, 1998)	ERP/PET place asymmetry at **later processing stages** (Heinze et al., 1998)
(Heinze et al., 1998)	Meta-analysis supports the canonical **RH-global/LH-local** pattern despite mixed single studies (Kleeck, 1989)

FIGURE 3 Foundational papers in hemispheric global-local research

3.2 Replicated Visual Asymmetry

Evidence is strongest in hierarchical-figure paradigms. Recent behavioral work in young and older adults found right-hemisphere global and left-hemisphere local specialization for letters and verbalizable objects, supporting a stimulus-independent account in those categories (Chen et al., 2024). Another recent large sample found the same group-level pattern in both young and older adults, although only about half of individuals showed the predicted pattern themselves (Chen & Davies, 2025).

Developmental studies broadly fit this model. Children show a shift from bilateral or immature processing toward adult-like right-global and left-local lateralization with age, and mature-lateralized children show matching rightward global and leftward local activation (Moses et al., 2002). Other child-adult work also found faster, more accurate global identification in the right hemisphere and local identification in the left hemisphere (Peterson & Peterson, 2014).

3.3 Mechanisms and Boundary Conditions

Dimension	Supported Pattern	Boundary Condition	Citations
Processing stage	Later-stage asymmetry	Early sensory gating not strongly lateralized	(Heinze et al., 1998)
Attention control	RH shifts global, LH shifts local	Top-down allocation contributes	(Yamaguchi et al., 2000)
Stimulus properties	Central broadband stimuli show clearer asymmetry	Unilateral presentation and contrast balancing weaken it	(Han et al., 2002)
Conflict demands	Effects strengthen for incongruent stimuli	Often absent for nonconflicting stimuli	(Volberg & Hübner, 2004; Volberg & Hübner, 2007)
Spatial scale integration	RH may integrate across scales	Not necessarily global preference per se	(Gerlach & Poirel, 2019)

FIGURE 4 Mechanisms and limits of hemispheric asymmetry

The clearest mechanistic theme is that hemispheric asymmetry is not simply an early visual filter. ERP and PET data place much of the difference at later representational or attentional stages, and several studies show that task demands determine whether the asymmetry becomes measurable (Heinze et al., 1998; Yamaguchi et al., 2000; Martens & Hübner, 2013).

3.4 Contradictions and Domain Spillover

Not all direct tests support the classic dichotomy. Some early and later visual-field studies found no significant hemispheric asymmetry despite robust global-precedence effects (Boles, 1984; Blanca & Alarcón, 2002). A large 2019 study found no larger left-visual-field advantage for global precedence once precedence and interference were deconfounded, arguing instead that the right hemisphere may be especially important for **integrating shape across scales** rather than for global shape processing itself (Gerlach & Poirel, 2019). A 2025 MEG decoding study also found heterogeneous lateralization profiles, including significant right-hemispheric lateralization of local processing in some analyses, directly challenging a rigid mapping (Hausinger et al., 2025).

The broader “holistic-right/analytic-left” generalization is even more fragile outside global-local vision. In callosotomy patients, both hemispheres could show analytic or holistic processing depending on task and stimulus, although the left hemisphere was somewhat more likely to engage analytic processing (Gur et al., 1992). In semantic processing, two experiments found similar associative and categorical priming across hemispheres, arguing that many observed differences reflect task demands more than fundamentally different semantic representations (Mech et al., 2022).

Results Timeline

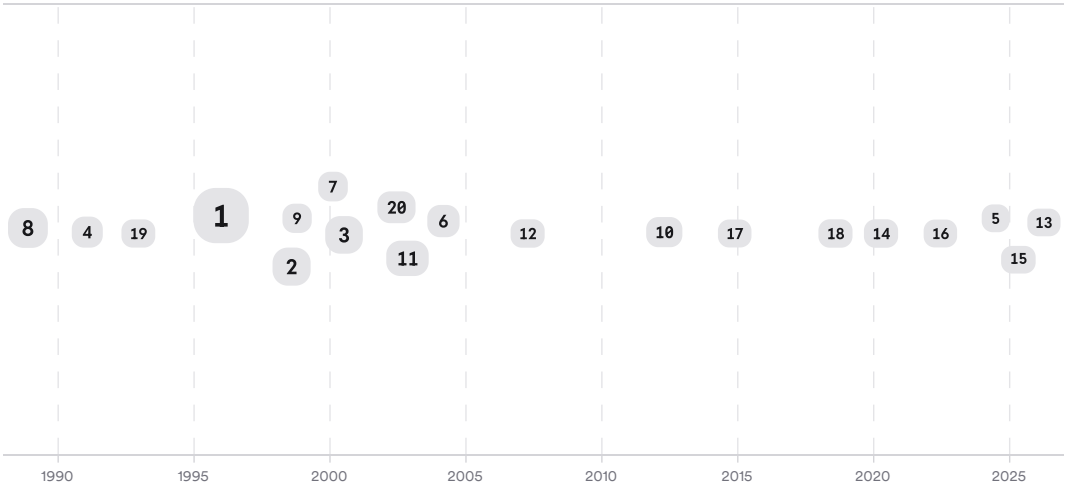

FIGURE 5 Timeline of hemispheric specialization findings; larger markers indicate more citations

The timeline shows an early period of mixed behavioral findings, a consolidation phase with lesion and neuroimaging support, and a recent phase emphasizing moderators such as conflict, stimulus type, and individual variability. The field has moved from asking whether asymmetry exists to asking **when, for whom, and by what mechanism** it appears (Kleeck, 1989; Fink et al., 1996; Chen & Davies, 2025).

Top Contributors

Type	Name	Papers
Author	G. Fink	[3687d65fd2f25209ab661998fad772ac][b457946d97df5504bfc4b5bd8ec33696]
Author	R. Hübner	[87223a163e9951e2acde6e953d0b6ffe][4e578d6a5e6353ba803b1aaa8b6e3560] [12a248b187e05de48845e92ee8590ac0][a4a51783833153f9a59a79aeb132ce61]
Author	Haiwen Chen	[155606b2575d5c37910a96073c857af2][702b1f070d6e591b847e9989c5acae0b]
Journal	*Neuropsychologia*	[25660562cb2358e08eb87d3abea7fe38][11d0a5217a0a50da814a75b348b6a2f6] [4e578d6a5e6353ba803b1aaa8b6e3560][935f486d1ae856ce98a7b801a1a51be4]

Type	Name	Papers
		[8ddc7d0588ec5e15b7b11b3ac2fd3598]
Journal	*Brain and Cognition*	[90758dc0c78b56e9ab365755704e0a4d][a4a51783833153f9a59a79aeb132ce61] [bc6ef218885b5749a68c46d7f228ee45][7379570d9b93595995f98c3021e6073a]
Journal	*NeuroImage*	[2d80bfa181d8592990dde4a6b79218c8][7fe6e9d154155cdf85aa297fd782e2ba] [06043f174d9f533ba5af8e596b9de8b6]

FIGURE 6 Authors and journals appearing most in included papers

4. Discussion

The core claim is supported, but only at the level of **biased specialization**, not strict functional segregation. Convergent lesion, PET, fMRI, ERP, and divided-visual-field results repeatedly identify a rightward advantage for global/configural processing and a leftward advantage for local/featural processing in hierarchical vision (Chen et al., 2024; Fink et al., 1996; Yamaguchi et al., 2000; Brederoo et al., 2017). That convergence across methods is the main strength of the literature.

The main weakness is that the effect is conditional. Some studies fail to find the asymmetry at all, and others show it mainly under conflict, particular spatial-frequency compositions, or specific stimulus sets (Kleeck, 1989; Mena, 1992; Han et al., 2002; Volberg & Hübner, 2007). Recent work also makes clear that group averages can mask substantial interindividual heterogeneity (Hausinger et al., 2025; Chen & Davies, 2025).

The broad extension from “global-local visual bias” to “analytic versus categorical versus holistic cognition” is the least secure part of the claim. Some face and emotion studies fit the broader framing, with more right-hemisphere holistic/configural and more left-hemisphere part-based shortcuts (Calvo & Beltrán, 2014; Ramon & Rossion, 2011). But semantic and callosotomy evidence shows that both hemispheres can support both modes depending on task structure, which argues against a single unifying dichotomy across cognition (Mech et al., 2022; Gur et al., 1992).

Claim	Evidence Strength	Reasoning	Papers
Right hemisphere shows a **relative advantage for global/configural visual processing**	Strong	Supported across lesion, behavioral, ERP, PET, and fMRI studies, though effect size varies by paradigm	(Fink et al., 1996; Yamaguchi et al., 2000; Kimchi & Merhav, 1991)
Left hemisphere shows a **relative advantage for local/featural visual processing**	Strong	Similar multimethod replication and recent confirmation in young, older, and child samples	(Chen et al., 2024; Chen & Davies, 2025; Peterson & Peterson, 2014)
The asymmetry is **task- and stimulus-dependent**	Moderate	Effects strengthen with conflict and vary with stimulus position, spatial frequency, and category	(Volberg & Hübner, 2004; Han et al., 2002; Brederoo et al., 2017)
Individuals differ substantially in lateralization pattern	Moderate	Recent large-sample and MEG work show heterogeneous profiles beyond group averages	(Chen & Davies, 2025; Hausinger et al., 2025)
A single broad **holistic-right / analytic-left law** explains cognition generally	Weak	Contradicted by semantic, callosotomy, and some face-processing studies showing bilateral or flexible processing	(Gur et al., 1992; Mech et al., 2022; Liu et al., 2014)

FIGURE 7 Key claims and supporting evidence in corpus

5. Conclusion

The literature supports the claim in its **narrow visual form**: the right hemisphere tends to be better at global or configural aspects of hierarchical stimuli, and the left hemisphere tends to be better at local or featural aspects. The literature does **not** support treating that tendency as an absolute or domain-general law of "holistic right brain" versus "analytic left brain" cognition (Gur et al., 1992; Gerlach & Poirel, 2019).

Research Gaps

The main gaps are not whether some asymmetry exists, but how stable it is across tasks, populations, and domains beyond classic Navon-style stimuli. Recent work points especially to underexplored individual differences, mechanistic timing, and generalization to nonvisual or real-world tasks (Hausinger et al., 2025; Spotorno & Tatler, 2024).

Topic/Outcome	Individual differences	Real-world tasks	Domain generalization	Causal perturbation
Hierarchical visual stimuli	6	3	4	2
Semantic/categorical processing	2	1	2	GAP
Face/character holistic processing	3	2	4	1
Aging and development	4	1	2	GAP
Natural scene processing	1	2	1	GAP

Open Research Questions

The next advances will likely come from combining large samples, richer tasks, and causal methods.

Question	Why
When do individuals show reversed or bilateral global-local lateralization patterns?	Large recent studies show subgroup heterogeneity, which likely explains many older inconsistencies and may link to attention or callosal connectivity.
Does hemispheric specialization in Navon tasks generalize to natural scene understanding and search?	Real-world scene studies remain sparse, and recent work suggests template type and timescale can alter lateralized search guidance.
Are global-local asymmetries a visual-specific phenomenon or part of a broader analytic-holistic architecture?	Semantic and face studies give mixed answers, so broader cognitive generalization remains unresolved despite decades of theory.

The answer to the question is therefore **yes, but only as a probabilistic, context-dependent specialization rather than a rigid left-brain/right-brain rule**.

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