

Neuroimaging in Cyberpsychology

A

ACC (Anterior Cingulate Cortex) – related terms: error monitoring, conflict detection. A region of the medial frontal lobe implicated in emotional regulation, decision-making, and the detection of performance errors. In neuroimaging studies of cyberpsychology, ACC activation is often observed when participants experience cognitive conflict while navigating complex online interfaces or when they receive negative feedback from social media platforms. Challenges include distinguishing ACC activity related to emotional distress from that linked to task-related conflict, especially when both occur simultaneously in virtual environments.

ADHD (Attention-Deficit/Hyperactivity Disorder) – related terms: executive function, impulsivity. Neuroimaging research shows altered fronto-striatal connectivity in individuals with ADHD, which can affect how they interact with digital media. For example, functional MRI (fMRI) scans reveal reduced activation in the dorsolateral prefrontal cortex during sustained attention tasks that involve scrolling through social feeds. A key challenge is accounting for medication effects, as stimulant drugs can normalize activity patterns, potentially confounding results.

AE (Adverse Event) – related terms: ethical review, risk management. In the context of neuroimaging studies, an AE might involve unexpected discomfort during a prolonged fMRI session while participants engage with immersive virtual reality (VR) environments. Researchers must have protocols to monitor physiological stress markers (e.g., Heart rate, galvanic skin response) and provide immediate debriefing.

Alpha Rhythm – related terms: EEG, resting-state. The 8-13 Hz oscillation recorded over posterior scalp regions, often associated with relaxed wakefulness. When participants view low-stimulus web pages, increased alpha power may indicate disengagement. However, alpha can also rise during mind-wandering, so interpreting it as “low attention” requires corroborating behavioral data.

Amplitude-Based Functional Connectivity – related terms: seed-based analysis, correlation matrix. A method that quantifies the strength of temporal co-fluctuations between brain regions by measuring the amplitude of BOLD (blood-oxygen-level-dependent) signals. In cyberpsychology, this approach helps identify networks that become synchronized when users experience flow during online gaming.

Anterior Insula – related terms: interoception, salience network. This cortical area integrates internal bodily states with external stimuli. FMRI studies show heightened anterior insula activation when participants receive “likes” or negative comments, reflecting the visceral impact of social feedback.

Artificial Neural Network (ANN) – related terms: deep learning, pattern recognition. Computational models inspired by biological neurons, used to decode complex neuroimaging data. For instance, a convolutional ANN can classify fMRI patterns associated with compulsive browsing versus controlled use. A major challenge is the risk of overfitting small sample sizes commonly seen in neuroimaging research.

Attention Network Test (ANT) – related terms: alerting, orienting, executive control. A behavioral paradigm often paired with fMRI to assess the efficiency of three attention systems. When the ANT is embedded in a web-based platform, researchers can examine how multitasking on social media influences each network's neural signature.

Auditory Evoked Potentials (AEP) – related terms: ERP, temporal resolution. Electrical responses recorded via EEG following an auditory stimulus. In studies of online video consumption, AEP latency can reveal how background music influences auditory processing speed.

Automated Anatomical Labeling (AAL) – related terms: brain atlas, ROI. A widely used parcellation scheme that assigns each voxel to a predefined anatomical region. Researchers studying cyber-induced stress often extract mean BOLD values from AAL-defined limbic structures (e.G., Amygdala, hippocampus) to quantify emotional reactivity.

B

BA (Brodmann Area) – related terms: cytoarchitecture, functional mapping. A system of cortical segmentation based on cellular composition. For example, BA 44/45 (Broca's area) is examined when participants generate textual responses in online forums, revealing language production networks.

Beta Rhythm – related terms: EEG, motor planning. The 13-30 Hz oscillation linked to active engagement and sensorimotor processes. During fast-paced video-game play, increased beta power over sensorimotor cortex signals heightened motor preparation.

Blood-Oxygen-Level-Dependent (BOLD) Signal – related terms: fMRI, hemodynamic response. The indirect measure of neuronal activity captured by fMRI, reflecting changes in deoxyhemoglobin concentration. In cyberpsychology, BOLD responses are mapped while participants browse news feeds to identify regions engaged in information appraisal.

Brain-Computer Interface (BCI) – related terms: real-time decoding, neurofeedback. Systems that translate neural signals into computer commands. A BCI can detect when a user's attention wanes during an online lecture and adapt the presentation speed accordingly. Ethical concerns revolve around privacy of decoded mental states.

Brain-Derived Neurotrophic Factor (BDNF) – related terms: plasticity, gene expression. While not directly measured by imaging, BDNF levels are often correlated with structural MRI metrics (e.G., Gray-matter thickness) in studies of long-term digital media exposure.

Brain Mapping – related terms: functional localization, voxel-wise analysis. The process of creating spatial representations of neural activity. In the context of social media, brain-mapping can reveal which cortical areas are recruited when users evaluate the credibility of shared articles.

Brain-Network Modularity – related terms: graph theory, community detection. A measure of how well a brain graph can be divided into distinct modules. High modularity during solitary browsing may indicate segregation of attentional and reward networks, whereas lower modularity during collaborative gaming

suggests increased integration.

Broadband Gamma Activity – related terms: ECoG, local field potential. High-frequency (>60 Hz) oscillations that correlate with local neuronal firing. Intracranial recordings during immersive VR show that broadband gamma in the parietal cortex predicts successful navigation of virtual environments.

Burden Test (Genetic Imaging) – related terms: polygenic risk score, voxel-wise association. Statistical methods that aggregate the effects of multiple genetic variants on imaging phenotypes. Researchers may use burden tests to explore how polygenic susceptibility to anxiety interacts with neural responses to cyber-bullying cues.

C

Caudate Nucleus – related terms: striatal circuitry, reward processing. Part of the dorsal striatum involved in habit formation. Functional imaging demonstrates heightened caudate activation when participants repeatedly click “refresh” on a news ticker, reflecting a habit loop.

Central Executive Network (CEN) – related terms: frontoparietal network, working memory. A set of regions (dorsolateral prefrontal cortex, posterior parietal cortex) that support goal-directed behavior. Disruption of CEN connectivity has been linked to reduced task performance during simultaneous texting and driving simulations.

c-Fos Imaging – related terms: immediate-early gene, activity-dependent labeling. A method that visualizes neuronal activation by detecting c-Fos protein expression post-mortem. In animal models of digital enrichment, c-Fos mapping shows increased activity in hippocampal subfields after exposure to interactive touchscreen tasks.

Channel-Based EEG Analysis – related terms: spatial filtering, independent component analysis. Approaches that treat each scalp electrode as a separate data stream. When studying the impact of video-stream buffering on attention, researchers compare channel-wise theta power over frontal sites.

Chronotype – related terms: circadian rhythm, morningness-eveningness. Individual preference for activity timing, which influences brain response to online content presented at different times of day. fMRI studies reveal that evening types show greater ventral striatal activation to late-night gaming.

Cluster-Level Correction – related terms: multiple comparisons, Gaussian random field. A statistical approach that controls false positives by evaluating the spatial extent of suprathreshold voxels. In whole-brain analyses of cyber-induced stress, cluster-level correction helps ensure that observed amygdala activations are not spurious.

Cognitive Load Theory – related terms: working memory capacity, intrinsic vs extrinsic load. The framework that describes how information processing demands affect learning. Neuroimaging evidence shows that high cognitive load during complex web-based tutorials corresponds with increased dorsolateral prefrontal cortex activation and reduced posterior parietal efficiency.

Connectivity Matrix – related terms: functional connectivity, graph representation. A square array where

each element reflects the strength of interaction between two brain regions. Researchers construct connectivity matrices from resting-state fMRI to compare network topology before and after a week of intensive social media use.

Corpus Callosum – related terms: interhemispheric transfer, diffusion tensor imaging (DTI). The major white-matter tract linking the left and right hemispheres. DTI studies have linked reduced fractional anisotropy in the corpus callosum to poorer dual-task performance when participants simultaneously browse and chat.

Cross-Validation – related terms: machine learning, model generalizability. A technique for assessing predictive models by partitioning data into training and testing subsets. In decoding neural signatures of addiction-like scrolling behavior, k-fold cross-validation safeguards against over-optimistic accuracy estimates.

Cue-Induced Craving Paradigm – related terms: reward circuitry, conditioned stimulus. An experimental design where participants view images or notifications associated with previously experienced online rewards (e.G., Notification sounds). FMRI reveals cue-induced activation in the ventral tegmental area and nucleus accumbens, mirroring substance-craving studies.

D

Default Mode Network (DMN) – related terms: mind-wandering, self-referential processing. A set of midline structures (medial prefrontal cortex, posterior cingulate cortex, precuneus) active during rest. Increased DMN activity during passive scrolling may indicate disengagement from external tasks, while excessive DMN-CEN coupling can predict susceptibility to online distraction.

Diffusion Tensor Imaging (DTI) – related terms: white-matter integrity, fractional anisotropy. MRI technique that models the diffusion of water molecules to infer fiber orientation. In cyberpsychology, DTI reveals altered integrity of the uncinate fasciculus in heavy social-media users, suggesting changes in frontotemporal connectivity.

Diffusion-Weighted Imaging (DWI) – related terms: microstructural changes, apparent diffusion coefficient. Sensitive to the random motion of water molecules. Short-term exposure to high-intensity screen lighting has been associated with transient changes in DWI metrics within visual cortex, interpreted as edema-like effects.

Dual-Task Paradigm – related terms: cognitive interference, resource allocation. Participants perform two tasks simultaneously (e.G., Texting while tracking a moving object). FMRI shows competition for shared neural resources in the dorsal attention network, leading to reduced performance on both tasks.

EEG (Electroencephalography) – related terms: temporal resolution, event-related potentials. Non-invasive recording of scalp electrical activity. When studying rapid visual search on e-commerce sites, EEG provides millisecond-level insight into attentional capture by product images.

EEG Microstates – related terms: global field power, temporal segmentation. Brief, quasi-stable scalp

topographies lasting 60-120 ms. Certain microstate classes become more prevalent during immersive gaming, reflecting shifts in large-scale network dynamics.

Emotion Regulation Network – related terms: prefrontal-limbic circuitry, cognitive reappraisal. Includes ventrolateral prefrontal cortex, dorsolateral prefrontal cortex, and amygdala. FMRI studies show that participants who employ reappraisal strategies while viewing negative comments exhibit reduced amygdala BOLD and increased prefrontal activation.

Entorhinal Cortex – related terms: memory encoding, grid cells. Serves as a gateway between hippocampus and neocortex. Functional connectivity between entorhinal cortex and posterior parietal cortex predicts navigation efficiency in virtual city environments.

Event-Related Potential (ERP) – related terms: time-locked averaging, P300. Waveforms extracted from EEG that reflect neural processing of discrete events. The P300 component is amplified when users detect a rare notification among frequent ones, indicating attentional allocation.

Exploratory Factor Analysis (EFA) – related terms: latent variables, dimensional reduction. Statistical method used to uncover underlying structures in questionnaire data (e.G., Digital well-being scales). When combined with imaging, factor scores can be correlated with regional brain volume.

FA (Fractional Anisotropy) – related terms: DTI metric, white-matter health. Values range from 0 (isotropic diffusion) to 1 (highly directional). Reduced FA in the superior longitudinal fasciculus has been linked to poorer performance on multitasking paradigms involving simultaneous video streaming and chat.

FDR (False Discovery Rate) – related terms: multiple comparison correction, Benjamini-Hochberg. Controls the expected proportion of false positives among declared significant results. Commonly applied to whole-brain voxel-wise analyses of social-media exposure effects.

Functional Connectivity – related terms: resting-state networks, correlation analysis. Temporal correlation of BOLD signals between distinct brain regions. In cyberpsychology, heightened connectivity between ventral striatum and orbitofrontal cortex during reward-based gaming predicts higher self-reported gaming addiction scores.

Functional Magnetic Resonance Imaging (fMRI) – related terms: BOLD, task-based design. Imaging modality that captures hemodynamic changes associated with neuronal activity. FMRI allows researchers to map brain regions engaged during specific online behaviors, such as “liking” a post or solving a CAPTCHA.

Functional Segregation – related terms: specialization, modular processing. The degree to which brain regions operate independently. High segregation in visual cortex during rapid image scrolling suggests efficient processing, whereas reduced segregation may indicate overload.

Gamma Rhythm – related terms: high-frequency oscillation, binding hypothesis. Oscillations around 30-100 Hz implicated in feature integration. Increased gamma power over occipital cortex occurs when participants view high-contrast advertisements, reflecting enhanced perceptual binding.

Gaze-Contingent Paradigm – related terms: eye-tracking, attention mapping. Visual stimuli are altered in real time based on where the participant looks. Combining gaze-contingent displays with fMRI reveals how attentional shifts modulate activity in the dorsal attention network during web navigation.

Granger Causality – related terms: effective connectivity, temporal precedence. Statistical method to infer directional influence between time series. Applied to EEG, it can suggest whether frontal theta drives parietal alpha during multitasking on social platforms.

Group-Level Analysis – related terms: random-effects model, population inference. Aggregates individual imaging results to draw conclusions about the broader sample. In cyberpsychology, group-level maps identify common neural patterns associated with chronic exposure to algorithmic content feeds.

H

Hippocampus – related terms: episodic memory, spatial navigation. Critical for forming new declarative memories. Structural MRI studies show reduced hippocampal volume in individuals with excessive nighttime screen use, possibly reflecting sleep-related neurotoxic effects.

Human Connectome Project (HCP) – related terms: high-resolution imaging, open data. Large-scale dataset providing standardized multimodal imaging. Cyberpsychology researchers can leverage HCP resting-state data to compare baseline network architecture with that of heavy social-media users.

ICA (Independent Component Analysis) – related terms: blind source separation, artifact removal. Decomposes fMRI or EEG data into spatially independent components. ICA helps isolate the default mode network from motion-related artifacts when participants are seated in a scanner while viewing dynamic web pages.

Illusory Motion Perception – related terms: visual cortex, motion aftereffect. The sensation of movement induced by static patterns. Prolonged exposure to scrolling animations can produce aftereffects measurable via fMRI activation in MT/V5, indicating neural adaptation.

Inhibitory Control – related terms: stop-signal task, right inferior frontal gyrus. The ability to suppress prepotent responses. Neuroimaging shows that frequent impulse-clicking on notification badges reduces activation in the right inferior frontal gyrus, suggesting diminished inhibitory capacity.

Intrinsic Connectivity Network (ICN) – related terms: resting-state fMRI, network fingerprint. Sets of brain regions that display coherent spontaneous activity. The salience network, a key ICN, becomes hyper-active when users encounter emotionally charged content, shifting attentional resources toward threat-related stimuli.

Interleaved Rest-Task Design – related terms: block design, baseline correction. Alternates periods of active stimulation with rest, allowing clearer separation of task-evoked BOLD from low-frequency drifts. Useful when studying short, repetitive online actions such as “scroll-click-scroll”.

Interpersonal Neural Synchrony – related terms: hyperscanning, social coupling. Simultaneous recording of two participants’ brain activity during interactive digital communication (e.G., Video chat). Increased

synchrony in the medial prefrontal cortex predicts higher perceived rapport.

Intervention-Based Neuroimaging – related terms: pre-post design, cognitive training. Imaging participants before and after a digital-wellness program to assess neural changes. Studies report increased CEN connectivity after mindfulness training designed to reduce compulsive smartphone checking.

iPSC-Derived Neurons – related terms: in-vitro model, neurotoxicity testing. While not an imaging modality, these cells can be imaged with calcium indicators to examine the cellular impact of blue-light exposure from screens.

Jittered Inter-Stimulus Interval – related terms: event-related fMRI, temporal de-correlation. Randomizes timing between stimuli to improve the estimation of individual hemodynamic responses. Applied in studies where participants view a series of social-media posts with variable intervals.

K

K-Nearest Neighbors (K-NN) – related terms: classification algorithm, pattern recognition. A simple machine-learning technique that can be used to categorize fMRI activation patterns associated with different online activities (e.G., Passive scrolling vs active commenting).

Kurtosis (EEG) – related terms: non-Gaussianity, spectral shape. A statistical measure of the peakedness of the EEG amplitude distribution. Elevated kurtosis in frontal channels may indicate bursts of high-frequency activity during surprise notifications.

L

Lateral Prefrontal Cortex (LPFC) – related terms: executive function, working memory. Involved in planning and decision-making. FMRI shows LPFC engagement when users weigh the pros and cons of sharing personal information on a digital platform.

Latent Dirichlet Allocation (LDA) – related terms: topic modeling, text analysis. Computational method for uncovering themes in large corpora of online comments. When combined with neuroimaging, the prevalence of certain topics (e.G., Political anger) can be linked to amygdala activation.

Learning Rate (Neural Networks) – related terms: gradient descent, overfitting. Parameter controlling how quickly a model updates its weights. In deep-learning classifiers of fMRI data, an appropriate learning rate ensures convergence without memorizing noise.

Linear Mixed-Effects Model (LME) – related terms: random intercept, hierarchical data. Statistical approach that accounts for both fixed effects (e.G., Condition) and random effects (e.G., Participant variability). Essential for analyzing repeated-measure neuroimaging data collected across multiple online sessions.

Longitudinal Neuroimaging – related terms: within-subject change, developmental trajectory. Repeated imaging of the same participants over weeks or months. Allows assessment of how chronic exposure to algorithmic feeds alters brain structure (e.G., Cortical thinning in the posterior cingulate).

Low-Frequency Fluctuation (LFF) – related terms: resting-state BOLD, ALFF. Slow oscillations (M

Machine Learning (ML) – related terms: supervised classification, cross-validation. Algorithms that learn patterns from data. In cyberpsychology, ML models predict user engagement levels from real-time EEG features.

Magnetoencephalography (MEG) – related terms: magnetic fields, source localization. Records magnetic fields generated by neuronal currents. MEG provides millisecond resolution for tracking rapid attentional shifts when users receive push notifications.

Mean Diffusivity (MD) – related terms: DTI metric, tissue density. Average diffusion across all directions. Elevated MD in the anterior corona radiata has been associated with prolonged exposure to high-intensity screen light.

Meta-Analysis (Neuroimaging) – related terms: effect size aggregation, coordinate-based. Statistical technique that combines results from multiple studies. Recent meta-analyses reveal consistent activation of the ventral striatum across diverse digital reward tasks.

Middle Temporal Gyrus (MTG) – related terms: semantic processing, language comprehension. Engaged when participants read user-generated comments. fMRI shows MTG activation correlates with the perceived relevance of the comment to the user's interests.

Multiband Imaging – related terms: simultaneous multi-slice, temporal resolution. Accelerates fMRI acquisition, allowing whole-brain coverage every 400 ms. Enables detection of rapid BOLD responses to fleeting visual cues such as pop-up ads.

Multivariate Pattern Analysis (MVPA) – related terms: pattern classification, support vector machine. An approach that examines distributed activation patterns rather than single voxels. MVPA can differentiate neural signatures of "scroll-fast" vs "scroll-slow" behavior with high accuracy.

N

Neurofeedback – related terms: real-time fMRI, self-regulation. Technique that provides users with live visualizations of their brain activity, allowing them to voluntarily modulate it. In a digital-detox study, participants learned to down-regulate amygdala activity while viewing stress-inducing notifications.

Neuroplasticity – related terms: synaptic remodeling, experience-dependent change. The brain's capacity to reorganize structure and function. Prolonged engagement with immersive VR can induce cortical thickness increases in the posterior parietal cortex, reflecting spatial learning.

Neurovascular Coupling – related terms: hemodynamic response, BOLD. The relationship between neuronal activity and subsequent changes in blood flow. Understanding coupling is essential when interpreting rapid BOLD spikes triggered by unexpected push notifications.

Neurovascular Unit (NVU) – related terms: blood-brain barrier, astrocytes. The functional ensemble of endothelial cells, pericytes, and glia that regulates cerebral blood flow. Disruption of NVU integrity may

occur after chronic exposure to high-frequency screen flicker, potentially influencing BOLD reliability.

Network Centrality – related terms: hubness, graph metrics. Quantifies the importance of a node within a brain graph. High centrality of the nucleus accumbens during reward-based gaming predicts faster reaction times.

Neurotransmitter Mapping (PET) – related terms: dopamine D2 receptors, radioligand. Positron emission tomography can quantify receptor availability. Studies have shown reduced dopamine D2 binding in the striatum of individuals with high-frequency loot-box purchasing, mirroring substance-use patterns.

Noise-Ceiling Analysis – related terms: model performance limit, reliability. Estimates the maximum achievable prediction accuracy given data reliability. Important for setting realistic expectations when building ML models on noisy fMRI data from online task paradigms.

O

Orbitofrontal Cortex (OFC) – related terms: value representation, decision making. Processes reward value and outcome expectancy. FMRI shows OFC activation when users evaluate the monetary worth of virtual items in online games.

Oscillatory Coupling – related terms: phase-amplitude coupling, cross-frequency interaction. Interaction between different frequency bands. During intense multitasking, theta phase may modulate gamma amplitude in frontoparietal networks, supporting information integration.

Out-of-Scanner Behavioral Logging – related terms: digital trace data, ecological validity. Recording of user actions (clicks, scroll depth) outside the scanner. Aligning these logs with fMRI timestamps enables precise mapping of neural responses to real-world digital events.

P

Parietal Cortex – related terms: spatial attention, sensorimotor integration. The posterior parietal cortex is recruited when users track moving objects on a screen, such as during fast-paced video games. FMRI reveals increased activation proportional to task difficulty.

Partial Least Squares (PLS) – related terms: multivariate statistics, brain-behavior correlation. Decomposes covariance between imaging data and external variables (e.G., Time spent on social media). PLS can identify latent brain patterns that explain variance in digital-use metrics.

Peak Latency (ERP) – related terms: P300, stimulus evaluation. The time point at which an ERP component reaches its maximum amplitude. Longer P300 latency during complex web-form completion indicates increased processing time.

Perfusion MRI – related terms: arterial spin labeling, cerebral blood flow. Measures absolute blood flow rather than relative BOLD changes. Useful for detecting chronic hypoperfusion in prefrontal regions of individuals who habitually use devices before sleep.

Phase-Locking Value (PLV) – related terms: functional connectivity, coherence. Quantifies the consistency of phase relationships between oscillatory signals across trials. High PLV between frontal and occipital electrodes during notification anticipation reflects synchronized attentional networks.

Power Spectral Density (PSD) – related terms: frequency analysis, EEG. Represents the distribution of signal power across frequencies. Elevated theta PSD in frontal sites correlates with increased mental workload during simultaneous video streaming and chatting.

Prefrontal Cortex (PFC) – related terms: executive control, impulse regulation. The PFC, especially the ventromedial sector, shows decreased activation in participants who report compulsive checking of smartphones, suggesting diminished top-down control.

Prediction Error – related terms: reinforcement learning, dopamine. The discrepancy between expected and actual outcomes. fMRI studies using a reward-learning task with digital loot boxes demonstrate ventral striatal prediction-error signals that scale with monetary value.

Principal Component Analysis (PCA) – related terms: dimensional reduction, eigenvectors. Reduces high-dimensional imaging data to a few components. PCA can isolate dominant variance related to screen-time duration across participants.

Psychophysiological Interaction (PPI) – related terms: task-modulated connectivity, seed region. Examines how connectivity between a seed region (e.G., Amygdala) and other areas changes as a function of psychological context (e.G., Viewing negative comments). PPI analyses reveal context-dependent coupling between limbic and prefrontal regions during cyber-bullying exposure.

Q-Metric (Motion Correction) – related terms: framewise displacement, scrubbing. Quantifies head motion in fMRI. High Q-metric values are common when participants react to sudden on-screen alerts, necessitating rigorous motion correction to avoid spurious activations.

R

Resting-State fMRI (rs-fMRI) – related terms: intrinsic connectivity, network analysis. Captures spontaneous BOLD fluctuations when participants are not performing a task. Rs-fMRI can reveal baseline differences in the salience network between heavy and light social-media users.

Reward Prediction Error (RPE) – related terms: temporal-difference learning, ventral striatum. Neural signal that drives learning about future rewards. In a study where participants receive variable numbers of “likes”, RPE magnitude correlates with ventral tegmental area BOLD.

Ridge Regression – related terms: regularization, multicollinearity. A linear model that penalizes large coefficients, useful for predicting behavioral outcomes (e.G., Screen-time) from high-dimensional imaging features while preventing overfitting.

S

Salience Network – related terms: anterior insula, anterior cingulate cortex. Detects behaviorally relevant

stimuli. Increased salience-network activity is observed when users encounter emotionally charged headlines, prompting rapid attentional shifts.

Seed-Based Correlation Analysis – related terms: functional connectivity, ROI. Computes correlation between the time series of a predefined seed region and all other voxels. Commonly used to explore connectivity of the nucleus accumbens during reward-driven gaming.

Signal-to-Noise Ratio (SNR) – related terms: image quality, acquisition parameters. Ratio of true signal to background noise. High SNR is essential for detecting subtle BOLD changes associated with brief notification bursts.

Single-Subject (Subject-Level) Analysis – related terms: individual activation maps, personalized neurofeedback. Analyzes each participant's data separately, allowing tailored feedback based on their unique neural response to digital stimuli.

Spatial Smoothing – related terms: Gaussian kernel, voxel-wise analysis. Applies a blur to fMRI data to increase SNR and meet statistical assumptions. Over-smoothing can obscure fine-grained activation patterns related to small UI elements.

Spontaneous BOLD Fluctuations – related terms: resting-state networks, low-frequency oscillations. Underlie functional connectivity. The amplitude of these fluctuations in the ventral striatum predicts susceptibility to impulsive clicking.

Standardized Uptake Value (SUV) – related terms: PET imaging, radiotracer quantification. Normalized measure of tracer concentration. Elevated SUV in the amygdala during exposure to cyber-bullying images indicates heightened metabolic activity.

Structural MRI – related terms: T1-weighted, voxel-based morphometry. Provides high-resolution images of brain anatomy. Voxel-based morphometry can detect cortical thinning in the dorsolateral prefrontal cortex associated with chronic multitasking.

Suprathreshold Cluster – related terms: statistical inference, cluster extent. A group of contiguous voxels exceeding a predefined statistical threshold. Identifying suprathreshold clusters helps locate regions where digital reward cues reliably increase activation.

Surface-Based Analysis – related terms: cortical flattening, vertex-wise statistics. Projects cortical data onto a 2-D surface, improving alignment across participants. Useful for mapping fine-grained visual-cortex responses to high-resolution web images.

T

Task-Based fMRI – related terms: event-related design, block design. Acquires BOLD data while participants perform a specific cognitive task, such as rating the relevance of online advertisements. Allows identification of task-specific activation patterns.

Temporal Signal-to-Noise Ratio (tSNR) – related terms: time-series stability, functional sensitivity. Ratio of

mean signal to its standard deviation over time. High tSNR is crucial for detecting rapid BOLD changes triggered by fleeting push notifications.

Thalamus – related terms: sensory relay, attention gating. Acts as a hub for routing sensory information. Increased thalamic activation is observed when users switch rapidly between multiple digital streams, reflecting heightened sensory gating demands.

Theta Rhythm – related terms: EEG, working memory. 4-8 Hz oscillations often linked to memory encoding and cognitive control.