ABSTRACTION

Unlocking meaning from experience through language

ABSTRACTION outputs 2024

21.02.2025 – VU, Amsterdam

ABSTRACTION IN THOUGHT

ABSTRACTION IN LANGUAGE

ABSTRACTION IN CREATIVITY
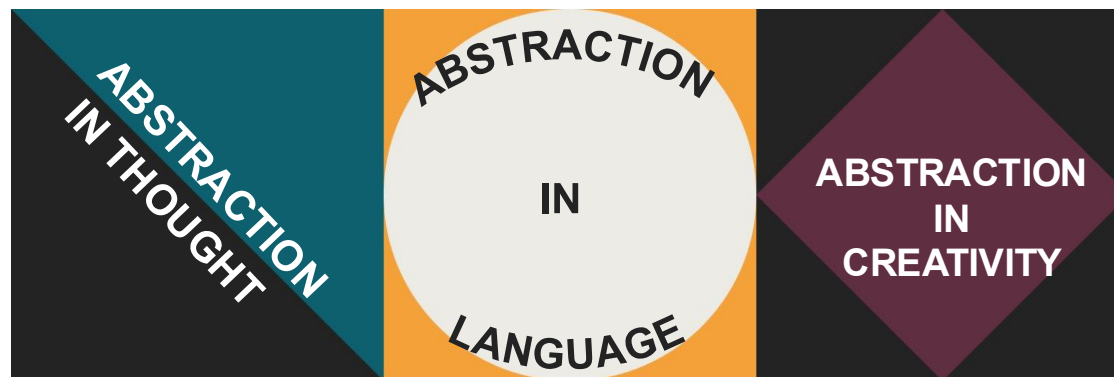
DISENTANGLING ABSTRACTION VARIABLES
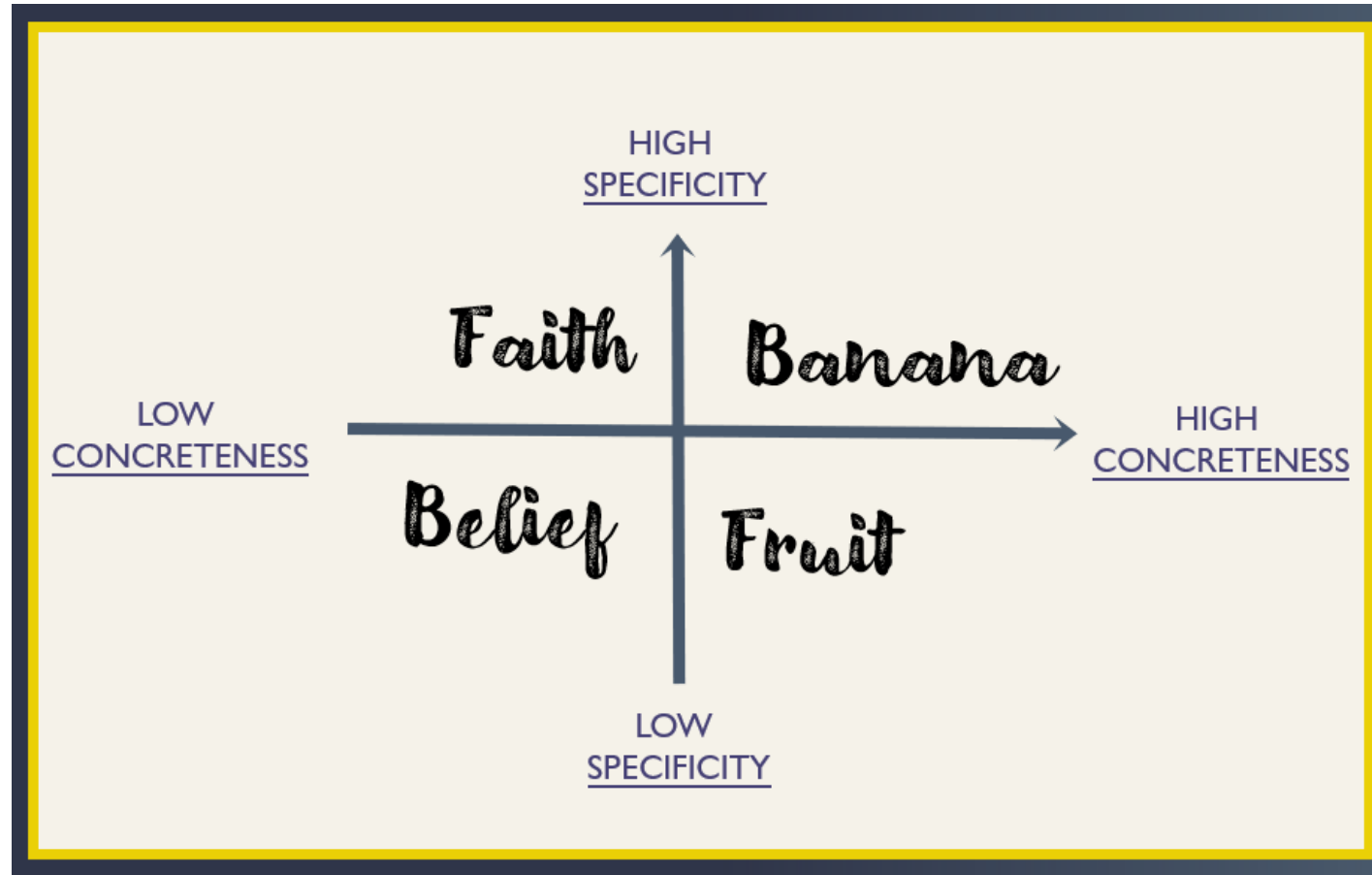
(Abstractness) Concreteness

- the degree of perceptibility of a word referent

- a quality of concept (word) that has often exemplified by multiple interactive elements with low percetual similairy.

Specificity

- the degree of precision of a word meaning in terms of category inclusiveness

- taxonomic hierarchical organization

ABSTRACTION RESEARCH GROUP

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ABSTRACTION

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OVERVIEW OF ABSTRACTION STUDIES

THOUGHT

- Do concreteness and specificity affect conversational dynamics?
- How language-mediated abstraction ability unfolds across ages and over time?
- How do **LLMs** replicate the categorical knowledge along the abstraction axis?
- How do **LLMs** replicate Specificity scores?

LANGUAGE

- How do specificity and concreteness are used in political debates?
- How abstractness & inclusiveness shape language?
- How do **LLMs** interpret generic sentences?

THOUGHT
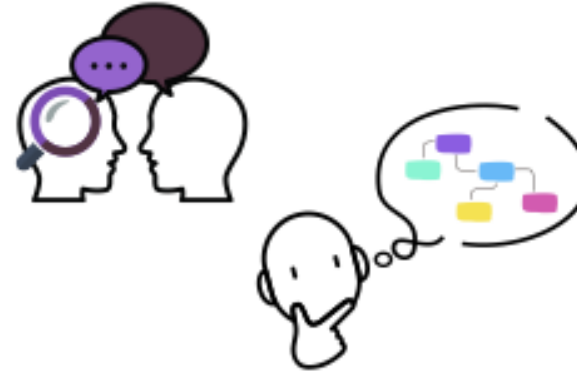
LANGUAGE

LLMs

DO CONCRETENESS & SPECIFICITY AFFECT CONVERSATIO-NAL DYNAMICS?

Abstractness impacts conversational dynamics

Claudia Mazzuca [a,*,1], Caterina Villani [b,1], Tommaso Lamarra [b], Marianna Marcella Bolognesi [b], Anna M. Borghi [a,c]

Abstract Sentences elicit more Uncertainty and Curiosity than Concrete Sentences

Mazzuca, Villani, Lamarra, Bolognesi, Borghi

COGSCI 2024
DYNAMICS OF COGNITION
July 24-27 • Rotterdam

How does sentence specificity shape uncertainty and curiosity in conversational dynamics?

Lamarra, Villani, Mazzuca, Borghi, Bolognesi

XPRAG.it

I made a judgment

?

What do you mean?

HOW DO LLMS REPLICATE THE CATEGORICAL KNOWLEDGE ALONG THE ABSTRACTION AXIS?

GWC 25

Wordnet & Word Ladders: Climbing the abstraction taxonomy with LLMs

Puccetti, Esuli, Bolognesi

Token: *parallelogram*
Abstraction Ladder: thing, object, shape, polygon, quadrilateral, *parallelogram*, rectangle, rhombus, square

Token: *creationism*
Abstraction Ladder: idea, theory, belief, philosophy, worldview, *creationism*, theism, monotheism, biblical, fundamentalist, young-earth

How Humans & LLMs Organize Conceptual Knowledge: Exploring Subordinate Categories in Italian

Pedrotti, Rambelli, Villani, Bolognesi

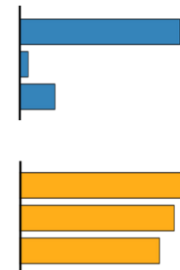UNDER REVIEW

Generate Exemplars of Basic-level Categories

STUDY 1 & 2

"list types of *hat*"

baseball hat
cowboy hat
fedora ...

cowboy hat
panama
fedora...

HOW ARE WORD SPECIFICITY AND CONCRETENESS USED IN POLITICAL DEBATES?

Red and blue language:
Word choices in the Trump & Harris 2024 presidential debate

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Abstract

Political debates are a peculiar type of political discourse, in which candidates directly confront one another, addressing not only the the moderator's questions, but also their opponent's statements, as well as the concerns of voters from both parties and undecided voters. Therefore, language is adjusted to meet specific expectations and achieve persuasion. We analyse how the language of Trump and Harris during the Presidential debate (September 10th 2024) differs in relation to semantic and pragmatic features, for which we formulated targeted hypotheses: framing values and ideology, appealing to emotion, using words with different degrees of concreteness and specificity, addressing others through singular or plural pronouns. Our findings include: differences in the use of figurative frames (Harris often framing issues around recovery and empowerment, Trump often focused on crisis and decline); similar use of emotional language, with Trump showing a slight higher tendency toward negativity and toward less subjective language compared to Harris; no significant difference in the specificity of candidates' responses; similar use of abstract language, with Trump showing more variability than Harris, depending on the subject discussed; differences in addressing the opponent, with Trump not mentioning Harris by name, while Harris referring to Trump frequently; different uses of pronouns, with Harris using both singular and plural pronouns equally, while Trump using more singular pronouns. The results are discussed in relation to previous literature on Red and Blue language, which refers to distinct linguistic patterns associated with conservative (Red) and liberal (Blue) political ideologies.

UNDER REVIEW

HOW ABSTRACTNESS AND INCLUSIVENESS SHAPE LANGUAGE?

CLiC it 2024

ABRICOT 🍑 - ABstRactness and Inclusiveness in COntexT: A CALAMITA Challenge

Giovanni **Puccetti**[1,*], Claudia **Collacciani**[2], Andrea Amelio **Ravelli**[3], Andrea **Esuli**[1] and Marianna Marcella **Bolognesi**[3]

Token: Margherita
Text: Le margherite di fronte alla mia casa saranno in piena fioritura.
Abstractness: 0.177
Inclusiveness: 0.187

(a) Example of sample for the *Margherita* token.

Token: Ambizione
Text: La sua ambizione lo rovinerà.
Abstractness: 0.478
Inclusiveness: 0.083

(b) Example of sample for the *Ambizione* token.

Token: Benzina
Text: La benzina è nella bottiglia del latte.
Abstractness: 0.064
Inclusiveness: 0.063

(c) Example of sample for a more concrete *Benzina* token.

Token: Benzina
Text: In Italia è disponibile la benzina a 95 ottani.
Abstractness: 0.573
Inclusiveness: 0.653

(d) Example of sample for a more abstract *Benzina* token.

Consiglio Nazionale delle Ricerche

Istituto di Scienza e Tecnologie dell'Informazione "A. Faedo"

HOW DO LLMS INTERPRET GENERIC SENTENCES?

Quantifying Generalizations: Exploring the Divide Between Human and LLMs' Sensitivity to Quantification

Collacciani, Rambelli, Bolognesi

LLMs do not show a strong sensitivity to quantifiers.

→ they do not have the commonsense knowledge required to interpret quantified sentences with respect to their semantic content.

But they seem to have encoded a meaning associated with the generic form.

This default interpretation of generics mirrors that of humans.

```
What is the correct completion? Birds
fly, therefore...
    no birds fly.
    few birds fly.
    some birds fly.
    most birds fly.
    all birds fly.
```