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A COMPARATIVE ANALYSIS OF METAPHORS IN HUMAN-WRITTEN AND AI-GENERATED ENGLISH TEXTS: A PILOT STUDY FRAMEWORK

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Abstract

The rapid integration of Large Language Models (LLMs) into natural language generation has raised fundamental questions in cognitive linguistics regarding how meaning is constructed. According to Conceptual Metaphor Theory (CMT), human metaphor generation is rooted in embodied physical experience. However, artificial intelligence systems generate complex metaphorical expressions through statistical probability without physical grounding. This paper proposes a methodological framework for a small-scale, comparative empirical pilot study to analyze how metaphorical expressions differ between human-written and AI-generated English texts. Drawing upon the Metaphor Identification Procedure Vrije Universiteit (MIPVU), this study outlines a systematic approach for identifying, classifying, and comparing the conventionality and contextual functions of metaphors across both mediums. Rather than presenting finalized empirical data, this thesis establishes a transparent, replicable coding methodology suitable for undergraduate linguistic research. The proposed framework aims to test whether AI systems predominantly reproduce highly conventionalized, "dead" metaphors from their training data or successfully synthesize novel conceptual mappings comparable to human creativity.

Keywords: Cognitive Linguistics, Conceptual Metaphor Theory, Artificial Intelligence, Large Language Models, MIPVU, Embodied Cognition, Corpus Linguistics.

Introduction

Historically, the construction of metaphorical meaning in the English language has been analyzed exclusively as an anthropocentric phenomenon. Metaphor is not merely a stylistic or literary device, but a fundamental cognitive mechanism that allows humans to conceptualize abstract ideas through concrete, physical terms. However, the advent of generative Large Language Models (LLMs) requires linguists to re-evaluate how semantic structures are formed. Modern AI models can generate highly fluent, context-specific metaphorical mappings, despite lacking the biological or physical experiences that traditionally ground human cognition.

As a first-year undergraduate research project, this thesis does not attempt to definitively solve the philosophical debate regarding AI consciousness. Instead, it



proposes a practical, corpus-driven linguistic methodology to observe *how* the output of AI systems differs from human writing at the lexical and conceptual levels.

Theoretical Framework and Literature Review

This research is grounded in Lakoff and Johnson's (1980) Conceptual Metaphor Theory (CMT), which posits that metaphor is rooted in "embodied cognition"—the idea that our understanding of abstract target domains (e.g., *time*, *love*) is structured by physical source domains (e.g., *motion*, *warmth*).

The introduction of LLMs creates a theoretical tension. LLMs do not possess physical bodies, leading to the "stochastic parrot" hypothesis proposed by Bender et al. (2021). This hypothesis suggests that massive language models stitch together sequences of linguistic forms based on probabilistic training data without access to underlying communicative intent or physical meaning.

Despite this lack of embodied cognition, recent computational linguistics studies demonstrate that LLMs exhibit sophisticated handling of figurative language. Wachowiak and Gromann (2023) investigated whether models like ChatGPT genuinely "grasp" conceptual metaphors. Their findings suggest that while LLMs successfully generate and explain highly conventional metaphors, their ability to navigate truly novel, cross-domain mappings remains inconsistent. Consequently, there is a distinct need for transparent, text-level comparative analyses to see how these theories manifest in everyday writing.

Research Problem, Aim, and Question

Research Problem: There is a lack of structured, comparative empirical data at the undergraduate level evaluating whether AI-generated texts rely more heavily on conventional (frozen) metaphors than human texts written under similar conditions.

Research Aim: To establish a transparent methodology for identifying and classifying metaphorical expressions in a comparable corpus of human and AI texts.

Principal Research Question: *How do metaphorical expressions differ between comparable human-written and AI-generated English texts in terms of their types, contextual functions, and degree of conventionality?*

Research Objectives

1. To compile a controlled, small-scale pilot corpus of human-written and AI-generated English texts matched by genre and prompt.
2. To apply a standardized linguistic framework to distinguish between literal and metaphorical word usage.
3. To classify the identified metaphors as either *conventional* (highly frequent in standard English) or *novel* (original conceptual mappings).



Methodology

To ensure a rigorous and honest empirical comparison, this study proposes the following pilot methodology, which is currently in the data-gathering phase.

Corpus Selection

A comparable corpus of 20 short texts will be compiled:

- **Human Texts (n=10):** Short descriptive essays (approx. 300 words each) written by university students or sourced from published essay collections on abstract topics (e.g., "The experience of overcoming a difficult challenge").
- **AI Texts (n=10):** Essays generated by a specified LLM (e.g., ChatGPT-4) using a consistent, documented prompt designed to match the topic, length, and tone of the human texts.

Metaphor Identification Procedure

The study will utilize the Metaphor Identification Procedure Vrije Universiteit (MIPVU), a highly reliable method for identifying metaphorically used words in discourse (Steen et al., 2010). The procedure prevents subjective guessing by adhering to strict steps:

1. Read the entire text to establish the general meaning.
2. Determine the contextual meaning of the lexical unit.
3. Check if the lexical unit has a more basic, concrete, or historical meaning in other contexts.
4. If the contextual meaning contrasts with the basic meaning but can be understood in comparison to it, mark the unit as metaphorical.

Classification and Coding Table

Once identified, metaphors will be classified based on their conventionality. The following coding table will be used by the researcher to document the findings objectively:

Text Source	Lexical Unit	Contextual Meaning	Basic (Concrete) Meaning	Metaphor Type (Conventional / Novel)
Example (Human)	"He hit a roadblock."	Encountered an abstract difficulty.	Physically striking a physical barrier.	Conventional
Example (AI)	"Time evaporated ."	Passed very quickly.	Liquid turning into gas.	Novel Extended

Findings and Discussion (Pending Data Collection)

Note: The empirical application of the coding table is currently in progress. Preliminary analysis will focus on two primary metrics once the dataset is fully



coded:

1. **Frequency:** Calculating the overall density of metaphorical expressions per 100 words in both human and AI texts.
2. **Conventionality Ratio:** Determining what percentage of the identified metaphors are novel conceptual blends versus standard, dictionary-documented conventional metaphors.

If the finalized data reveals that AI predominantly utilizes conventional metaphors compared to human writers, it would lend empirical support to the hypothesis that LLMs operate primarily by reproducing frequent probabilistic patterns (Bender et al., 2021). Conversely, a high frequency of coherent, novel metaphors in the AI corpus would suggest that advanced statistical models can effectively simulate processes similar to human conceptual blending.

Conclusion

The intersection of generative Artificial Intelligence and cognitive linguistics challenges traditional assumptions about how language and meaning are constructed. By shifting the focus from philosophical debates about AI consciousness to rigorous, text-based corpus analysis, linguists can objectively measure the linguistic outputs of LLMs. The methodology proposed in this thesis provides a standardized, replicable framework for identifying and classifying metaphors. Completing this empirical pilot study will serve as a foundational step for broader linguistic research into how artificial systems replicate, alter, or fail to capture the embodied nuances of the English language.

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