

# Novelty Assessment Report

**Paper:** From Five Dimensions to Many: Large Language Models as Precise and Interpretable Psychological Profilers

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## Abstract

Psychological constructs within individuals are widely believed to be interconnected. We investigated whether and how Large Language Models (LLMs) can model the correlational structure of human psychological traits from minimal quantitative inputs. We prompted various LLMs with Big Five Personality Scale responses from 816 human individuals to role-play their responses on nine other psychological scales. LLMs demonstrated remarkable accuracy in capturing human psychological structure, with the inter-scale correlation patterns from LLM-generated responses strongly aligning with those from human data ( $R^2 > 0.88$ ). This zero-shot performance substantially exceeded predictions based on semantic similarity and approached the accuracy of machine learning algorithms trained directly on the dataset. Analysis of reasoning traces revealed that LLMs use a systematic two-stage process: First, they transform raw Big Five responses into natural language personality summaries through information selection and compression, analogous to generating sufficient statistics. Second, they generate target scale responses based on reasoning from these summaries. For information selection, LLMs identify the same key personality factors as trained algorithms, though they fail to differentiate item importance within factors. The resulting compressed summaries are not merely redundant representations but capture synergistic information—adding them to original scores enhances prediction alignment, suggesting they encode emergent, second-order patterns of trait interplay. Our findings demonstrate that LLMs can precisely predict individual participants' psychological traits from minimal data through a process of abstraction and reasoning, offering both a powerful tool for psychological simulation and valuable insights into their emergent reasoning capabilities.

### Disclaimer

This report is **AI-GENERATED** using Large Language Models and WisPaper (a scholar search engine). It analyzes academic papers' tasks and contributions against retrieved prior work. While this system identifies **POTENTIAL** overlaps and novel directions, **ITS COVERAGE IS NOT EXHAUSTIVE AND JUDGMENTS ARE APPROXIMATE**. These results are intended to assist human reviewers and **SHOULD NOT** be relied upon as a definitive verdict on novelty.

Note that some papers exist in multiple, slightly different versions (e.g., with different titles or URLs). The system may retrieve several versions of the same underlying work. The current automated pipeline does not reliably align or distinguish these cases, so human reviewers will need to disambiguate them manually.

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## Core Task Landscape

This paper addresses: **Predicting Psychological Trait Correlations from Personality Scale Responses**

A total of **50 papers** were analyzed and organized into a taxonomy with **14 categories**.

### Taxonomy Overview

The research landscape has been organized into the following main categories:

- **Computational and Machine Learning Approaches to Personality Prediction**
- **Psychometric Development and Validation of Personality Instruments**
- **Personality Trait Prediction of Life Outcomes and Well-Being**
- **Methodological and Theoretical Advances in Personality Assessment**

### Complete Taxonomy Tree

- Predicting Psychological Trait Correlations from Personality Scale Responses Survey Taxonomy
- Computational and Machine Learning Approaches to Personality Prediction
  - Large Language Model-Based Personality Inference ★ (3 papers)
  - [0] From Five Dimensions to Many: Large Language Models as Precise and Interpretable Psychological Profilers (Anon et al., 2026) [View paper](#)
  - [1] Psychometric Evaluation of Large Language Model Embeddings for Personality Trait Prediction (Julina Maharjan, 2025) [View paper](#)
  - [43] Applying Psychometrics to Large Language Model Simulated Populations: Recreating the HEXACO Personality Inventory Experiment with Generative Agents (Martin, 2025) [View paper](#)
  - Classical Machine Learning for Personality Prediction (4 papers)
  - [2] Forecasting traits: human personality prediction with machine learning methodology-a comparative study (D. J. Jagannath, 2024) [View paper](#)
  - [20] A prediction-focused approach to personality modeling (Gal Lavi, 2022) [View paper](#)
  - [22] Forecasting employee personality changes in the post covid-19 era: Ensemble learning approach (D. Dissanayake, 2023) [View paper](#)
  - [34] The Predictive Five: A supervised learning approach to personality psychology (Gal Ben-Yosef, 2022) [View paper](#)
  - Natural Language Processing for Trait Assessment (5 papers)
  - [8] AI knows you: deep learning model for prediction of extroversion personality trait (Anam Naz, 2024) [View paper](#)
  - [11] Predicting personality and psychological distress using natural Language Processing: a study protocol (Ji-Yoon Jang, 2022) [View paper](#)
  - [13] Computational personality: a survey (Liang Yang, 2022) [View paper](#)
  - [16] Predicting personality using answers to open-ended interview questions (Madhura Jayaratne, 2020) [View paper](#)
  - [45] Predicting personality traits with instagram pictures (Bruce Ferwerda, 2015) [View paper](#)
- Psychometric Development and Validation of Personality Instruments
  - Brief Personality Scale Development and Validation (4 papers)
  - [12] Short scales for the assessment of personality traits: Development and validation of the Portuguese Ten-Item Personality Inventory (TIPI) (Andreia Nunes, 2018) [View paper](#)

- [15] Measuring personality traits with ultra-short scales: A study of the Ten Item Personality Inventory (TIPI) in a Spanish sample (Estrella Romero, 2012) [View paper](#)
- [17] Unveiling the Psychological Traits of Multi-Marathoners: Insights from TIPI Personality Trait Analysis (Leo Lundy, 2024) [View paper](#)
- [36] Further validity of the Japanese version of the Ten Item Personality Inventory (TIPI-J) (ATSUSHI OSHIO, 2014) [View paper](#)
- Comprehensive Personality Inventory Validation (5 papers)
- [3] Comparative validity of different strategies of constructing personality inventory scales. (Harold D. Hase, 1967) [View paper](#)
- [7] The theory and construction of the personality inventory (Robert G. Bernreuter, 1933) [View paper](#)
- [30] Personality inventory for DSM-5 in China: Evaluation of DSM-5 and ICD-11 trait structure and continuity with personality disorder types (Shulin Fang, 2021) [View paper](#)
- [33] The development of a Big Five adolescent personality inventory (J. Lounsbury, 2003) [View paper](#)
- [47] Rotation to maximize the construct validity of factors in the NEO Personality Inventory (Robert-R. McCrae, 1989) [View paper](#)
- Specialized and Domain-Specific Personality Measures (10 papers)
- [23] Construct validity of the psychopathic personality inventory two-factor model with offenders. (Christopher J. Patrick, 2006) [View paper](#)
- [24] The discriminant (and convergent) validity of the Personality Inventory for DSM-5. (Cristina Crego, 2015) [View paper](#)
- [25] Persistence is multi-trait: persistence scale development and persistence perseveration and perfectionism questionnaire into polish translation (Wojciech Styk, 2023) [View paper](#)
- [26] Egos inflating over time: A cross-temporal meta-analysis of the Narcissistic Personality Inventory (J. Twenge, 2008) [View paper](#)
- [27] Predicting multicultural effectiveness of international students: The Multicultural Personality Questionnaire (V. Oudenhoven, 2002) [View paper](#)
- [29] The two-factor model of psychopathic personality: evidence from the psychopathic personality inventory. (David K. Marcus, 2013) [View paper](#)
- [32] Factor analysis and construct validity of the narcissistic personality inventory (Robert A. Emmons, 1984) [View paper](#)
- [40] Construct validity of the Psychopathic Personality Inventory in a correctional sample (Ann-Marie R. Sandoval, 2000) [View paper](#)
- [41] Beyond the big five: The dark triad and the supernumerary personality inventory (Livia Veselka, 2011) [View paper](#)
- [50] Associations Between MMPI-3 Scale Scores and the DSM-5 AMPD and ICD-11 Dimensional Personality Traits (Tiffany A. Brown, 2022) [View paper](#)
- Personality Trait Prediction of Life Outcomes and Well-Being
  - Personality Prediction of Well-Being and Mental Health (7 papers)
  - [5] Introversion, Alexithymia, and Hostility: A Path Analysis From Personality to Suicidal Ideation Among University Students. (S. Guidotti, 2024) [View paper](#)
  - [6] Predicting Psychological and Subjective Well-Being from Personality: Incremental Prediction from 30 Facets Over the Big 5 (Anglim Jeromy, 2014) [View paper](#)
  - [10] Trait emotional intelligence as predictor of psychological health in undergraduate medical students: A hierarchical multiple regression approach (Preeti Jain, 2023) [View paper](#)
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  - [39] The predictive value of personality traits for psychological problems (stress, anxiety and depression): Results from a large population based study (Zeinab Alizadeh, 2018) [View paper](#)
  - [46] The role of personality in prediction of satisfaction with life in recreational athletes during the first wave of pandemic COVID-19 (Danijela Živković, 2022) [View paper](#)
  - [48] A longitudinal cohort study observed increasing perfectionism and declining resilience, ambiguity tolerance and calling during medical school which is not explained (DS Eley, 2022) [View paper](#)
  - Personality Prediction of Behavioral Outcomes (4 papers)
  - [18] Predicting donation behaviour with the Supernumerary Personality Inventory (Christopher Marcin Kowalski, 2021) [View paper](#)
  - [21] How much can personality predict prosocial behavior? (Y. A. Nielsen, 2024) [View paper](#)
  - [31] Unearthing the "green" personality: Core traits predict environmentally friendly behavior (Gary Lewis, 2016) [View paper](#)
  - [44] Predicting behavior from personality trait scores (John Gormly, 1983) [View paper](#)
  - Personality and Physical Health Correlates (1 papers)
  - [35] Beyond BMI: Personality traits' associations with adiposity and metabolic rate (Kadri Arumäe, 2022) [View paper](#)
- Methodological and Theoretical Advances in Personality Assessment
  - Scale Construction and Item-Level Analysis (1 papers)
  - [19] Successful explanations start with accurate descriptions: Questionnaire items as personality markers for more accurate predictions (Anne Seeboth, 2018) [View paper](#)
  - Response Validity and Data Quality Issues (1 papers)
  - [9] Confounding Effects of Insufficient Effort Responding Across Survey Sources: The Case of Personality Predicting Performance (Jason L. Huang, 2024) [View paper](#)
  - Personality Structure and Factor Analysis (2 papers)
  - [37] Predicting trait emotional intelligence from HEXACO personality: Domains, facets, and the general factor of personality. (Jeromy Anglim, 2019) [View paper](#)
  - [38] Personality functioning as generalized correlated changes in personality traits (Christopher J. Hopwood, 2025) [View paper](#)
  - Self-Estimation and Meta-Perception of Personality (2 papers)
  - [14] Estimating one's own personality and intelligence scores (Adrian Furnham, 2004) [View paper](#)
  - [42] The relationship between estimated and psychometric personality and intelligence scores (Tomas Chamorro-Premuzic, 2004) [View paper](#)
  - Cross-Domain and Non-Human Personality Assessment (2 papers)
  - [4] Relationship between the canine behavioral assessment and research questionnaire and monash canine personality questionnaire (Revised) to predict training outcome in (M Marcato, 2023) [View paper](#)
  - [49] Exploring the relationships between personality and color preferences (Juliet Jue, 2022) [View paper](#)

## Narrative

Core task: Predicting psychological trait correlations from personality scale responses. The field encompasses diverse approaches to understanding and forecasting personality traits, organized into four main branches. Computational and Machine Learning Approaches

to Personality Prediction leverage modern algorithms—including deep learning and large language models—to infer traits from digital footprints, text, or structured responses. Psychometric Development and Validation of Personality Instruments focuses on constructing and refining measurement tools, ensuring reliability and validity across populations and languages, as seen in works like Personality Inventory Construction[3] and various cultural adaptations. Personality Trait Prediction of Life Outcomes and Well-Being examines how traits forecast real-world behaviors, health, and satisfaction, with studies such as Facets Predict Wellbeing[6] and Personality Predicts Wellbeing[28] demonstrating predictive power. Methodological and Theoretical Advances in Personality Assessment addresses foundational issues in measurement theory, response validity, and the evolution of assessment frameworks.

Recent computational work has intensified around large language model-based inference, exploring whether LLMs can simulate or predict personality profiles from minimal input. LLMs Psychological Profilers[0] sits squarely within this emerging cluster, investigating how modern language models function as psychological profilers by predicting trait correlations. This approach contrasts with earlier NLP methods like NLP Personality Prediction[11] and shares methodological kinship with LLM Embeddings Personality[1] and LLM HEXACO Simulation[43], which similarly probe LLM capabilities for personality assessment. A central question across these studies is whether model-generated predictions capture genuine psychometric structure or reflect superficial pattern matching. Meanwhile, traditional psychometric branches continue refining instruments and exploring trait-outcome links, highlighting ongoing tensions between data-driven prediction and theory-grounded measurement.

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## Related Works in Same Category

The following **2 sibling papers** share the same taxonomy leaf node with the original paper:

### 1. Psychometric Evaluation of Large Language Model Embeddings for Personality Trait Prediction

**Authors:** Julina Maharjan, Ruoming Jin, Jianfeng Zhu, Deric Kenne, D. Kenne | **Year/Venue:** 2025 • Journal of Medical Internet Research | **URL:** [View paper](#)

#### Abstract

Abstract Background Recent advancements in large language models (LLMs) have generated significant interest in their potential for assessing psychological constructs, particularly personality traits. While prior research has explored LLMs' capabilities in zero-shot or few-shot personality inference, few studies have systematically evaluated LLM embeddings within a psychometric validity framework or examined their correlations with linguistic and emotional markers. Additionally, the comparative...

#### Relationship Analysis

Both papers belong to the Large Language Model-Based Personality Inference category, using LLMs to predict personality traits from minimal inputs. They overlap in using Big Five personality data and evaluating LLM capabilities for psychological trait prediction, but differ fundamentally in approach: the original paper focuses on zero-shot prediction of inter-scale correlations from Big Five responses to reconstruct psychological networks, while the candidate paper evaluates LLM embeddings trained with deep learning for personality prediction from Reddit text, emphasizing psychometric validation and comparison with feature engineering methods.

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### 2. Applying Psychometrics to Large Language Model Simulated Populations: Recreating the HEXACO Personality Inventory Experiment with Generative Agents

**Authors:** Martin, Daniel P., Sarah Mercer, Swatton, Phil, et al. (7 authors total) | **Year/Venue:** 2025 | **URL:** [View paper](#)

#### Abstract

Generative agents powered by Large Language Models demonstrate human-like characteristics through sophisticated natural language interactions. Their ability to assume roles and personalities based on predefined character biographies has positioned them as cost-effective substitutes for human participants in social science research. This paper explores the validity of such persona-based agents in representing human populations; we recreate the HEXACO personality inventory experiment by surveying ...

#### Relationship Analysis

Both papers belong to the Large Language Model-Based Personality Inference category, using LLMs to predict or assess personality traits from minimal inputs. The original paper uses Big Five personality scale responses to predict correlations across nine other psychological scales, focusing on the structural alignment of inter-scale correlations and revealing a two-stage reasoning process involving information compression. The candidate paper recreates the HEXACO personality inventory experiment by generating agent personas and conducting factor analysis on their responses, focusing on whether coherent personality structures can be recovered from LLM-generated data and examining cross-model consistency rather than individual-level prediction accuracy.

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## Contributions Analysis

**Overall novelty summary.** The paper investigates whether large language models can predict correlational structures among psychological traits when prompted with minimal quantitative inputs (Big Five responses). It resides in the 'Large Language Model-Based Personality Inference' leaf, which contains only three papers total, indicating a sparse and emerging research direction. This leaf sits within the broader 'Computational and Machine Learning Approaches to Personality Prediction' branch, distinguishing itself from classical machine learning methods and traditional NLP approaches by focusing specifically on generative AI capabilities for personality assessment.

The taxonomy reveals neighboring leaves dedicated to 'Classical Machine Learning for Personality Prediction' (four papers) and 'Natural Language Processing for Trait Assessment' (five papers), both employing non-LLM computational methods. The paper's approach diverges from these by leveraging zero-shot reasoning in large language models rather than supervised learning or feature extraction from unstructured text. The broader field also includes extensive psychometric validation work and trait-outcome prediction studies, but the paper's computational focus and minimal-input paradigm position it distinctly within the emerging LLM-based inference cluster.

Among 23 candidates examined across three contributions, none were found to clearly refute the paper's claims. The 'second-order structural alignment evaluation method' examined 10 candidates with zero refutations, suggesting limited prior work on this specific evaluation approach. The 'structural amplification phenomenon' contribution also examined 10 candidates without refutation, indicating potential novelty in characterizing how LLMs amplify correlational patterns. The 'two-stage reasoning process decomposition' examined three candidates, again with no clear prior overlap. These statistics reflect a focused search scope rather than exhaustive coverage.

Given the limited search scope of 23 candidates and the sparse three-paper leaf, the work appears to occupy relatively unexplored territory within LLM-based personality inference. The absence of refuting prior work across all contributions suggests either genuine novelty or gaps in the candidate pool. The taxonomy context confirms this is an emerging subfield, though the small search scale means substantial related work may exist beyond the examined candidates.

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This paper presents **3 main contributions**, each analyzed against relevant prior work:

## **Contribution 1: Second-order structural alignment evaluation method for psychological trait prediction**

**Description:** The authors introduce a novel evaluation methodology that moves beyond first-order prediction accuracy to assess how well LLMs reconstruct the entire correlational structure (nomothetic network) of psychological traits. This second-order analysis compares inter-scale correlation patterns rather than individual trait predictions.

This contribution was assessed against **10 related papers** from the literature. Papers with potential prior art are analyzed in detail with textual evidence; others receive brief assessments.

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### **1. First-versus second-order latent growth curve models: Some insights from latent state-trait theory**

URL: [View paper](#)

#### **Brief Assessment**

Latent Growth Models[68] focuses on longitudinal change measurement using first-order versus second-order latent growth curve models in the context of state-trait theory, not on evaluating correlation structure alignment for psychological trait prediction models.

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### **2. Physiognomy: Personality traits prediction by learning**

URL: [View paper](#)

#### **Brief Assessment**

Physiognomy Personality Prediction[73] focuses on predicting personality traits from facial images using CNNs, not on evaluating correlational structures between psychological scales. The paper does not address second-order structural alignment or nomothetic network reconstruction methods.

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### **3. Applications of covariance structure modeling in psychology: Cause for concern?**

URL: [View paper](#)

#### **Brief Assessment**

Covariance Structure Modeling[64] focuses on evaluating covariance structure models in psychology research, examining measurement models and structural equation modeling. It does not address second-order correlation structure evaluation for psychological trait prediction from LLM outputs or minimal personality data inputs.

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### **4. A higher-order model of ecological values and its relationship to personality**

URL: [View paper](#)

#### **Brief Assessment**

Ecological Values Personality[72] uses second-order factor analysis to model the hierarchical structure of ecological values themselves, not to evaluate prediction model performance by comparing inter-scale correlation patterns as the original paper does.

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### **5. Teacher's corner: Testing measurement invariance of second-order factor models**

URL: [View paper](#)

#### **Brief Assessment**

Second-Order Measurement Invariance[69] focuses on testing measurement invariance in hierarchical factor models for quality of life data, not on evaluating LLM predictions of psychological trait correlations or nomothetic networks.

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### **6. Good Character at College: The Combined Role of Second-Order Character Strength Factors and Phronesis Motivation in Undergraduate Academic**

URL: [View paper](#)

#### **Brief Assessment**

Character Strength College[66] focuses on character strengths and phronesis motivation in undergraduate academic contexts, not on LLM-based psychological trait prediction or second-order correlation structure evaluation methods.

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### **7. Personality traits leads to investor's financial risk tolerance: A structural equation modelling approach**

URL: [View paper](#)

#### **Brief Assessment**

Personality Financial Risk[67] examines second-order personality factors predicting financial risk tolerance in investment contexts, not evaluation methods for assessing how well models reconstruct psychological trait correlation structures.

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### **8. Reliability of scales with second-order structure: Evaluation of coefficient alpha's population slippage using latent variable modeling**

URL: [View paper](#)

#### **Brief Assessment**

Second-Order Reliability[71] focuses on evaluating coefficient alpha's reliability for second-order factorial structures in psychometric scales, not on evaluating how well prediction models reconstruct correlational structures of psychological traits. The candidate addresses measurement reliability theory, while the original paper addresses predictive model evaluation.

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### **9. Relationship of core self-evaluations to goal setting, motivation, and performance.**

URL: [View paper](#)

#### **Brief Assessment**

Core Self-Evaluations Goals[70] examines correlations among four specific personality traits (self-esteem, locus of control, self-efficacy, neuroticism) as a nomological network for predicting job performance. It does not propose a general second-order evaluation methodology for assessing how well models reconstruct entire correlational structures across diverse psychological scales.

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### **10. A comparison of bifactor and second-order models of quality of life**

URL: [View paper](#)

#### **Brief Assessment**

Bifactor Quality Life[65] compares bifactor versus second-order factor models for quality of life constructs using structural equation modeling. This is fundamentally different from the original paper's method of evaluating LLM predictions by comparing inter-scale correlation patterns in psychological trait networks.

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## **Contribution 2: Discovery and characterization of structural amplification phenomenon in LLM psychological reasoning**

**Description:** The authors identify and characterize a systematic phenomenon where LLMs reconstruct an idealized, linearly amplified version of human psychological trait correlations when predicting from sparse Big Five personality inputs. This structural amplification (regression slope greater than 1.0) represents a form of noise filtering that produces theory-consistent representations.

This contribution was assessed against **10 related papers** from the literature. Papers with potential prior art are analyzed in detail with textual evidence; others receive brief assessments.

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### **1. Puzzlingly high correlations in fMRI studies of emotion, personality, and social cognition**

URL: [View paper](#)

#### **Brief Assessment**

fMRI Correlations Puzzle[56] addresses systematic inflation of correlations in neuroimaging studies due to non-independent statistical analyses (selecting voxels based on correlation, then reporting those same correlations). The ORIGINAL paper describes LLMs amplifying psychological trait correlations through noise filtering when predicting from personality data—a fundamentally different domain and mechanism.

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### **2. Toward a structure-and process-integrated view of personality: Traits as density distributions of states.**

URL: [View paper](#)

#### **Brief Assessment**

Traits Density Distributions[59] focuses on theoretical frameworks for understanding personality traits as density distributions of states in human psychology, not on LLM behavior or computational prediction of psychological correlations.

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### **3. Serotonin depletion amplifies distinct human social emotions as a function of individual differences in personality**

URL: [View paper](#)

#### **Brief Assessment**

Serotonin Personality Emotions[55] examines how serotonin depletion amplifies human emotional responses to social scenarios, not LLM prediction patterns. This is a neuroscience study of human neurochemistry, not computational modeling of psychological trait correlations.

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### **4. Exploring Careers for a Clearer Future Work-Self: The Influence of Proactive Personality as a Moderator**

URL: [View paper](#)

#### **Brief Assessment**

Proactive Personality Careers[53] focuses on career exploration and future work-self clarity in middle school students using traditional psychological scales. It does not involve LLMs, computational modeling, or structural amplification of correlation patterns in psychological trait prediction.

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### **5. Dark-side personality trait interactions: Amplifying negative predictions of leadership performance**

URL: [View paper](#)

#### **Brief Assessment**

Dark Personality Leadership[60] examines multiplicative interactions between narcissism and other dark personality traits in predicting leadership performance using human data. It does not involve LLMs, psychological trait prediction from sparse inputs, or structural amplification of correlation patterns in AI systems.

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### **6. A meta-analytic review of personality traits and their associations with mental health treatment outcomes**

URL: [View paper](#)

#### **Brief Assessment**

Personality Treatment Outcomes[57] is a meta-analysis examining how personality traits predict mental health treatment outcomes in humans. It does not address LLM psychological reasoning, structural amplification in correlations, or AI systems predicting psychological traits from sparse inputs.

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### **7. The justice sensitivity inventory: Factorial validity, location in the personality facet space, demographic pattern, and normative data**

URL: [View paper](#)

#### **Brief Assessment**

Justice Sensitivity Inventory[58] focuses on measuring individual differences in justice sensitivity across four perspectives (victim, observer, beneficiary, perpetrator) using psychometric validation. It does not address LLM psychological reasoning, structural amplification in correlation patterns, or prediction from personality data.

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### **8. Comparing NIRA and Traditional Network Approaches: A Study Case With Antisocial Personality Disorder Traits.**

URL: [View paper](#)

#### **Brief Assessment**

Antisocial Personality Networks[54] focuses on network analysis methods (NIRA) for examining antisocial personality disorder traits, not on LLM psychological reasoning or structural amplification in correlation patterns when predicting from personality data.

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### **9. The impact of suppressing and amplifying expressions on personality judgments**

URL: [View paper](#)

#### **Brief Assessment**

Expression Suppression Personality[52] examines how amplifying or suppressing emotional expressions affects personality judgments in human social interactions, not structural amplification in LLM-generated psychological trait correlations or computational reasoning processes.

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### **10. Leveraging Machine Learning Algorithm for Predicting Personality Traits on Twitter**

URL: [View paper](#)

#### **Brief Assessment**

Twitter Personality Prediction[51] focuses on predicting Big Five personality traits from social media data using traditional machine learning classifiers (XGBoost), not on analyzing how LLMs reconstruct psychological trait correlations or structural amplification phenomena.

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### Contribution 3: Two-stage reasoning process decomposition through meta-prompt analysis

**Description:** The authors develop a meta-prompt methodology to parse LLM reasoning traces, revealing that models employ a concept-driven information selection strategy (prioritizing high-level personality factors) followed by information compression into predictively potent natural language summaries that contain emergent, synergistic information beyond the original numerical inputs.

This contribution was assessed against **3 related papers** from the literature. Papers with potential prior art are analyzed in detail with textual evidence; others receive brief assessments.

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#### 1. Two-stage adaptive integration of multi-source heterogeneous data based on an improved random subspace and prediction of default risk of microcredit

URL: [View paper](#)

##### Brief Assessment

Microcredit Default Prediction[62] focuses on credit risk assessment using heterogeneous data integration and random subspace methods, not on LLM reasoning processes or psychological trait prediction through meta-prompt analysis.

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#### 2. Understanding dual process cognition via the minimum description length principle

URL: [View paper](#)

##### Brief Assessment

Dual Process MDL[61] focuses on dual-process cognition in decision-making tasks (executive control, reward-based learning, judgment), not on LLM reasoning traces for psychological trait prediction. The two-stage process in the candidate refers to automatic vs. controlled action selection systems, not information selection and compression for personality inference.

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#### 3. Curiosity: From psychology to computation

URL: [View paper](#)

##### Brief Assessment

Curiosity Psychology Computation[63] discusses curiosity mechanisms and prediction improvement in learning contexts, not LLM reasoning trace analysis or meta-prompt methodologies for parsing psychological trait predictions.

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## Appendix: Text Similarity Detection

No high-similarity text segments were detected across any compared papers.

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## References

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