**Study B — Wᵣ Sequencing: mPFC/PCC ↔ Basal Ganglia During Narrative Re‑Ordering**

**Title**

Striatal Support for Reflective Sequencing: Testing Wᵣ Narrative Integration via Online Re‑Ordering

**Rationale (WFT → Neural)**

WFT frames Wᵣ as reflective metabolization (sequencing/paradox holding). If sequencing is core, basal ganglia should couple with mPFC/PCC when narratives must be actively re‑ordered.

**Hypotheses**

1. **Coupling↑ with sequencing load:** mPFC/PCC↔caudate/putamen connectivity increases when participants re‑order autobiographical micro‑episodes vs simple recall.
2. **Coherence link:** Stronger coupling predicts higher linguistic coherence (temporal markers, causal connectives) and better delayed recall integration.
3. **Depression moderation:** Elevated depressive symptoms → reduced coupling and lower coherence.

**Design**

* Within‑subject: Recall (baseline) vs Re‑order (auditory prompts trigger time‑jumps).
* Individual narratives generated pre‑scan; difficulty calibrated.

**Participants**

* N=50 adults; dimensional depression sample (PHQ‑9 range). Exclude neurological disorders, current mania/psychosis.

**Tasks/Stimuli**

* 8 autobiographical micro‑episodes (30–45s each), recorded pre‑scan.
* In‑scanner: auditory prompts (“jump back 10s”, “jump to ending”) require live re‑sequencing.

**Measures**

* fMRI (mPFC, PCC, caudate, putamen); audio recorded; post‑scan written summaries.
* Language metrics: automated coherence indices (discourse markers, time words) + human ratings.
* 24h delayed recall.

**Procedure**

1. Training and calibration.
2. Scan: Recall blocks → Re‑order blocks (counterbalanced).
3. Post‑scan summaries; day‑2 recall online.

**Primary Outcomes**

* FC(mPFC/PCC↔striatum) Recall vs Re‑order; coherence score Δ; coupling~coherence slope.

**Secondary Outcomes**

* Delayed recall integration; moderation by PHQ‑9.

**Analysis Plan**

* GLM; PPI/β‑series connectivity; sliding‑window HMM for state switches.
* NLP metrics (Coh‑Metrix‑style) + rater composites.
* Mixed models: Coherence ~ FC + Condition + PHQ‑9 + (1|subject).

**Power & N**

* Expect medium effect (d≈0.5) on FC and coherence → N=50.

**Exclusions**

* Speech artifacts >25% volumes; failure to follow prompts.

**Prereg Items**

* ROIs, prompt schedule, coherence metric recipe, primary contrasts.

**Ethics & Safety**

* Autobiographical but non‑traumatic memories; content screening.

**Reentry Protocol**

* Brief breath cadence between blocks; debrief.

**Data/Code**

* BIDS; audio + transcripts; code on OSF (de‑identified).

**Notes for All Studies**

* **Blinding:** Analysts blinded to condition/group where feasible.
* **Multiple Comparisons:** Limit to prereg ROIs; FDR for exploratory.
* **Reporting:** Deviations from prereg documented; null results reported.
* **Generalization:** Templates are modular—swap tasks for population‑specific variants (e.g., grief instead of trauma; dyadic tasks for Wₑ).