Introduction and Methodology

NeuroDraft 3.0 is an expert system designed to automate neuropsychological examinations and the generation of clinical protocols. The system serves as a functional bridge between classical qualitative assessment and contemporary requirements for quantitative data standardization.

1. Methodological Foundation

The system is rooted in the **systemic-dynamic approach** to higher mental functions. The analytical algorithms are based on the principles of **syndrome analysis**, allowing the clinician to qualify not only the presence of a deficit but also its primary underlying radical (**factor**).

2. System Philosophy

The primary objective of NeuroDraft is the transformation of a specialist's primary observations into a structured document that meets international standards of **evidence-based medicine**. The system facilitates:

- **Objectification:** Translation of qualitative ratings into variable metric systems (**Z-scores, T-scores, percentiles**).
- **Data Synthesis:** Integration of neuropsychological performance with neuroimaging findings (**MRI/CT**) and screening scales (**MoCA, MMSE, GDS**).
- **Clinical Navigation:** Automated identification of rehabilitation targets in accordance with **ICF** (International Classification of Functioning) categories.

3. Assessment Architecture

The system utilizes a **10-domain structure** for cognitive assessment. Internal calculations are performed on a 6-point scale (0 — functional preservation, 5 — total functional collapse). To ensure data continuity and eliminate methodological barriers across different regional standards, the system allows for the instantaneous conversion of raw scores into familiar international metrics. This enables the seamless integration of NeuroDraft into the clinical protocols of diverse diagnostic schools.

Technological Paradigm: Deterministic Synthesis vs. AI

Unlike modern stochastic Artificial Intelligence models (**LLMs**), which are prone to unpredictable data distortions, NeuroDraft 3.0 is built upon a **strict deterministic architecture**.

- **Structural Integrity:** The system operates on a verified array of clinical data and linguistic matrices. This ensures that every word in the final protocol is strictly mapped to a specific combination of input factors.
- **Elimination of "Hallucinations":** The use of a fixed, scientifically-grounded lexicon guarantees that the system does not "invent" symptoms. Instead, it performs **precision synthesis** based on established neuropsychological diagnostic algorithms.
- **Validation:** Every formulation within the matrix has undergone expert review and adheres to the classical terminology of the neuropsychological school, ensuring absolute reproducibility of results given identical input parameters.

Data Security and Confidentiality

NeuroDraft 3.0 is engineered with the highest priority placed on personal data security and medical privilege.

- **Local Processing:** CogniCore NeuroSystems servers do not store patient personal data. The generation process occurs **"on the fly"**: the generated protocol is transmitted directly to the specialist’s browser and downloaded to their local device.
- **Absence of Centralized Databases:** The system does not maintain a database of examinations unless otherwise specified by corporate contractual requirements. Upon closing the session or restarting the application, all temporary input data is purged from volatile memory.
- **Specialist Responsibility:** The identification of the patient (Name or ID), as well as the interpretation and subsequent use of the data, remains the **exclusive responsibility of the specialist**. The system provides a synthesis tool, but the final clinical conclusion rests solely with the attending clinician.

4. Clinical Report Status

It is critical to understand that the automatically generated protocol is an **advanced draft**, not a final medical conclusion.

- **Verification:** The specialist is obligated to thoroughly review the generated text and make necessary adjustments should any discrepancies with the actual clinical presentation be identified.
- **Flexibility:** The system allows for the editing of the final text directly within the interface or via a word processor following export.

5. Objectification: Neuroimaging and Psychometrics

The inclusion of **MRI/CT** data and screening scale results (**MoCA, MMSE, GDS**) is not strictly mandatory (obligatory) for the engine's operation; however, it is highly recommended to maintain the high quality standards of global neuropsychology.

- **Synthesis:** These modules enable the system to correlate functional deficits with structural brain changes, significantly enhancing the credibility and evidentiary value of the report.
- **Interpretational Nuances:** When inputting neuroimaging data, it should be noted that the clinical presentation does not always align perfectly with the lesion site (due to phenomena such as **diaschisis** or **plasticity**). While the system accounts for these nuances, the final data reconciliation remains the responsibility of the expert.

Technical Toolkit and Navigation

To ensure an uninterrupted workflow and efficient state management, several "quick-action" tools have been integrated into the interface.

1. Data Reset Function (♻ RESET)

- **Purpose:** A button for the instantaneous clearing of all current session parameters.
- **Mechanism:** Activation initiates a full reset of the application cache (**Session State**). All sliders return to "0," text fields are cleared, and selected presets and tags are deactivated.
- **Recommendation:** Utilize this function prior to commencing each new examination to eliminate the risk of data contamination (mixing data from the previous patient with the current one).

2. Interactive Manual (📖 GUIDE)

- **Accessibility:** This button provides immediate access to the current version of this manual.
- **Contextual Support:** In future updates, this section will be supplemented with hyperlinks to specific **CogniCore Academy** training modules for deep methodological immersion.

3. Generation Management (🚀 GENERATE REPORT)

- This is the system’s primary trigger. The deterministic synthesis algorithm is initiated **only** after this button is pressed. If parameters are modified (e.g., a slider is moved), the button must be pressed again to refresh the analytical dashboard and the generated text.

User Interface: Data Input

The workflow is designed linearly to minimize cognitive load on the specialist.

1. Patient Demographics and Settings

- **Identification:** Enter the Patient ID or surname. Ensure compliance with your organization's data security protocols.
- **Scoring System:** Select the preferred coordinate system (**Z-score, T-score, etc.**) before beginning the assessment. This instantly adapts the slider labels to your familiar standard, while the underlying calculations remain based on the 0–5 scale.

2. Core Profile Type Selection

The selection of the profile code is a critical step that defines the foundational architecture and "logical engine" of the entire protocol. Each profile type determines a specific lexical vocabulary and synthesis algorithm:

- **Group 0 Codes (0, 00, 0+, 0w, 0-, 0*):** Variants of functional norms, borderline states, or physiological fluctuations.
- **Code 0000 (Non-Contact Profile):** Utilized in cases of profound impairment where communication or contact is severely disrupted, rendering standardized testing impossible.
- **Codes 1–5 (Organic Spectrum):** Reflect a gradient of organic brain pathology — from mild partial deficits (**1**) to total cognitive collapse (**5**).
- **Code 7 (Affective-Dynamic Profile):** Characterized by primary disturbances in affective control and neurodynamics. It reflects a specific lability where cognitive deficit is secondary to emotional instability and the affective background of mental activity.
- **Code 8 (SSD — Schizophrenia Spectrum):** Represents the endogenous spectrum. This activates specific terminology (e.g., distortions in generalization processes, motivational deficit) and requires correlation with neural vectors.
- **Code 9 (Affective Profile):** The depressive variant. The synthesis logic here is directly linked to **GDS** (Geriatric Depression Scale) scores and affective presets.

3. Cognitive Domain Assessment (10 Sliders)

- Each function is evaluated based on the results of administered neuropsychological tests.

- If a domain was not assessed, leave the value at **"0"**. The system will interpret this as a functional norm within the context of the current examination.

4. Instrumental Data (MRI/CT & Psychometrics)

- **MRI LOCALIZATION:** Select the zones of interest confirmed by neuroimaging. This activates the corresponding topographical modules in the final report.
- **Screening Scales:** Enter the scores for the respective scales. These data influence the automated determination of deficit severity and the clinical risk of depressive disorders in the conclusion.

5. Clinical Markers (Tags): Psycho-Behavioral Context

Unlike domain-specific scores, NeuroDraft 3.0 tags are utilized to capture the **emotional-personality pattern** and the specifics of clinical rapport. They integrate behavioral nuances into the report that are critical for differential diagnosis and rehabilitation forecasting.

Key Tag Categories:

- **SSD Spectrum (Type-8 Contact):** Allows for the specification of social and communicative defect types.
    - *8paranoid* – reflects suspiciousness and overvalued ideation;
    - *8mannerism* – captures eccentricity and inadequacy of behavioral acts;
    - *8withdrawn* – marks autism and deep internal withdrawal.
- **Personality Determinants:** Describe the premorbid background or developed deviations.
    - *antisocial-p* – introduces signs of antisocial attitudes and impaired volitional control;
    - *infantile* – reflects immaturity of the emotional-volitional sphere.
- **Anamnestic Traces (History markers):** Account for the influence of prior experience on current status.
    - *tox-hist* – marks "toxic traces" (chronic intoxications) that alter the neurodynamic background;
    - *panic-history* – indicates a history of panic attacks, explaining specific anxiety during testing.
- **Affective Reactions to Deficit:**
    - *psd (post-stroke depression)* – captures secondary depressive reactions to the awareness of illness, essential for distinguishing primary deficits from reactive states.

Analytical Dashboard: Data Interpretation (Output)

Upon activation of the "Generate Report" command, the system constructs a multi-level analytical dashboard that serves as both a visual and mathematical validation of the clinical conclusion.

1. Topographical Diagnosis: Heatmap (Brain Units)

- A visual model based on **Luria’s three functional units** of the brain.
- **Gradient Highlighting:** The system automatically calculates the "load" of impairment for each structure. The most saturated (bright) unit indicates the primary focus of the deficit ("the epicenter"), while paler shades mark collateral (secondary) dysfunction.

2. Systemic Syndromes (Networks)

- Network pattern indicators point to the specific nature of the impairment (vascular, degenerative, subcortical, etc.). The activation of a specific **"Network"** assists the specialist in differentiating a systemic failure from a localized defect.

3. Clinical Metrics (Mathematical Verification Table)

- The left panel of the dashboard provides a quantitative cross-section of all 10 domains. Data is displayed in your selected metric system (e.g., **Z-scores**) with "traffic light" color-coding (Green/Yellow/Red) for instantaneous severity assessment.

4. Rehab Targets (ICF Mapping)

- The right panel automatically converts identified functional impairments into **ICF codes** (International Classification of Functioning). This provides a ready-made list of **rehabilitation targets** upon which an individualized restorative training plan is constructed.

Final Stage: Export and Clinical Documentation

The final stage of the workflow involves the generation and export of the official clinical document.

1. Intelligent Formatting (Mayo/Boston Standard)

Upon clicking the 🖳 **WORD** button, the system generates a document adhering to the canons of international academic typesetting:

- **Typography:** The use of **Sans Serif** fonts (Helvetica/Arial) ensures maximum readability and a sterile, professional document appearance.
- **Semantic Highlighting:** The export algorithm automatically recognizes and bolds key clinical markers, severity levels, and **ICF codes**. This creates a "navigational map" within the text, allowing multidisciplinary specialists to quickly identify critical findings.

2. Graphics Integration

The visual profile (**Radar Chart**) is converted into a high-contrast image on a light background, optimized for laser printing without loss of detail or resolution.

3. Post-Processing and Integration

The system supports a rapid text duplication feature (📋 **COPY**) for the instantaneous transfer of data into **Electronic Health Records (EHR)** or other internal clinical management systems.

Appendix No. 1: Clinical Modifier Matrix

To achieve expert-level precision, NeuroDraft 3.0 utilizes a two-tier text modification system: **Presets** and **Tags**.

1. PRESETS (Adjustments & Network Syndromes)

Presets function as "functional filters." They do not merely alter terminology but reconfigure the **pathogenetic logic** of the entire protocol synthesis.

- **Regulatory and Neurodynamic (ndyn, r-reg, l-reg):** Focus the report on deficits in executive control, programming, and inactivity (anterior brain regions).
- **Aphasic and Gnostic (a-sens, a-eff, a-dyn, v-gnosis, etc.):** Activate detailed descriptions of instrumental impairments (speech, vision, praxis). These form the foundation for **Organic Profile Types (1–5)**.
- **Network Syndromes (vci-svd, msa, ccas, thalam, retic, striar, callosal-ds):** The system's most powerful analytical tool. Selecting a network preset compels the engine to describe deficits as the result of a **systemic failure** (e.g., thalamic or cerebellar pathways) rather than a localized focal lesion.
- **Affective Register (dep-grief, dep-somatic, dep-cog, dep-anxious, dep-adjustment):** Five versions of depressive filters. These "color" cognitive complaints with the clinical features of affective disorders, which is critical for **Type 9** profiles.

2. TAGS (Clinical Markers)

Tags act as "point injections" of meaning. They are interspersed throughout the text to add critical behavioral and anamnestic nuances without altering the fundamental structure of the syndrome.

- **SSD Register (Type-8):** *8paranoid, 8mannerism, 8withdrawn*. Specifically define rapport and thought patterns within **Type 8** (Schizophrenia Spectrum) profiles.
- **Behavioral Determinants:**
    - **malingering-p:** Introduces indicators of aggravation, feigning, or instructional behavior into the report (critical for forensic and insurance medicine).
    - **antisocial-p:** Describes violations of social norms and impaired volitional control.
- **Medical Context:**
    - **tox-hist:** Accounts for the impact of prior or chronic intoxications.
    - **medical-comorbidity:** Adds a somatic background to explain generalized weakness or cognitive lability.
    - **psd:** Clarifies the reactive nature of depression (e.g., post-stroke).
- **Specific Phenomena:** *anomia* (naming difficulties), *panic-history* (anxiety-related diagnostic traces).

TABLE A: PRESETS (Adjustments & Networks)

These influence the core engine logic, sentence structure, and topographical synthesis.

Preset Code	Category	Clinical Content and Impact on Report
ndyn, a-dyn	**Neurodynamics**	Reflect activation deficits. Shift focus to processing speed, fatigability, and mental inertia.
r-reg, l-reg	**Regulation**	Programming and control. Activate descriptions of "anterior" defects (prefrontal regions).
v-gnosis, v-neglect	**Visual Gnosis**	Activate modules for visual perception and spatial neglect phenomena.
apr-dyn, kin, con	**Praxis**	Detail impairments in voluntary movements (dynamic, kinesthetic, and constructive praxis).
a-sens, eff, aff	**Speech/Language**	Specify the type of language deficit (sensory, efferent, or afferent components).
a-amn, a-sem	**Memory/Thought**	Refine the nature of amnestic and semantic difficulties.
vci-svd	**NETWORK: Vascular**	**Network Preset.** Generates the report through the lens of cerebrovascular disease (SVD/VCI). Highlighted in the dashboard.
msa, ccas	**NETWORK: Systemic**	**Network Presets.** Describe multisystem atrophy or cerebellar cognitive-affective syndrome.
thalam, retic, striar	**NETWORK: Subcortical**	**Topographical Networks.** Shift the report toward subcortical lesions (thalamic, reticular, or striatal syndromes).
callosal-ds	**NETWORK: Connectivity**	**Network Preset.** Describes the interhemispheric disconnection syndrome.
dep- (grief, somatic, cog, anxious, adjustment)	**Affective Fillers**	**Affective Overlays.** Five variants of depression. Reconfigure the report to reflect low mood and psychosomatic symptoms.

TABLE B: TAGS (Clinical Markers)

These provide precise qualitative characteristics without altering the global syndrome structure.

Tag Code	Category	Significance for Interpretation
8paranoid, 8mannerism, 8withdrawn	**SSD Spectrum**	Specify the type of rapport and behavioral eccentricities in the endogenous process.
tox-hist	**Anamnesis**	Indicates an exogenous toxic background (alcohol, substances, chemical exposure).
malingering-p	**Orientation**	Marks suspicion of aggravation, malingering, or self-serving behavioral patterns.
antisocial-p	**Personality**	Describes empathy deficits, aggression, and violation of social boundaries.
medical-comorbidity	**Somatics**	Accounts for the impact of severe somatic illnesses on cognitive status.
anomia	**Symptom**	Integrates a description of naming difficulties into the speech/language block.
a-sensory	**Symptom**	Reflects sensory processing deficits or specific auditory/sensory agnosia.
panic-history	**Anxiety**	Indicates a history of panic attacks, explaining the anxious background during testing.
psd	**Reaction**	Post-stroke depression. Distinguishes organic defect from the emotional reaction to it.