



## Findings from the NUCOREpus: A Field Study of Intuitive Language across Science Communications

Emily E. Dahlgaard Thor, Eliza Grossman, Kristhy Bartels, Shrreya Agarwal, Nicole Pochinki, Kyleigh Watson, Melissa Morgan, Natalia Chavez, Dr. John Coley

### Opportunity

#### Abstract:

There is an urgent need for accessible and relevant science publications – our research looks to address this need through informed cognitive science. Research in cognitive science indicates that people rely on intuitive thought patterns, known as “cognitive construals,” to make sense of complex scientific topics. Three of these cognitive construals – anthropic (using humans as a base for reasoning), teleological (reverse causal reasoning), and essentialist (assuming an underlying essence) thinking – have been shown to relate to scientific misconceptions (Coley & Tanner, 2015), and are aligned with intuitive language. Our current work seeks to understand how intuitive language is currently being used in online science communications. To do this, we built a first-of-its-kind corpus of over 360 freely accessible science articles (NUCOREpus), geared towards varying audiences: these audiences were the general public, science interested audiences, and science scholars. Researchers have examined 60 of these articles (about the topic of DNA specifically) for the present study. These articles were methodically coded for construal-consistent intuitive language, among other things. Results showed that intuitive language decreases significantly ( $X^2, p=0.002$ ) as the intended audience has increasing subject-based knowledge. These data support our hypothesis that publications geared towards the general public contain more intuitive language than those geared towards scholarly audiences. This suggests that authors rely on intuitive language to convey complex scientific content to non-expert audiences, which has major implications for how people, especially non-experts, may understand that information.

#### Background:

- Thinking intuitively about genetics is common (1)
- Intuitive thought** can be studied using language consistent with cognitive construals
  - **Cognitive Construals** are mental shortcuts
    - *Anthropic*: human-centered reasoning
    - *Teleology*: reversed causal reasoning
    - *Essentialism*: assuming an underlying essence
- These construals are associated with misconceptions about science (2)
- Evidence of intuitive language in science classrooms (3) and science textbooks (4)

#### Goal:

Understand how *intuitive language* is currently used in freely accessible, written, online *communications* about the scientific concept of genetics for varying *audiences*.

### Approach

#### 1) Built a corpus of written online science communications in a modern field study

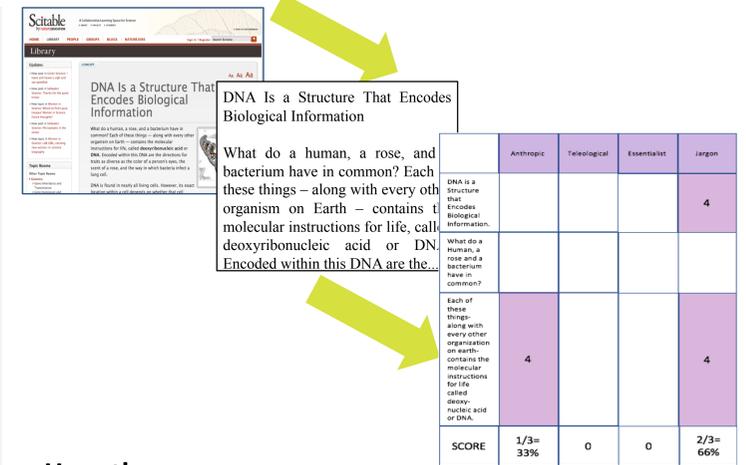
##### NUCOREpus consists of:

- 1st page of results from 2 most popular search engines in 3 different audience categories:
  - *General Public*: Google, Bing → e.g. Wikipedia
  - *Science-Interested*: National Geographic, Discover
  - *Scholarly*: Google Scholar
- 350 current, publicly and freely accessible articles about varying science content topics → **61 articles specific to genetics**

#### 2) Measure intuitive language and jargon

##### Coding methodology:

- Trained coders individually coded each sentence for evidence of intuitive language
- Teams of 4 coders agreed on all codes

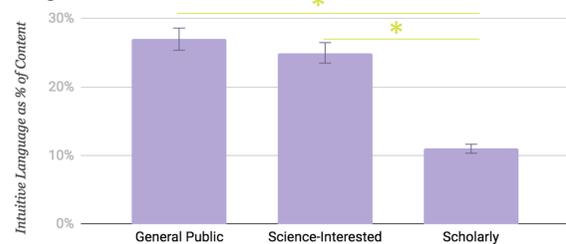


#### Hypotheses:

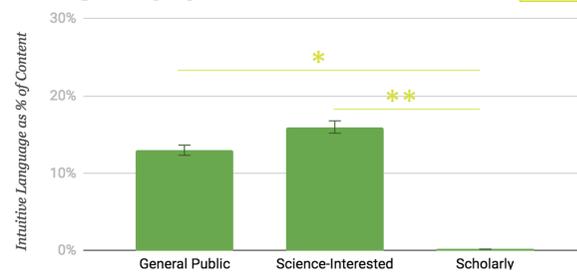
- That articles in the NUCOREpus would show evidence of intuitive language
- That articles for general audiences would contain more intuitive language than would scholarly communications

### Results

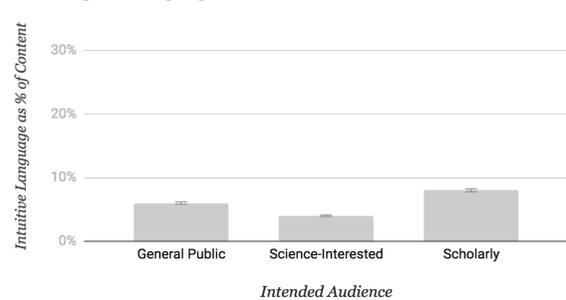
Intuitive Language as Proportion of Sentences in Content by Target Audience



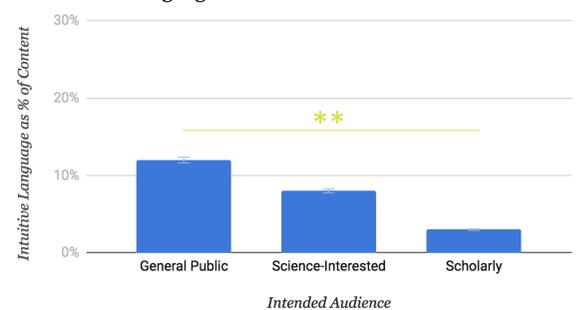
Anthropic Language



Teleological Language



Essentialist Language



#### Conclusions: Support for our hypotheses

- Articles in the NUCOREpus show evidence of intuitive language
- Communications for general audiences contain more intuitive language than do scholarly communications

### Impact

The unique feature about my innovation is its modern field study of online science communications (the NUCOREpus).

This solves the problem of understanding and contextualizing the disparity of accessibility across science publications.

Our findings can be commercialized to inform effective science communication techniques, aligned with the interests of publishers, marketers, science writers, etc.



These findings have broad implications for how science is currently being communicated, especially to general non-expert audiences, which may have downstream consequences for how general audiences come to understand the content.