

SUICIDE PHENOTYPE: FROM LINGUISTICS TO NEUROLOGY

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INTRODUCTION

- The neurolinguistic phenotype of suicide includes observable brain and language markers linked to elevated suicide risk.
- Reflects dysregulation in emotional processing and cognitive control.
- Combines alterations in brain function (e.g. amygdala-prefrontal connectivity) with specific language patterns.
- Early identification may improve prevention strategies.

OBJECTIVES

- Identify key neurological and linguistic features associated with suicidal risk.
- Explore the integration of brain imaging and language analysis for early detection.

METHODS

- 15 high-risk individuals assessed using:
 - Functional MRI (fMRI) during exposure to emotional stimuli.
 - Automated Natural Language Processing (NLP) of spoken and written language.
- Brain regions analyzed:
 - Amygdala.
 - Prefrontal cortex.
- Language analysis focused on:
 - Syntax and semantics.
 - Cognitive distortions (e.g. dichotomous thinking, rumination).
 - Emotional valence and self-referential patterns.



RESULTS

- **fMRI findings:**
 - Increased amygdala activity.
 - Decreased prefrontal cortex activation.
 - Associated with emotional distress
 - Reduced cognitive inhibition.



- **Linguistic markers:**

- **High use of negative emotional language** (themes of guilt, despair)

- **Frequent self-deprecating and all-or-nothing expressions**

I've lost everything

There's no way out

- **Marked reduction in positive emotional content**

DISCUSSION

- Neurolinguistic phenotype helps identify individuals at risk before behavioral signs emerge.
- Integration of fMRI and NLP offers a novel, multidimensional assessment tool.
- Supports development of targeted interventions based on emotional and cognitive dysregulation.
- Opens a path toward more personalized, preventative mental health strategies.