

Large Language Models and I-O Psychology: Has the ChatGPT Revolution Begun?

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This is a Safe Space

- **It is okay** to be overwhelmed by all the changes out there
- **It is okay** to be confused by rapid-fire new terms and technologies
- **It is not okay** to give up



To That End, Let's Start with Basics

- **Artificial intelligence** (AI) is not intelligent.
- **Natural language processing** (NLP) is a family of AI techniques.
 - Text modelling, like bag-of-words and text embedding
 - Natural language understanding (NLU)
 - Natural language generation (NLG)



There Are a Lot of Basics

- **Machine learning** (ML) is the branch of AI focused on prediction, e.g., using regression.
- **Generative AI** is the branch of AI (mostly ML) techniques that create unstructured predictions.
 - Text, images, audio, and video



Midjourney

/imagine [prompt A koala eating mango in the Sahara desert in the style of Picasso]

(example from printify.org)



So Many Basics...

- **Large language models (LLM)** are a type of generative AI for text that rely on a specific type of ML called neural network modeling
 - Use massive unstructured text datasets as input
 - Predict a single **token** or word as output
 - Thus, models predict new output from their own prior output



Too Many Basics...

- **Generative pretrained transformer (GPT)** is a specific type of LLM created by OpenAI, with many versions and variants
 - GPT-2, model is open source (but not the data; released 2019)
 - GPT-3, closed source, released 2020
 - GPT-3.5 is closed but has free access via ChatGPT, released 2022
 - GPT-4 is closed and requires a paid subscription, can take non-text inputs (e.g., PDFs, images), released 2023
 - GPT-5 is not *yet* being trained but is probably < 2 years out
- Google Bard, Meta Llama, Anthropic Claude, etc. are LLMs but not GPTs



Running Out of Basics!

- GPT is the model
- ChatGPT is the interface to the model
- Think of GPT like *regression* and ChatGPT like a *regression dashboard*



Running Out of Basics

- Commercial products based on GPT (and other LLM) use these three techniques to customize responses
 - **Prompt engineering**
 - **Guardrails**
 - **Fine-tuning**



An Illustration of GPT “Cognition”

- Failures of basic reasoning are easier to see than complex failures, but the basic idea is the same
- Using OpenAI’s ChatGPT with the GPT-4 algorithm
 - <https://youtu.be/XLlovgF01uU>



Starter LLM Guidelines

- It is best to keep a **human-in-the-loop**.
- LLM **hallucinations** imply thin data or a lack of **prompt engineering**.
- These are not systems you can plug-and-play and requires **development** (Landers, 2023).



Opportunities and Threats from LLMs for I-O

- New methods for creating materials
- New methods for background research
- New ways to collect data or interact with stakeholders
- New ways to prepare, fake, and cheat
- New ways to make ratings/scoring
- New ways to present/interpret reports/results



New Methods to Create Materials

- LLMs can be used to generate assessment items, like:
 - Cognitive and non-cognitive items, including psychometric
 - Interview questions
- Also, other materials, including:
 - Activity designs (e.g., ACs, L&D, teambuilding)
 - Scripts



New Methods to Create Materials

- Cost savings related to audio/video production
 - Image generation using e.g. Midjourney
 - Music/audio generation using e.g. AudioCraft, Audiogen
 - Video generation using e.g. Synthesia (sort of)
<https://www.youtube.com/watch?v=sjhe0stgOdA>



Generate a 5-question psychometric assessment of adaptability.



Certainly! Adaptability is the ability to adjust to changes and new situations effectively. Here's a short 5-question psychometric assessment to gauge adaptability:

Adaptability Assessment

Please indicate how much you agree with each statement on a scale of 1 to 5, where 1 = Strongly Disagree and 5 = Strongly Agree.

1. Embracing Change

When there are sudden changes in my personal or work environment, I easily adjust and find ways to make the situation work for me.

1 2 3 4 5

2. Learning Agility

I actively seek out new experiences and challenges to learn and grow, even if they are outside my comfort zone.

1 2 3 4 5

3. Problem-Solving in Uncertainty

When faced with unfamiliar problems or challenges, I confidently experiment with potential solutions until I find one that works.

Scoring:

- 5-10: Low adaptability – You may find it challenging to seeking opportunities to push your boundaries and g
- 11-20: Moderate adaptability – You show a good level improvement. Reflect on situations where you felt res be more open in the future.
- 21-25: High adaptability – You exhibit a strong ability Continue to embrace changes and challenges to furtl



New Methods for Background Research

- GPT-3 was very bad with research.
- GPT-4 is pretty good.
- There are new fine-tuned models being created all the time that have access to current research.



What are common scholarly models of trait adaptability? Provide citations.

T

Several scholarly models and frameworks have been proposed to explain and understand trait adaptability. Here are some of the most prominent ones:

1. **Big Five Personality Traits (Five Factor Model)**

- Although not exclusively about adaptability, the Big Five includes the trait of "Openness to Experience" which is closely related to adaptability. People scoring high on this trait tend to be more adaptable, curious, and open to new experiences.
- **Citation:** McCrae, R. R., & Costa, P. T. (1997). Personality trait structure as a human universal. *American Psychologist*, 52(5), 509. ■

2. **Emotional Intelligence**

- This model, particularly associated with the work of Daniel Goleman, suggests that one's ability to recognize, understand, manage, and reason with emotions plays a critical role in adaptability.
- **Citation:** Goleman, D. (1995). *Emotional intelligence*. New York: Bantam. ■

3. **Learning Agility**

- This is a relatively newer concept that focuses on one's ability to learn from experiences and apply those learnings to new and unfamiliar situations. It's a strong indicator of leadership potential and adaptability.
- **Citation:** Lombardo, M. M., & Eichinger, R. W. (2000). High potentials as high learners. *Human Resource Management*, 39(4), 321-329. ■



New Methods for Background Research

- Emerging research literature on how to optimize AI
- **Chain of Density Prompting**
 - Adams, G., Fabbri, A., Ladhak, F., Lehman, E., & Elhadad, N. (2023). *From Sparse to Dense: GPT-4 Summarization with Chain of Density Prompting*. arXiv preprint arXiv:2309.04269.



Article: {{article}}

You will generate increasingly concise entity-dense summaries of the above article. Repeat the following 2 steps 5 times.

Step 1: Identify 1-3 informative entities (delimited) from the article which are missing from the previously generated summary.

Step 2: Write a new denser summary of identical length which covers every entity and detail from the previous summary plus the missing entities.

A missing entity is

- Relevant: to the main stories.
- Specific: descriptive yet concise (5 words or fewer).
- Novel: not in the previous summary.
- Faithful: present in the article.
- Anywhere: located in the article.

Guidelines:

- The first summary should be long (4-5 sentences, ~80 words), yet highly non-specific, containing little information beyond the entities marked as missing. Use overly verbose language and fillers (e.g., "this article discusses") to reach ~80 words.
- Make every word count. Rewrite the previous summary to improve flow and make space for additional entities.
- Make space with fusion, compression, and removal of uninformative phrases like "the article discusses".
- The summaries should become highly dense and concise, yet self-contained, e.g., easily understood without the article.
- Missing entities can appear anywhere in the new summary.
- Never drop entities from the previous summary. If space cannot be made, add fewer new entities.

Remember: Use the exact same number of words for each summary.



New Ways to Collect Data

- Adaptive language-based assessments are coming.
 - SJTs that craft scenarios in real-time based on responses
 - Virtual interviewers that ask for clarification when too little detail has been presented.
 - Chat agents that ask for permission to hunt through your web browser history to score behavioral markers.



New Ways to Interact with Stakeholders

- Interactive coaches that recall prior conversations and provide bespoke recommendations/advice
- Interactive agents that collect requested types/formats of data



New Ways to Prepare, Fake, and Cheat



I use ChatGPT to ace interviews: 'Works for every single job'

By [Brooke Kato](#)

Published May 24, 2023 | Updated May 25, 2023, 12:14 p.m. ET

Responding to recruiter emails with GPT-3

github.com/bi1yeu/recruiter_rm

'I used ChatGPT to answer interview questions'

The uses of AI are expanding rapidly.

By Emily Chantiri on Feb 13 2023 02:50 PM



New Ways to Make Ratings / Scoring

- Automatic scoring of open-ended text/speech
 - Interview responses
 - Open-ended text prompts
 - Biodata and demographic information
- Includes applications in job analysis, learning, performance assessment



New Ways to Make Ratings / Scoring

- Contrast with the “old” way
 - Wang, Y., Tian, J., Ones, D. S., & Landers, R. N. (2022). Using natural language processing and machine learning to replace human content coders. *Psychological Methods*.
- Less advanced tech can already create psychometrically valid ratings; these new approaches are more accurate.



New Ways to Present/Interpret Results

- Generative AI can be used to create narrative feedback reports based on numerical scores.
 - Customized per-person feedback, at the question level.
 - Text-to-speech can create interactive feedback agents.
- Risk management is key (for now).



Our Current Research

- Wang, Huang, Roper, Ellingsen, Behrend & Landers
 - Collaboration between UMN, Michigan State, and SHL
 - Exploring differences between
 - novice managers / expert IOs / generative AI for generating / responding / scoring interview questions
 - Early results showing experts and prompt-engineered generative AI not too far apart in *generating*
 - Responses are generally more coherent but require more active engineering to reduce generic tone



Things to Keep In Mind

- This is a rapidly developing space and is only going to get faster.
- The barriers to entry are smaller than ever before.
- This is the beginning of something as transformative as *the internet*.
- The demonstrations I gave today were not engineered (i.e., no prompt engineering or fine-tuning).



Some Closing Guidance

- **Generative AI is not likely to replace IO, but IOs using generative AI will be more effective than IOs who do not.**
 - If you are not actively exploring generative AI, you are already behind.
- Some guidance on how to grapple with the IO-technologist gap
 - Landers, R. N. (2023). Fixing the IO Psychology-Technology Interface (IOPTI): Avoiding both IO/Tech and Tech/IO conflict. In T. M. Kantrowitz, D. H. Reynolds, & J. C. Scott (Eds.), *Talent Assessment: Embracing Innovation and Mitigating Risk in the Digital Age* (SIOP Professional Practice Series). Oxford University Press.
- Some guidance on why your graduate program didn't prepare you for this and how to change your thinking
 - Landers, R. N. & Marin, S. (2021). Theory and technology in organizational psychology: A review of technology integration paradigms and their effects on the validity of theory. *Annual Review of Organizational Psychology and Organizational Behavior*, 8, 235-258. <https://doi.org/10.1146/annurev-orgpsych-012420-060843>



Thank You for Listening!

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Parrot



- Capable of mimicking human speech
- Does not understand what it means
- Humans have known for thousands of years
- Very little respect from people

chatGPT



- Capable of mimicking human writing
- Does not understand what it means
- Humans have known for less than half a year
- Everyone is losing their  over it



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