

Comprehensive Neuroimaging & TMS Report

Subject 2040 - Functional & Structural Analysis

Report Date: November 29, 2025

Analysis Scope: TMS Targeting, Volumetrics, Dopamine Network, ASD Biomarkers

EXECUTIVE SUMMARY

This comprehensive analysis identifies a specific neurobiological profile characterized by **"Posterior Dominance"**:

1. TMS TARGETING RECOMMENDATIONS

Multi-run fMRI analysis identified the optimal stimulation site to regulate the sgACC (Depression) and Amygdala (Anxiety).

Target	Coordinates (MNI)	Connectivity (sgACC)	Recommendation
Optimal dlPFC	(-46, 44, 16)	r = -0.329 (Strong)	PRIMARY TARGET
Experimental dmPFC	(2, 50, 42)	r = -0.342 (Strongest)	Secondary / Adjunct
Standard (5cm)	(-44, 30, 48)	r = -0.023 (None)	Not Recommended

2. BRAIN STRUCTURE & STRENGTHS PROFILE

Volumetric analysis reveals a clear trade-off between hyper-developed posterior systems and vulnerable anterior/limbic systems.

Region	Function	Status	Implication
Occipital Pole	Visual Processing	LARGE	Exceptional visual memory/pattern recognition
Right TPJ	Attention/Awareness	LARGE	Hyper-awareness of environment (Distractibility)
dlPFC	Logic/Systemizing	NORMAL	Intact executive function & logic hardware
White Matter	Processing Speed	HIGH RATIO	Hyper-connected / Fast processing speed
Amygdala	Emotion Regulation	SMALL	Emotional dysregulation / Anxiety vulnerability
Striatum	Reward/Motivation	SMALL	Anhedonia / Motivation deficits
Fusiform Gyrus	Face Processing	SMALL	Difficulty reading facial expressions (ASD)

3. DOPAMINE & MOTIVATION NETWORK

Analysis confirms the biological basis for motivation deficits (Anhedonia).

1. Structural Atrophy: All components of the Basal Ganglia (NAcc, Caudate, Putamen) are significantly smaller than norms.

2. Functional Disconnection: The Ventral Tegmental Area (VTA) shows near-zero functional connectivity with the Nucleus Accumbens ($r=0.00$) and PFC ($r=0.04$).

Clinical Implication: The brain's reward system is structurally small and functionally dormant. Treatment requires strong external stimulation (TMS to dlPFC) to reactivate the mesocortical dopamine pathway.

4. ASD NEUROBIOLOGY

The neuroimaging profile strongly supports a High-Functioning ASD neurotype.

- **Face Blindness Circuit:** Small Fusiform Gyrus + Disconnected Amygdala = Difficulty tagging faces with emotional meaning.
- **Intense World Theory:** High White Matter ratio + Large TPJ = Sensory/Attentional overwhelm leading to withdrawal.
- **Systemizing Strength:** Intact dlPFC (Logic) vs. Impaired Insula (Interoception/Feeling).

5. FINAL CLINICAL RECOMMENDATIONS

RECOMMENDED PROTOCOL

Target: Left Ventral dlPFC (-46, 44, 16)

Rationale: This target acts as the "Master Regulator." It uses the patient's cognitive strength (dlPFC) to inhibit the

Adjunct Options:
1. **Omega-3s/Plasmalogens:** To support Hippocampal/mPFC volume.
2. **d**

Disclaimer: This report is for research and informational purposes only. It does not constitute a medical diagnosis. All treatment decisions must be made by a qualified clinician.