The Sapir-Whorf Hypothesis: The State-of-the-Art

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- Did the speaker witness it?
- When did it happen?
- Was it just one cat or more?
- Was it a male or a female cat?

Can the specific requirements of a language lead speakers to pay attention to different properties of the picture?

Does language **determine** or **affect** cognition?

Language Determines Cognition

Language Affects Cognition

Language is Independent from Cognition

Cognition Determines Language

Linguistic Determinism

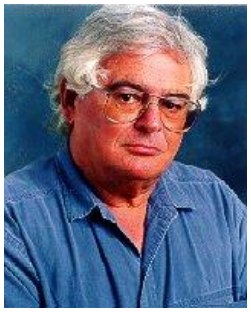
Whorf, B (1956)

Sapir, E (1924)

Linguistic Relativity

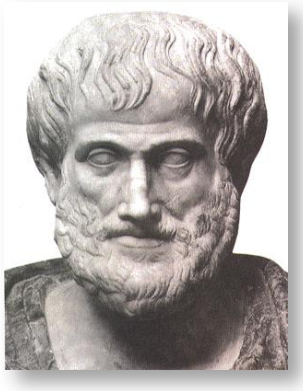
Slobin, D (1996)

Modularity



Fodor, J (1983)

"Cognitive Determinism"



Aristotle (330? BC)

Linguistic Determinism

Whorf, B (1956)

Sapir, E (1924)

We perceive and think about the world in accord with linguistic conventions

- **Problem**: success in translation
- **Problem**: No language no thought? Dr Jill Bolte Taylor (see www.youtube.com/watch?v=UyyjU8fzEYU)

Linguistic Relativism

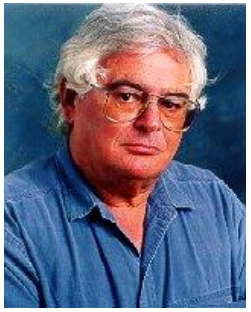
Sapir, E (1924)

Slobin, D (1996)

The language we speak affect the manner in which we perceive and think about the world, directing our attention to those categories encoded by the language.

- **Thinking for Speaking:** Effects of language on cognition only when needed, namely, when we are using language (Slobin, 1996)

Modularity



Fodor, J (1983)

Language (just like perception) is a module independent from other cognitive functions (Fodor, 1983).

In particular language cannot affect perception although language *might* affect high level cognition, such as reasoning and decision making

Testing Linguistic Effects on Cognition
What Cognitive Functions?

- Perception
- Numerical Cognition
- Categorization/semantic representation
- Reasoning
- …

Testing Linguistic Effects on Cognition: **What Linguistic properties?**

Lexical differences: language may have or not words to refer to certain referents

- Snow words (e.g., Whorf, 1956)
- Manner of motion verbs (e.g., Slobin, 1996)
- Color terms (e.g., Robertson et al, 1999)

Grammatical differences

- Grammatical Gender (e.g., Vigliocco et al., 2005)
- Future time reference (Chen, 2013)

Mapping space into words

- Absolute vs. relative frame of reference (e.g., Majid et al., 2003)
- Containment (e.g., Choi et al., 1999)

Thorny Issues

- Language or Culture or Culture via Language?

- What is language-less cognition? (in other words: how can scientists know that their tasks are truly non-linguistic?)

Testing Hypotheses:
The case of visual perception

Language should always affect perception

Language can affect Perception

Language and Perception Should not interact

Colour Perception
Winawer et al., PNAS (2007)

Russian: lighter blue = *goluboy*; darker blue = *siniy*
English: same word = blue
Colour discrimination Task across Russian (but not English) boundary
With no interference; rehearsing digits and maintaining a visual pattern

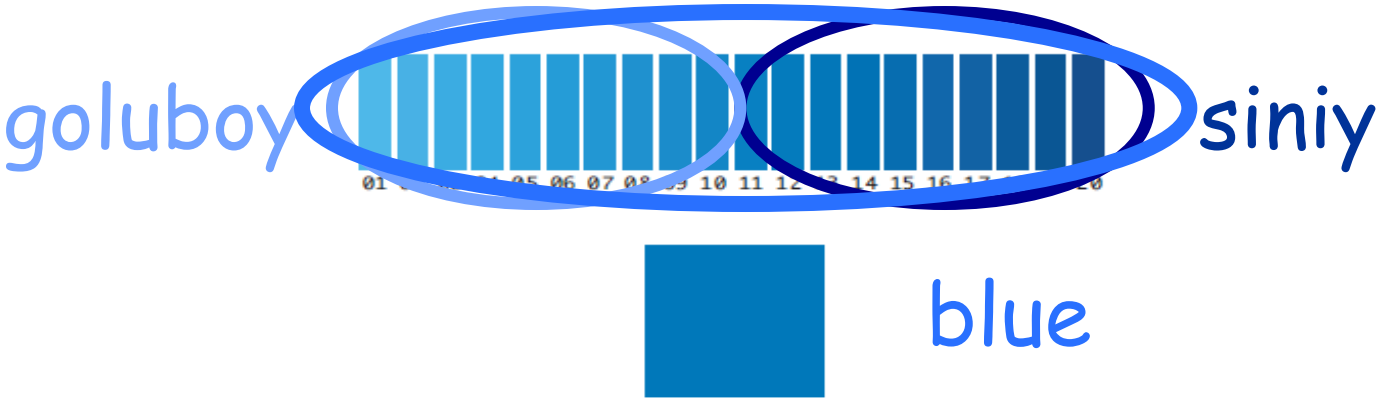


Fig. 1. The 20 blue colors used in this study are shown at the top of the figure An example triad of color squares used in this study is shown at the bottom o the figure. Subjects were instructed to pick which one of the two bottom squares matched the color of the top square.

Colour Perception
Winawer et al., PNAS (2007)

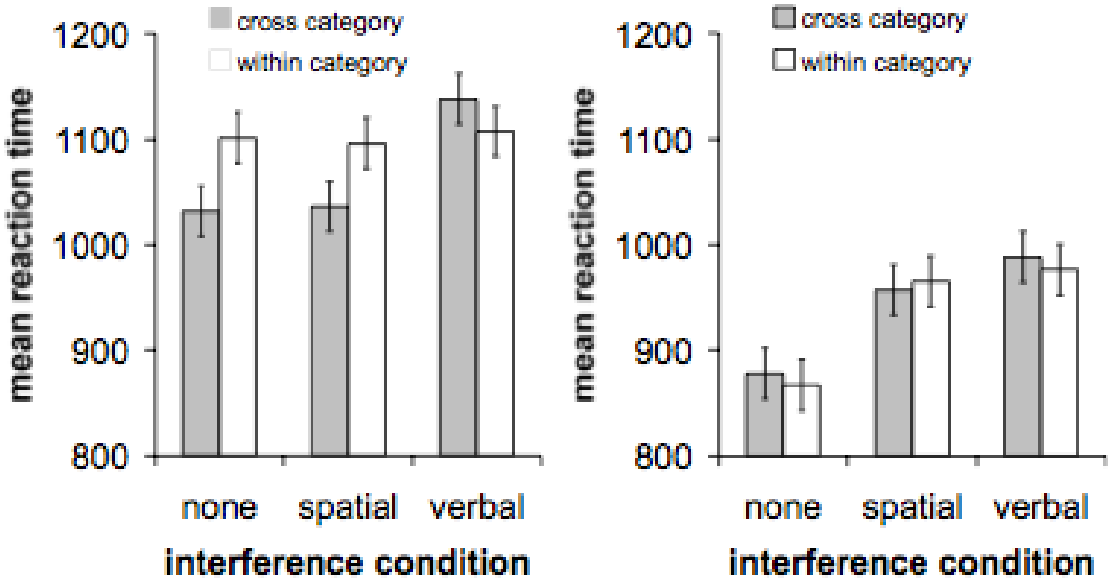


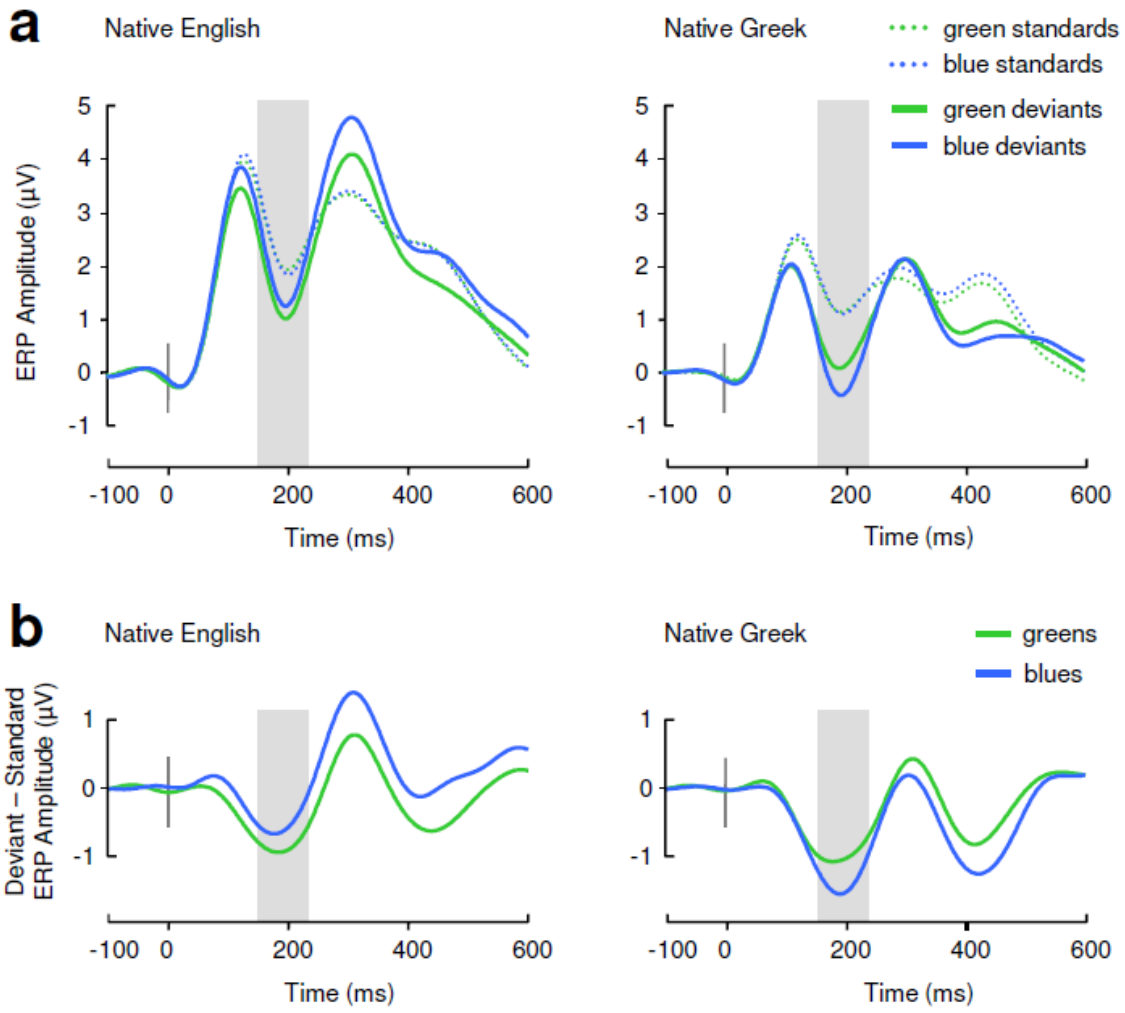
Fig. 2. Russian speakers' (*Left*) and English speakers' (*Right*) reaction times (msec) shown for the no-interference, spatial-interference, and verbal-interference conditions. Both near-color and far-color comparisons are included in these graphs. Error bars represent one SE of the estimate of the two-way interaction between category and interference condition.

Language affects perception but not always!

Colour Perception
Thierry et al., PNAS (2009)

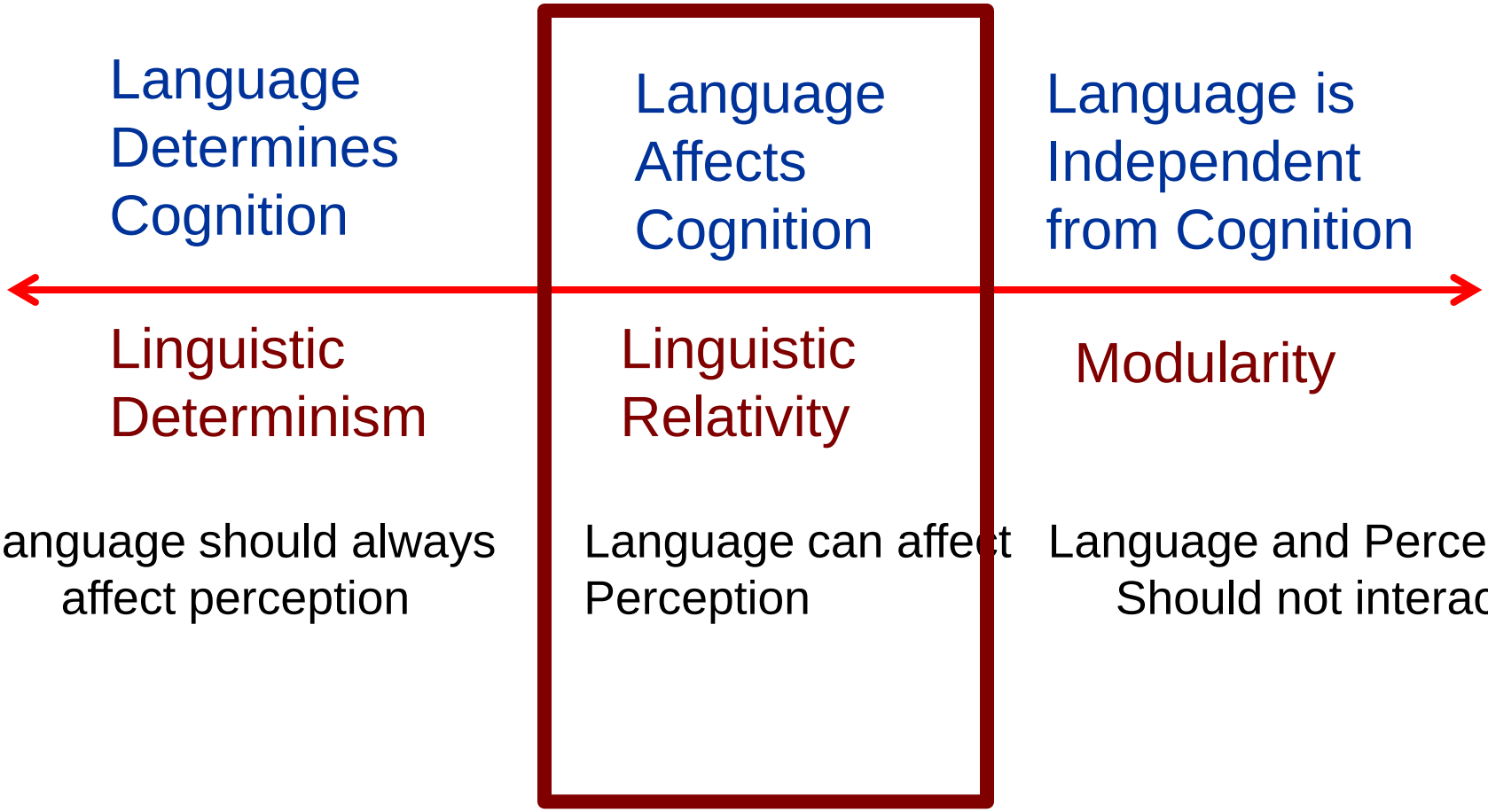
Greek: lighter blue = *ghalazio*; darker blue = *ble*
English: same word = *blue*
Using Mismatch Negativity to look for <u>preattentive</u> effects of language

Colour Perception
Thierry et al., PNAS (2009)



Language affects perception in very immediate ways

Testing Hypotheses:
The case of visual perception



Linguistic Relativity (not determinism) effects across domains

Lexical differences: language may have or not words to refer to certain referents

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Future Time Reference
Chen, American Economic Review, 2013

Languages can be divided between:

- **Strong Future Time Reference Languages**: those that always mark future tense (e.g., French, English)

- **Weak Future Time Reference**: those that can use present tense for future events (e.g., German)

e.g., it rains today, it will rain tomorrow

TED talkhttp://www.ted.com/talk/keith_chen_could_your_language_affect_your_ability_to_save_money.html

Future time reference
Chen, American Economic Review, 2013

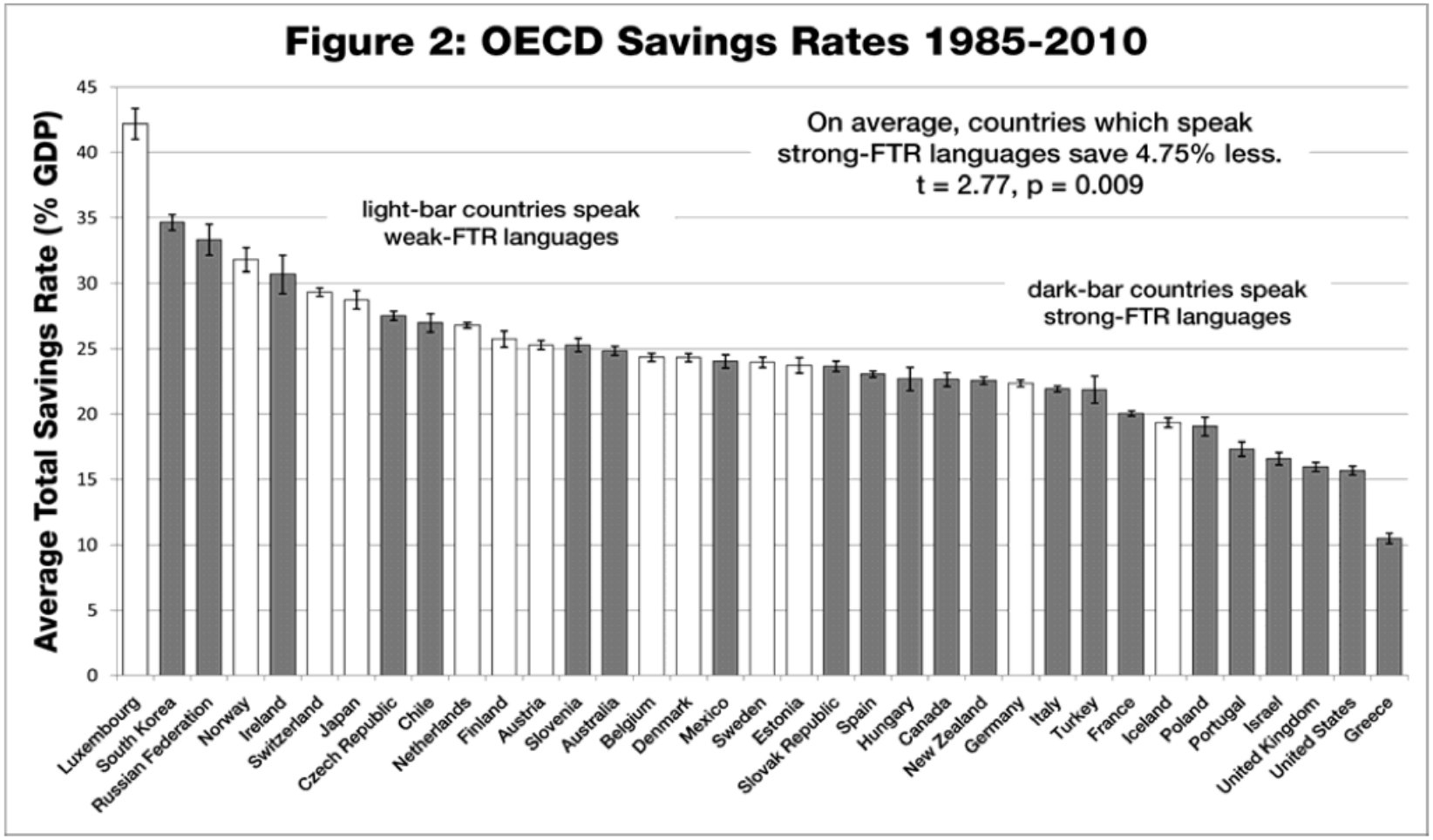

Figure 2 shows average total savings rates, accounting for both private and government consumption. Both Switzerland and Belgium have significant within-country FTR variation; for simplicity they are shaded according to their majority-FTR status. Difference in means are computed using a OLS regression where observations are clustered at the country level.

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Language can affect cognition