The Attralucian Essays:

Exploring the Finite

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Tranfictors: Words as Compressed Transducers of Meaning

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Abstract

This essay synthesizes the Useful Fictions model and the Transducers model from the Attralucian Essay series to propose a new, measurable framework for understanding language. We posit that words function as measurable, context-sensitive fictions, compressing complex observations into a linguistic form. This compression, however, introduces a quantifiable semantic uncertainty, which we propose to measure using a "fiction quality" metric. Drawing on concepts from the Semantic Uncertainty Appendix (SUA) introduced in Essay 16, this metric allows us to quantify semantic precision and provides a framework for analyzing the collaborative role of the reader in co-authoring meaning. The model offers a falsifiable, cross-disciplinary framework for language, with

significant implications for fields ranging from cognitive science and AI to public communication.

> **Tranfictor**: A word that shapes observations into a precise linguistic fiction through transduction, maximizing semantic quality (e.g., ∼99% for 'cheetah') with minimal compression-induced uncertainty, as quantified by the fiction quality metric and documented via the Semantic Uncertainty Appendix (Haylett, 2025, Attralucian Essay 16).

Introduction

In the foundational Attralucian Essay 01, we introduced two complementary models for language: Useful Fictions (Haylett, 2025, Attralucian Essay 01, p. 7) and Transducers (Haylett, 2025, Attralucian Essay 01, p. 8). The Useful Fictions model presents words as context-dependent abstractions, akin to simplified maps of a complex territory. A word like "chair" does not refer to a single, Platonic ideal but rather to a vast, heterogeneous class of objects, each with its own unique properties. The Transducer model expands on this by framing words as systems that compress observations into linguistic signals. Just as a microphone transduces sound waves into an electrical signal, a word transduces a messy, high-dimensional reality into a low-dimensional linguistic form.

Both models, while distinct, share a fundamental reliance

on compression. To simplify reality into a manageable linguistic unit, a word must discard information. This process is not without cost; it introduces an inherent semantic uncertainty, much like the margin of error in a physical measurement. In Finite Mechanics, a voltage reading is never a single, perfect value but a range with a ± margin. We argue that a word's meaning operates under a similar principle. This essay poses a central question: How can we quantify a word's semantic precision as a fiction, and, critically, how does the reader's active role shape its meaning and reduce this uncertainty?

We also propose '*tranfictor*' as a novel term for words that act as compressed transducers of meaning, shaping observations into fictions with measurable precision. A *tranfictor* like 'cheetah' delivers high fiction quality (99 percent), while 'chair' (50percent) requires reader qualifiers to resolve ambiguity (Attralucian Essay 01, p. 8).

Compression and Semantic Quality

Compression is the engine of linguistic efficiency. A word like "chair" allows us to communicate about a vast array of seating objects—from a wooden stool to a plush armchair—without having to describe each one in exhaustive detail. Similarly, "cheetah" compresses a specific biological entity into a concise term, encapsulating a complex set of biological and behavioural traits.

We propose a "fiction quality" metric, a measure of a

word's semantic precision, ranging from 50 percent to 100 percent. This metric is directly correlated with the level of compression.

High-compression words have low fiction quality because they are highly ambiguous and require significant context to resolve their meaning. A word like "freedom," for instance, compresses an abstract, philosophical concept with a near-infinite number of possible interpretations. Its fiction quality is low, perhaps around 20 percent, because it needs extensive qualifiers (e.g., "freedom of speech," "financial freedom") to become semantically useful. Without context, it is a coarse sensor reading with a massive margin of error.

Low-compression words have high fiction quality because they are precise and have fewer alternative representations. A word like "cheetah" has a high fiction quality, perhaps 99 percent, due to its stable, biologically defined referent. Its semantic uncertainty is minimal, and its meaning is largely consistent across different contexts.

Let's consider our core example, "chair." This is a moderately compressed term with a fiction quality of around 50percent. While it simplifies a category of objects, its meaning is highly ambiguous without qualifiers. A request to "bring a chair" can be misinterpreted without additional context (e.g., "bring an office chair," "bring a dining chair"). This is analogous to a coarse sensor that gives a reading of "medium," requiring follow-up

measurements to get a precise value. The fiction quality metric can be conceptually represented as Quality = 1 - (Compression Ratio), where the compression ratio reflects the number of potential referents a word can map to.

The Reader as Author

A crucial insight into the language-as-transducer model is the reader's active role in the decompression process. The reader is not a passive receiver but an active co-author of meaning. They do not simply absorb a signal; they decompress it by adding context-specific qualifiers based on their own cognitive state and environment.

When a reader encounters the word "chair," their brain immediately begins to fill in the missing details. If they are in a meeting room, they might decompress it as an "ergonomic office chair." If they are at a dining table, it becomes a "wooden dining chair." The reader's context acts as a high-pass filter, adding precision to the signal. In contrast, the word "cheetah" requires minimal decompression because its semantic space is already highly constrained.

This collaborative process is a form of internal transduction (Haylett, 2025, Attralucian Essay 01, p. 8), where words project a latent semantic geometry that the reader shapes. This concept echoes philosophical ideas, particularly those from thinkers like Wittgenstein, who em-

phasized how language games and shared contexts determine meaning. This co-creation of meaning is not just a philosophical curiosity; it has practical implications for human-AI interaction, where large language models (LLMs) and users collaboratively refine ambiguous queries to construct a stable, shared understanding.

The compression ratio reflects the number of potential referents in a corpus. For 'chair,' a high ratio (e.g., 100+ referents like stools, thrones) yields 50 percent quality; for 'cheetah,' a low ratio (e.g., one species) yields 99 p[ercent."

We could also consider the exploratory question: "Could corpus statistics or reader surveys calibrate the compression ratio?"

Quantifying Uncertainty with the SUA

To make this model falsifiable and measurable, we turn to the Semantic Uncertainty Appendix (SUA), a concept from Attralucian Essay 16. The SUA is a practical tool for documenting a word's operational definitions, ambiguities, and valid domains of use. It is, in essence, a quantifiable inventory of a word's compressed referents and its associated semantic noise.

An SUA for "chair" would list its primary definitions ("a piece of furniture for one person to sit on"), its ambiguities (e.g., "chair of a meeting," "electric chair"), and

the contexts where it is valid (e.g., furniture design, biology—referring to the "chair of the board"). The complexity and length of the SUA directly correlate with a word's compression level and low fiction quality.

Conversely, an SUA for "cheetah" would be simple, listing its biological classification, physical traits, and behavioural characteristics. It would have few ambiguities and a narrow set of valid contexts, confirming its high fiction quality.

The SUA makes the fiction quality metric measurable by grounding it in observable data—the documentation of a word's definitional boundaries and its ambiguity in use. This process makes the very fictions we use in language falsifiable, bringing linguistic theory into the rigorous framework of Finite Mechanics.

It's of note that unlike dialectal attractors, which stabilize meaning across communities (Haylett, 2025, Attralucian Essay 01, p. 10), *tranfictors* focus on individual word precision, shaping observations with minimal compression.

Implications and Future Directions

This unified model has significant implications for both technology and society. For AI, understanding fiction quality can improve the interpretability of LLMs. A model trained on a corpus of language should, in theory,

struggle more with embedding ambiguous, low-quality terms like "fairness" or "consciousness" (Haylett, 2025, Attralucian Essay 01, p. 9) than it would with precise, high-quality terms like "quantum superposition." Fiction quality could thus inform embedding stability, preventing model collapse under semantic perturbation.

In public communication, this framework provides a clear diagnostic tool for reducing misinterpretation. By identifying and qualifying high-compression terms, we can reduce communication friction and foster shared understanding, a vital task in a world rife with semantic noise.

This model also lays the groundwork for future essays in the series. The concepts of semantic compression and collaborative decompression can be extended to analyze sentence trajectories, where a sentence's meaning is a product of cascading decompression events. It can also inform a study of meaning perturbation, where noise in the communication channel distorts the reader's decompression process, and dialect as attractors (Haylett, 2025, Attralucian Essay 01, p. 10), where shared context reduces compression uncertainty.

Conclusion

In summary, this essay unifies the Useful Fictions and Transducers models into a single, cohesive framework. Words are not static symbols but dynamic transducers of finite fictions, whose semantic precision is directly tied

to their compression level and the reader's collaborative role in decompressing their meaning. By quantifying fiction quality with tools like the Semantic Uncertainty Appendix, we move language from a realm of subjective interpretation to one of measurable, falsifiable theory. This approach aligns the study of language with the rigour of Finite Mechanics, paving the way for a measurable theory of meaning in a finite, uncertain world.