Does Language Influence Our Thoughts?

The Sapir-Whorf Hypothesis (Linguistic Relativity)

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The Big Ideas

- Kaplan's *Chapter 11* explores the **Sapir-Whorf Hypothesis**: the idea that language shapes how we think and perceive the world.
- The chapter addresses the myth that "*language limits thoughts*"
- Kaplan examines how *language* may affect human cognition through examples involving color, time, and space.
- She discusses how different languages categorize the world in unique ways, which may shape what their speakers notice or prioritize.
- The chapter case study tests this idea by exploring how speakers of different languages categorize and perceive colors.

The Big Picture Research Questions

How does language shape human perception of color and, more broadly, influence how people think about and categorize the world around them?

This question connects to the myth that language determines perception and thought.

It asks whether the *words* we use actually **alter** how we experience reality.

Kaplan uses this question to explore how deeply language and cognition are intertwined.

The big-picture question sets the foundation for studies that test ***linguistic relativity***, like the Berinmo–Himba research.

It highlights the ongoing debate over whether perception is universal or language-dependent.

Methodology: Participants

Language Differences:
Berinmo/Himba are 5-color primary languages (whereas English is a 9-color primary language)

Relevant Definitions:
Nol: Berinmo color roughly equating to green/blue)
Wor: Berinmo color roughly equating to yellow/orange/brown
Dumbu: Himba color roughly equating to yellow/beige
Burou: Himba color roughly equating to green/blue/purple

Cibelli et al. (2016)

Roberson et al. (2005)

-12 monolingual Himba adults
-12 Native English speakers
-Aged 17-55

Roberson et al. (2000)

-8 monolingual Berinmo adults
-8 Native English speakers
-Aged 20-50

Other methodology was the same!

Methodology:
2AFC Color Discrimination

Design

Apparatus: Solar-powered portable light box; Stimuli mounted on a display board

Materials: 160 color chips; judged chips could either be 2.5 or 5 Munsell Hue steps apart

Number of trials omitted from Methods

5 seconds

30 second pause

Methodology:
2AFC Color Discrimination

Trial Conditions

Within (Green/Blue)

- The matching colors were *within* a single English color category (e.g., both green)

Across (Green/Blue)

- The matching colors were *across* English color categories (e.g., one green, one blue)

NOTE: They were **within** a single Berinmo/Himba color category

***Within (Nol/Wor):**

- The matching colors were *within* a single Berinmo color category (e.g., both nol)

***Across (Nol/Wor):**

- The matching colors were *across* Berinmo color categories (e.g., one nol, one wor)

NOTE: They were **within** a single English color category

*For the study on Himba speakers, the condition was within or across dumbu or burou.

Methodology:
2AFC Color Discrimination

Design

A

5 seconds

30 second pause

Green v Blue (English)
Nol (Berimno), Burou (Himba)

B

Green (English)
Nol v Wor (Berinmo)
Dumbu v Burou (Himba)

Trial Conditions

Within (Green/Blue): The matching colors were *within* a single English color category (e.g., both green)
Across (Green/Blue): The matching colors were *across* English color categories (e.g., one green, one blue)
NOTE: They were **within** a single Berinmo/Himba color category
***Within (Nol/Wor):** The matching colors were *within* a single Berinmo color category (e.g., both nol)
***Across (Nol/Wor):** The matching colors were *across* Berinmo color categories (e.g., one nol, one wor)
NOTE: They were **within** a single English color category

*For the study on Himba speakers, the condition was within or across dumbu or burou.

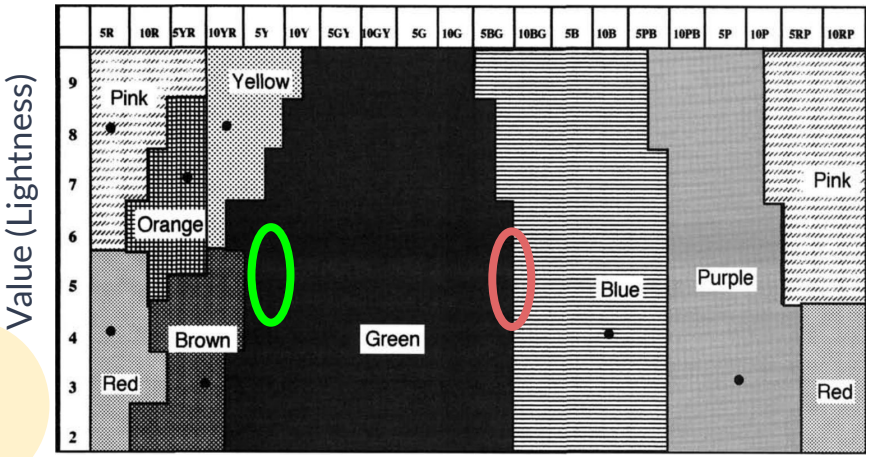
Measurable Research Question:

Are there differences between English and Berinmo/Himba in the proportion of correct answers in the **within** versus **across** category conditions for their specific language?

Specifically, will people perform *better* on the **across** category condition **in their native language**?

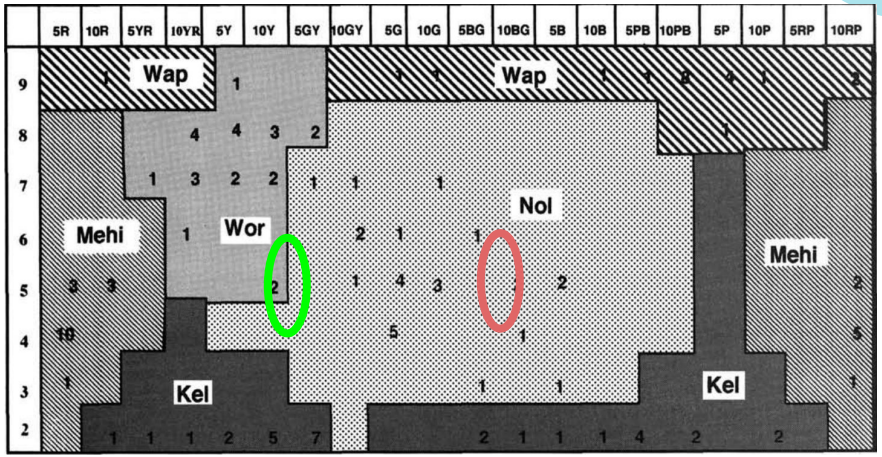
Color Boundaries

Munsell hue steps



English speakers

Munsell hue steps

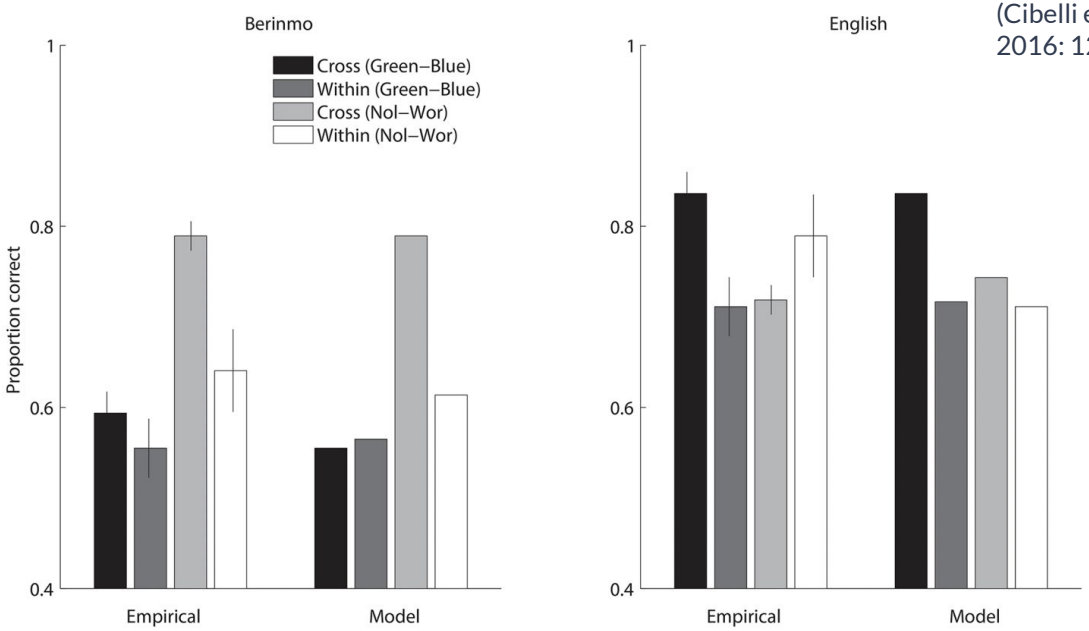


Berinmo speakers

Figures 2 & 3 from Roberson et al. (2000), pg. 372-373

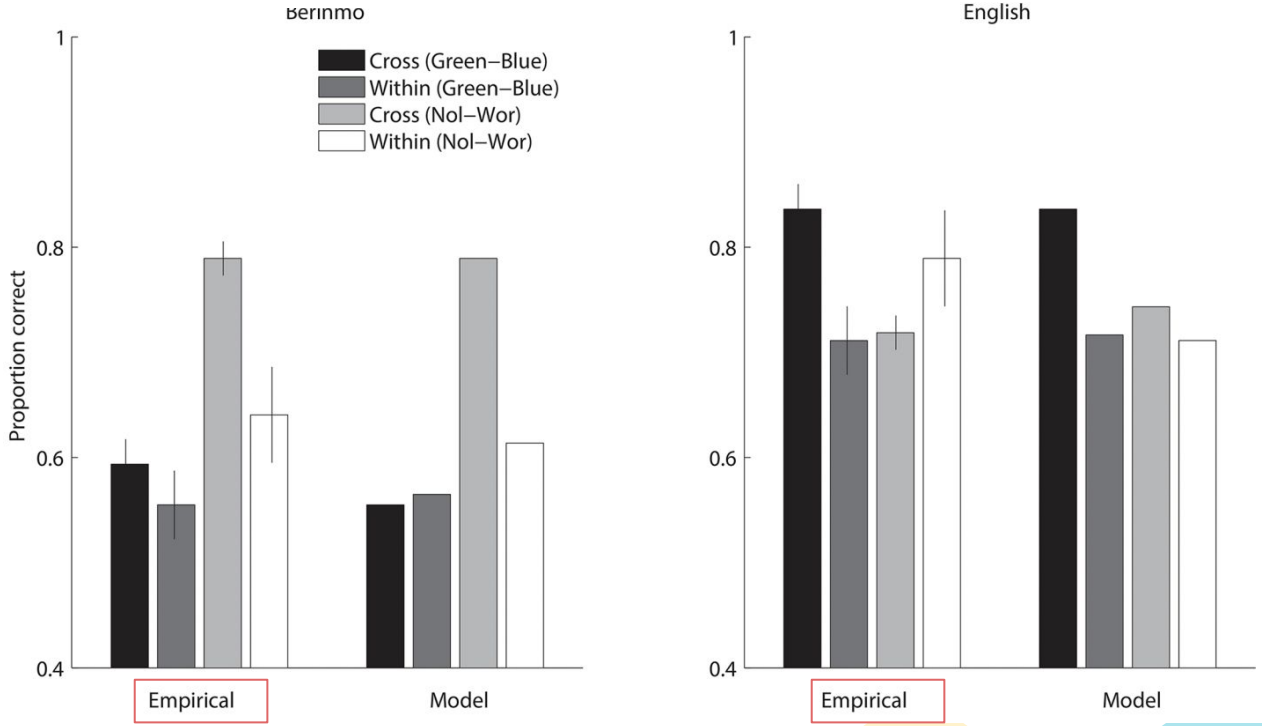
“Parsing” the Data: Overview

- The data is presented as a bar graph, where the height of each bar represents the proportion of correct responses
- Thin lines represent error bars, showing the standard error of the mean (variability in data) and how much responses might vary



(Cibelli et al, 2016: 12)

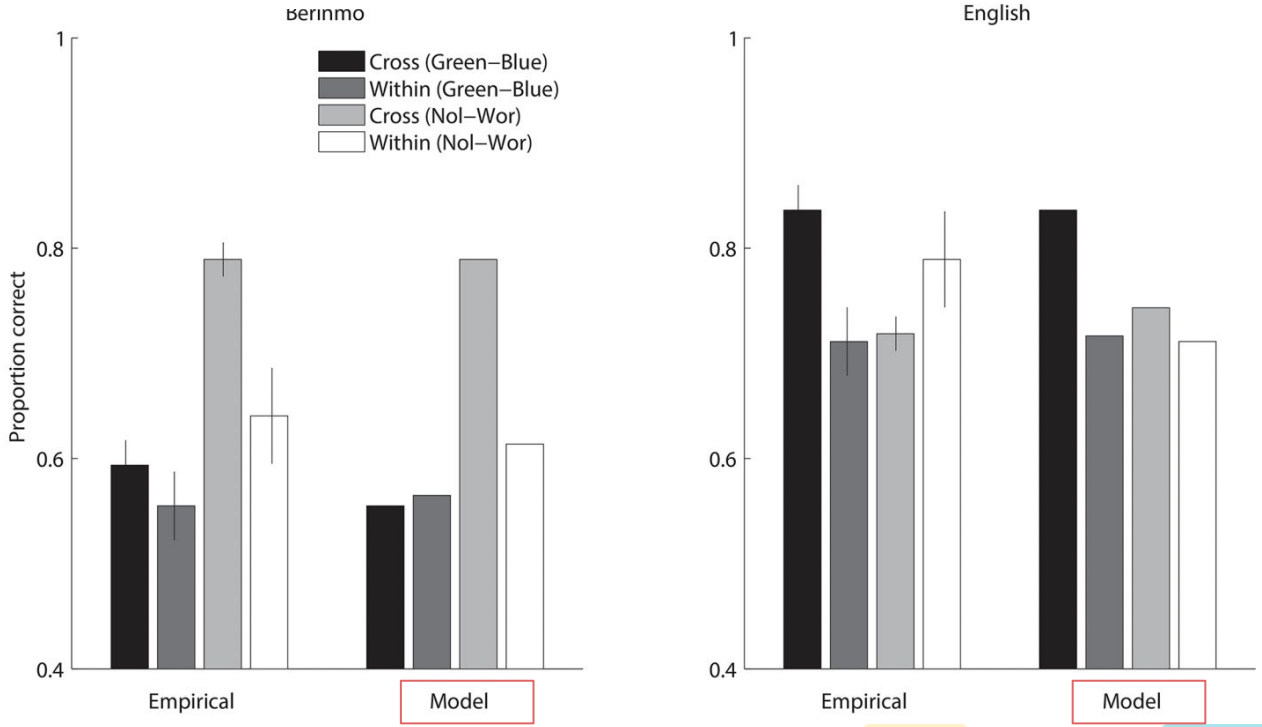
Parsing: X-axis



(Cibelli et al, 2016: 12)

Empirical: Describes the actual participants' color discrimination performance- how they performed on the test

Parsing: X-axis



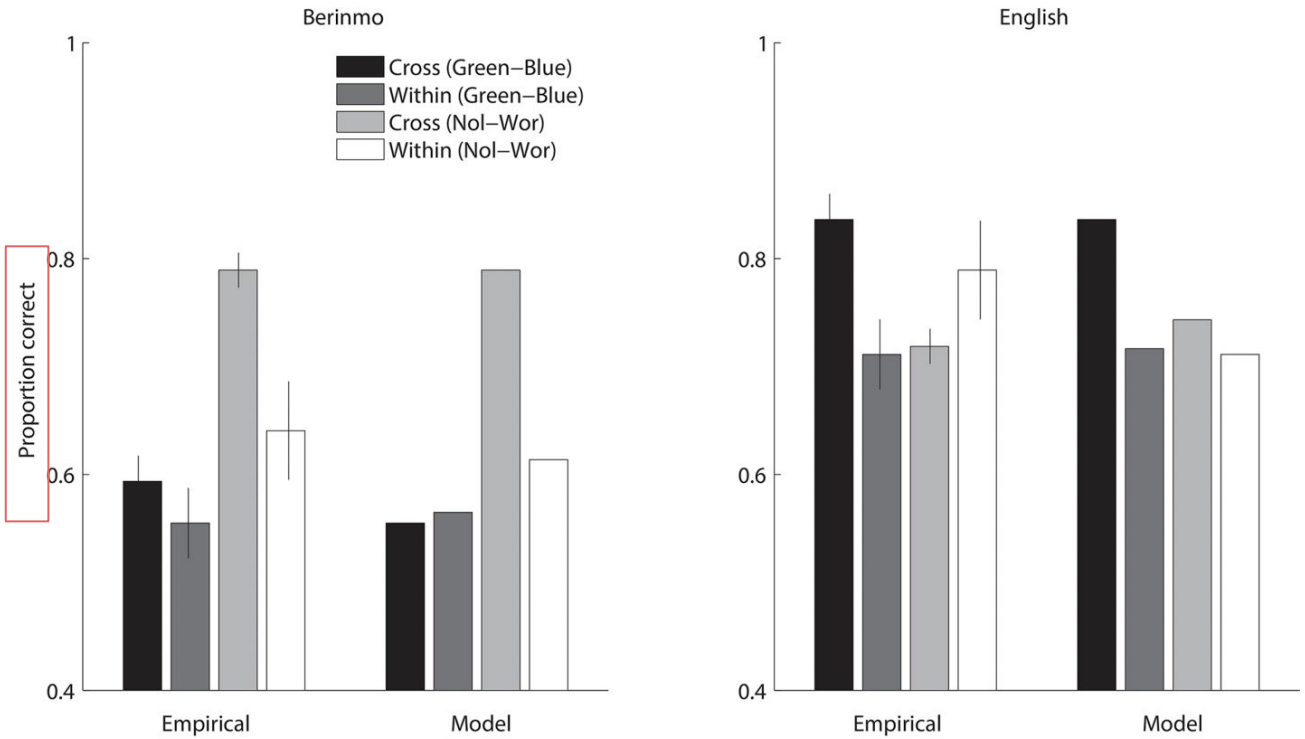
(Cibelli et al, 2016: 12)

Model: describes predictions of the probabilistic model- based on their performance, what is likely to be seen if tested again

Parsing: Y-axis

(Cibelli et al, 2016: 12)

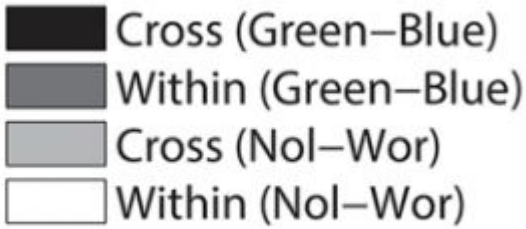
1.0- perfect performance



0.4- starting value, just short of mid/chance level performance

Proportion correct represents how accurately participants identified/discriminated between pairs of colors in the experiment

Berinmo Legend

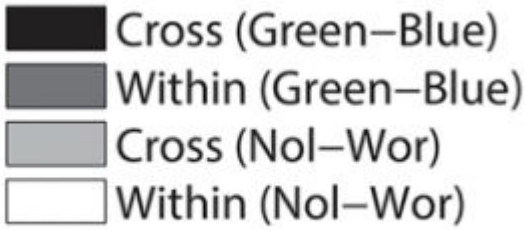


(Cibelli et al, 2016: 12)

- Black bar: two color samples came from different color categories in English (green vs. blue). The pair crosses a known word boundary for English speakers.

- Dark gray bar: two color samples were different shades within the same category (both greens or both blues) in English. Tests how well people can discriminate colors without linguistic boundaries.

Berinmo Legend

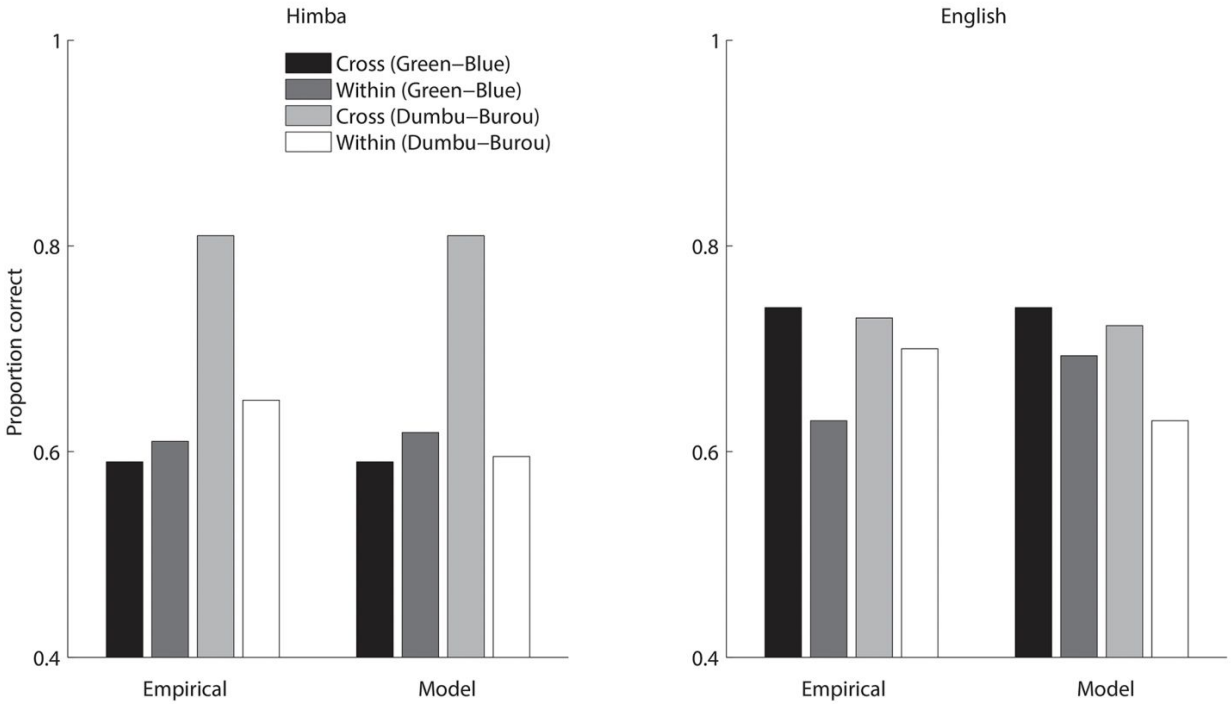


(Cibelli et al, 2016: 12)

- Light gray bar: two color samples came from different color categories in Berinmo (nol vs. wor). The pair crosses a known word boundary for Berinmo speakers.

- White bar: two color samples were different shades within the same category (both nol or both wor) in Berinmo. Tests how well people can discriminate colors without linguistic boundaries.

Himba Legend



(Cibelli et al, 2016: 12)

For Himba, the graphs are set up identically, but the light gray bar represents a cross between Dumbu-Burou, and the white bar represents a color within Dumbu-Burou

Data Graphic Interpretation

- In the empirical models, every language grouped had the highest accuracy in their **own languages' cross of colors**.
- English speakers' performance was more balanced across categories. Their cross between Dubmu and Burou is nearly equal to the cross between Green and Blue.
- Himba speakers showed the highest difference between cross-boundary colors in Himba than any other language and category
- In nearly all all cases, **accuracy is higher for cross-category than within-category trials**
- The Berinmo empirical model shows a vast difference between error bars compared to Cross (Nol-Wor).

Data Graphic Interpretation Cont.

- Speakers are **more accurate** at distinguishing colors that fall into <u>different</u> categories in their own language
- When two colors could overlap the same category, participants find them harder to distinguish
- English speakers were better able to distinguish between the colors in all tested languages, whereas Berinmo and Himba speakers were more accurate when looking at their own linguistic boundaries. English speakers were generally better at the task, but still have a **cross-boundary advantage**.
- Overlapping error bars for English speakers deem it not statistically significant, while Himba and Berinmo speakers did show a difference in the cross color of their own language- implies Berinmo and Himba speakers rely more on their linguistic background to determine what they are looking at

Evaluation, Concerns, and Broader Connections

- Some concerns include small sample sizes, cultural unfamiliarity with testing conditions, and possible translation or task-design biases.
- The experiment's interpretation can be debated — results might reflect attention or memory differences rather than direct perceptual changes.
- Compared to other case studies in Chapter 11, such as Winawer et al.'s Russian–English color research, this study confirms and extends earlier findings by showing similar effects in other cultures
- Overall, it further elaborates on Kaplan's discussion of ***linguistic relativity*** while clarifying that perception is also shaped by universal cognitive processes.
- The myth is therefore partly confirmed and partly revised — language ***influences*** how we categorize experience, but it **does not** completely dictate what we see.

Discussion

- The Berinmo–Himba experiment supports a weaker form of the Sapir-Whorf Hypothesis, showing that language guides but does not determine perception.
- **Connection to MRQ**: The measurable differences in color sensitivity correspond directly to linguistic categories, confirming a link between language and perception.
- **Connection to BPRQ**: Demonstrates that language influences thought processes in subtle ways, not absolute ones.
- **Connection to Myth**: The myth is partially confirmed — people who speak different languages perceive the world with slightly different emphases, not completely different realities.
- **Connection to Kaplan**: This aligns with Kaplan's argument that linguistic relativity is real but limited, showing that language shapes thought in nuanced and context-dependent ways

References

Cibelli, Emily, Yang Xu, Joseph L. Austerweil, Thomas L. Griffiths, Terry Regier. (2016). The Sapir-Whorf hypothesis and probabilistic inference: Evidence from the domain of color. *PLOS ONE*, *11*(8): e0161521. https://doi.org/10.1371/journal.pone.0161521.

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