

Tiered Neurodata Risk Classification Framework based on functional exposure

Classifying neurodata by the capacity to enable inference, reconstruction, profiling or harm.

RISK CATEGORY	RISK TIER & DESCRIPTION		ILLUSTRATIVE ARTEFACTS REQUIRING ASSESSMENT
Conventional privacy-based risk TIERS 1, 1B, 2 AND 3 Risk linked primarily to identifiability and individual privacy. Tier 1b is assessed from the recipient's perspective.	1	TIER 1 — ANONYMISED AGGREGATE OUTPUTS Group-level or summary information with no participant-level record and no reasonable small-group disclosure risk. Minimal risk of re-identification or individual inference.	• Group-level activation maps (voxel-wise averages) • Aggregated connectivity matrices • Summary statistics (e.g., mean amplitudes by group) • Published group results with no individual-level data
	1b	TIER 1B — PARTICIPANT-LEVEL, NON-LINKABLE NEURODATA Participant-level records with identifiers, identifying anatomy and metadata removed, no linkage key available to the intended recipient, and a documented disclosure-risk assessment for that recipient (for public release: any member of the public). Recipient-relative.	• Defaced structural MRI released without any key • EEG/MEG with identifying metadata removed and key destroyed • Participant-level summary derivatives that reveal no more than the source • Synthetic participant-level data with reproduction excluded by testing
	2	TIER 2 — PSEUDONYMISED / CONTROLLED-ACCESS NEURODATA Participant-level data linkable to an individual through a code, repository record or institutional key available to the recipient; re-identification risk mitigated but not eliminated.	• Pseudonymised EEG or fMRI time series • Structural MRI (T1-weighted) with participant code • Clinical neuropsychological scores with codes • Data stored in controlled-access repositories
		TIER 3 — DIRECTLY IDENTIFIABLE OR INTRINSICALLY TRACEABLE NEURODATA	• Non-defaced structural MRI; raw DICOM with headers

Post-transformation functional-exposure tiers

TIERS 4 AND 5

Risk driven by the capacity to support inference, profiling or harm, independent of identifiability.

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Data containing direct identifiers, recognisable anatomy, identifying acquisition metadata or intrinsic signal characteristics that permit identification or tracing without reliance on a separately protected key.

- EEG/MEG/ECOG with identifying metadata or demonstrated fingerprinting capacity
- Implant telemetry or BCI logs with device identifiers
- Neurodata linked to names, voice or video

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TIER 4 — FUNCTIONALLY REVEALING DERIVATIVE NEURODATA

Transformed data with excess inferential capacity: inference outside the authorised purpose, re-identification by the derivative alone, or reconstruction of stimuli, speech, imagery or signals. Standard summary derivatives retain the source tier.

- Connectome fingerprints and participant-unique embeddings
- Decoders reconstructing stimuli, speech or imagery
- Cognitive, emotional or behavioural profiles beyond the approved purpose
- Risk scores and biomarkers used for prohibited inferences

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TIER 5 — MODEL-ASSOCIATED OR COMPUTATIONALLY PERSISTENT NEURODATA

Neural information dispersed across AI models, synthetic-data generators or computational infrastructure with continuing functional exposure, where inference, extraction or reconstruction may be possible without the original dataset.

- Model weights trained on neurodata
- Latent representations in generative models
- Federated-learning updates and model gradients
- Synthetic neurodata generators; persistent embedding stores

KEY PRINCIPLE Tier assignment is informed by functional exposure; legal status remains determined under applicable law. The highest applicable tier governs; an Unknown answer takes the more protective tier; participant status (Step 0B) can raise the minimum tier.