

LLMs Consistency in Describing and Scoring Personality

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MIPT

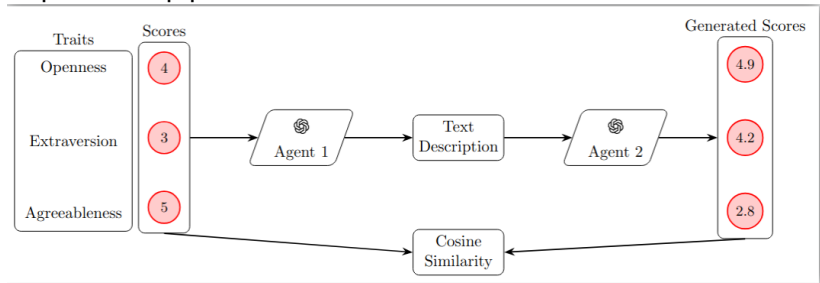
2025

Goals

- ▶ Develop a framework for measuring LLM fidelity in personality profiling for any set of personality traits.
- ▶ Evaluate LLM consistency in converting numerical personality scores to text and back.
- ▶ Assess LLM performance on both well-established (e.g., Big Five) and understudied/synthetic traits.
- ▶ Investigate the impact of parameters (e.g., temperature) and trait ordering on consistency.

LLMs consistency in personality scoring

Experiment pipeline



1. Big Five – set of personality traits with a lot of research
2. Personality conditioning – prompting model with a personality

$S_{agent, traits} : \text{score} \rightarrow \text{text}$

$S_{agent, traits}^{-1} : \text{text} \rightarrow \text{score}$

Research question: $S(S^{-1}) = I?$

Evaluating LLM Consistency

Core Challenge

- ▶ LLMs lack intrinsic personality; their responses vary based on input structure (e.g., **trait order**, **prompt phrasing**).
- ▶ Prompting agent with personality induces consistency.
- ▶ No frameworks for evaluating LLMs along arbitrary personality dimensions

Key Questions

- ▶ Can LLMs reliably map between numerical scores (\mathbf{p}) and textual descriptions (\mathbf{d})?
- ▶ Is the reconstruction error $\|\mathbf{p} - g(f(\mathbf{p}))\| < \epsilon$ consistent across traits?
- ▶ Does error increase for understudied traits ($\mathcal{S} \subset \mathcal{P}$)?

Temperature Experiment: Key Findings

Experimental Setup

- ▶ Varied temperature (0.2-1.5) during description generation
- ▶ 200 runs with Big Five traits

Optimal Range Found

- ▶ Best balance at **T = 1.25**
- ▶ Preserves trait fidelity while allowing nuance

Key Insight

Temperature isn't just stylistic - it **directly affects** how much latent trait signal survives text generation.

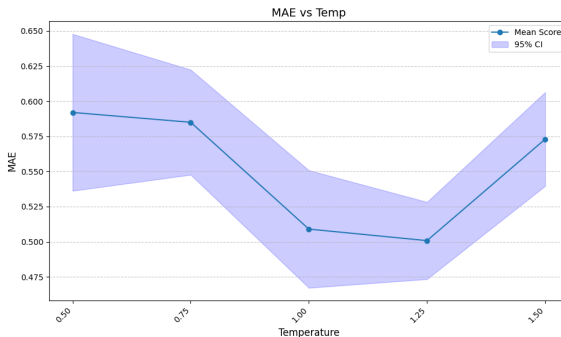


Figure: MAE vs. Temperature

Ordering Experiment: Impact of Trait Sequence

Experimental Design

- ▶ Tested 4 trait orderings with Big Five:

Key Finding

- ▶ Order effect exists and is significant

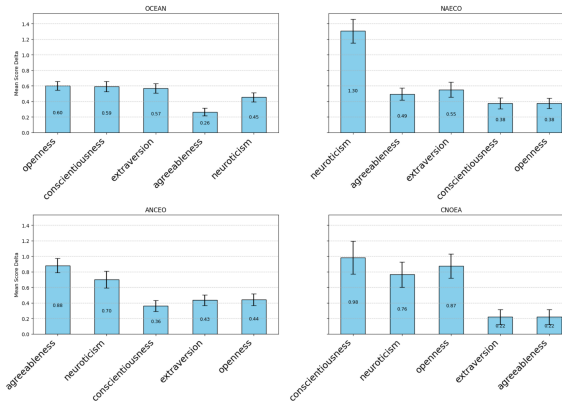


Figure: MAE across different trait orderings (O-C-E-A-N vs. alternatives)

Consistency Across Different Trait Sets

Key Findings

- ▶ **Best performance** on Big Five (MAE 0.26-0.6)
- ▶ **Moderate success** with clinical traits (MAE 0.4-1.2)
- ▶ **Highest errors** for synthetic traits (MAE up to 0.85)

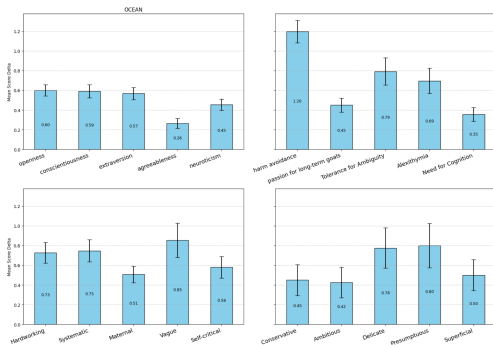


Figure: MAE across trait categories (your Fig.4 data)

Conclusion & Limitations

Key Findings

- ▶ **Two-stage framework** effectively measures LLM consistency in personality simulation
- ▶ **Significant ordering effects**: Up to 11% MAE variation across sequences
- ▶ Performance hierarchy:
 - ▶ Big Five (best) \gg Clinical traits \gg Abstract/Synthetic

Limitations

- ▶ Single-model bias (DeepSeekV3 only)
- ▶ Numerical MAE may mask semantic errors
- ▶ Ordering effects not tested on synthetic traits