

Human Language

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Why do we have language?

You tell me :)

Why do we have language?

- Some ideas:
 - Communication is important for survival (sharing information about food and threats), therefore it evolved over time for that very social purpose (**domain-specific**)
 - Cognition happens inside the mind, so language evolved to allow us to think better for ourselves, ultimately turning into a language that could be used socially as well
 - Our cognition got extremely advanced in general; because it was so advanced, eventually language kind of just... came around (**domain-general**)

How did we get here?

- There are other communication systems in the animal communication world, and specifically in the primate communication world
 - *Protolanguage* – an intermediate stage in between what animals (still) do and what we do today
 - Perhaps ~1.6m years ago
 - Labels are attached to concepts, but no grammar or syntax
- One idea: it emerged entirely vocally, from grunts to words
- Another: gesture came first, and eventually this system expanded to include vocalizations, too
 - (maybe this is why humans are both left-hemisphere dominant for language and right-handed dominant)
 - Apes do make spontaneous gestures more often than vocalizations

What is language?

- Design features approach: there are specific properties that spoken human language has, and the way to define language is through this checklist:

Design Features

- Vocal-auditory channel
- Broadcast transmission, directional reception
- Rapid fading
- Interchangeable (speaker/hearer)
- Complete feedback
- Specialization (energy/volume doesn't change the meaning)
- Semanticity
- Arbitrariness
- Discreteness
- Displacement
- Openness
- Tradition (cultural)
- Duality of patterning (combine meaningless segments into meaningful ones)
- Prevarication (we can lie/mislead)
- Reflectiveness (communicate about communication)
- Learnability (of another language)

Design Features

- Most (all?) of these are found in animal communication as well
- So what are the ones that really help us distinguish?
 - Properties of complex syntax
 - Combining discrete parts retains the identity of the parts and also creates new meaning
 - Sentences depend on ordering categories (nouns, verbs) in the right way
 - Verbs
 - Content words vs. function words
 - Recursion (embedding a constituent within a constituent of the same type)
 - Open-endedness and the complex syntax above together allow us to communicate about anything
 - It seems like no animals can do that

Design Features

- Some have claimed recursion is the only feature necessary to distinguish human language
 - Plenty disagree with this, noting that there are others that distinguish human language
 - And there is some evidence of human language that does not use recursion (maybe)

At the forefront

Luigi Rizzi*

Monkey morpho-syntax and merge-based systems

Network analysis reveals underlying syntactic features in a vocally learnt mammalian display, humpback whale song

Jenny A. Allen^{1,2}, Ellen C. Garland³, Rebecca A. Dunlop¹ and Michael J. Noad¹

Cultural Transmission, Evolution, and Revolution in Vocal Displays: Insights From Bird and Whale Song

Ellen C. Garland^{1} and Peter K. McGregor²*

Can we teach them?

- Animals seem to be capable of *protolanguage*
 - Dogs can learn the names of many objects
 - And can even use inference to learn new names
 - Parrot(s) can learn and repeat words
 - And can put together sequences
 - And can use words to understand concepts
 - Dolphins can comprehend sequencing
 - WATER RIGHT BASKET FETCH means move [the basket to the right] over to the water pipes
 - RIGHT WATER BASKET FETCH means move any basket over to [the water pipe on the right]

Can we teach them?

- Most of the research has focused on chimpanzees
 - Chimpanzees have demonstrated *cognitive* skills (nonlinguistic) comparable to those of a ~3 year old
 - First attempts to teach them language used vocalizations... which didn't work because chimpanzees have different vocal tracts
 - More progress was made trying to teach gestural signs
 - **Washoe** was brought up like a human child from the age of 1, taught ASL
 - Vocabulary of ~150-200 signs that could be used in strings
 - “baby down” “hug hurry”
 - Sensitivity to word order?
 - “you tickle me” vs. “I tickle you”
 - Some signs passed down to adopted son
 - Nim Chimpsky taught ASL as well, learned many signs and 2-sign utterances

Can we teach them?

- Many of the design features seemed to be successfully learned
 - Displacement, discreteness, reflectiveness, cultural transmission
 - Some understanding of basic syntax?
- but
- Methodological concerns
 - Claims that trainers overinterpret produced signs
 - Incomplete corpora
- Doubts of creativity
 - Mostly imitation and cued behavior?
 - Just complex associations, not actual learning of syntax
 - Back to the cognitive vs linguistic question
 - Limited utterance length, heavy repetition, rare spontaneity, non-displaced topics
- Behavior \neq thinking

Can we teach them?

- Later research has pivoted to bonobos (mostly from one specific lab)
 - More intelligent, more social, more communicative
 - Taught a lexigram-based system
 - And exposed to English via trainers



Can we teach them?

- Kanzi the bonobo learned ~50 symbols, produced ~800 combinations
 - Sensitive to word order, understood differences between verbs (e.g., “get” vs “take”)
 - High rate of spontaneous (unprompted, nonimitated) productions
 - Perhaps success comes from early exposure, like it does for humans
- Still no evidence of grammatical complexity, morphology, function words, etc.
- Plenty of doubts about both semantic and syntactic knowledge in primates

Can we teach them?

Recent Use of Signs by Chimpanzees (*Pan Troglodytes*) in Interactions With Humans

Esteban Rivas
Nijmegen University

In light of the controversy about the linguistic properties of chimpanzee signing behavior, the recent sign use of 5 chimpanzees (*Pan troglodytes*) with long histories of sign use was analyzed while they interacted with longtime human companions. Four corpora from 1992 to 1999 consisting of 3,448 sign utterances were examined. The chimpanzees predominantly used object and action signs. There was no evidence for semantic or syntactic structure in combinations of signs. Longer combinations showed repetition and stringing of object and action signs. The chimpanzees mostly signed with an acquisitive motivation. Requests for objects and actions were the predominant communicative intentions of the sign utterances, though naming and answering also occurred. This recent sign use shows multiple differences with (early) human language.

Why does it matter?

- Important for theories of language acquisition
- If animals can legitimately learn language, that effectively rules out theories that claim there's a uniquely-human language-specific acquisition device (e.g., Chomsky's Language Acquisition Device)
- If animals cannot, perhaps the answer lies in such an acquisition device
 - Or perhaps there are other explanations
- Significant gap between production and comprehension

Language and thought

- What is the relationship between language and thought?
 - Extreme view: **linguistic determinism** (Sapir-Whorf hypothesis)
 - The language you speak determines the way you think
 - Moderate view: **linguistic relativism**
 - The language you speak influences the way you think
 - Skeptical view: **thinking for speaking**
 - The language you speak winds up being associated with the way that you think

Language and thought

- No need to engage with the idea that thought is impossible without language
 - Animals, pre-linguistic children, individuals with brain damage, etc.
- What we can discuss is the nature of that relationship

Language and thought

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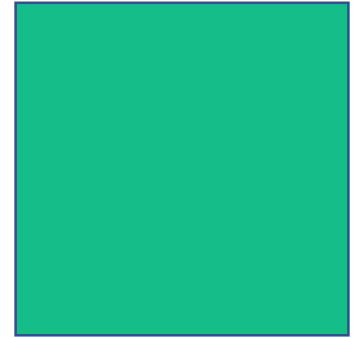
Language and thought

- Lots of research has investigated the language/thought relationship through **color**
- Why might this be the case?
- Languages differ in color terms
- The color space is objectively manipulable

Language and thought

- English and Tarahumara have different color terms
 - English *blue* and *green*
 - Tarahumara *siyo-name*
- Speakers of both languages asked to identify the odd one out (Kay & Kempton, 1984)
- English speakers exaggerate the difference between 2 & 3 compared to Tarahumara speakers

1



2



3



Language and thought

- English and Tarahumara have different



JOURNAL ARTICLE

- English
- Tarahumara

Tarahumara Color Modifiers: Category Structure Presaging Evolutionary Change

- Speakers to identify & Kemp

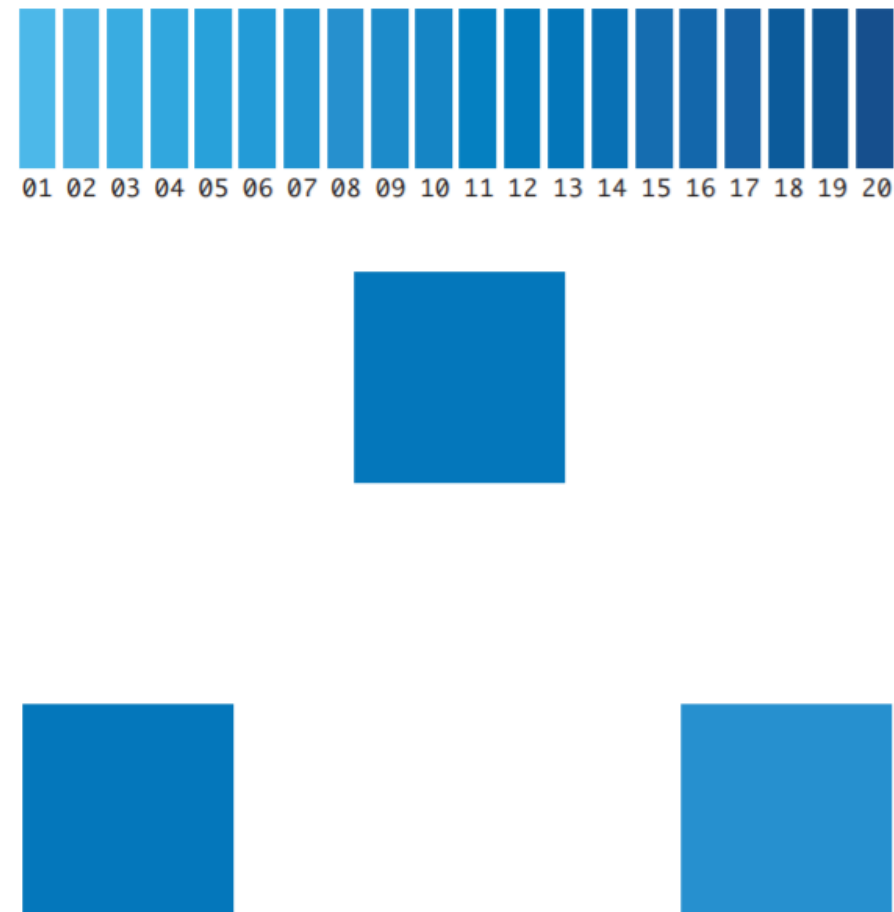
Don Burgess, Willett Kempton, Robert E. Maclaury.

American Ethnologist, Vol. 10, No. 1 (Feb., 1983), pp. 133-149 (17 pages)

- English speakers exaggerate the difference between 2 & 3 compared to Tarahumara speakers

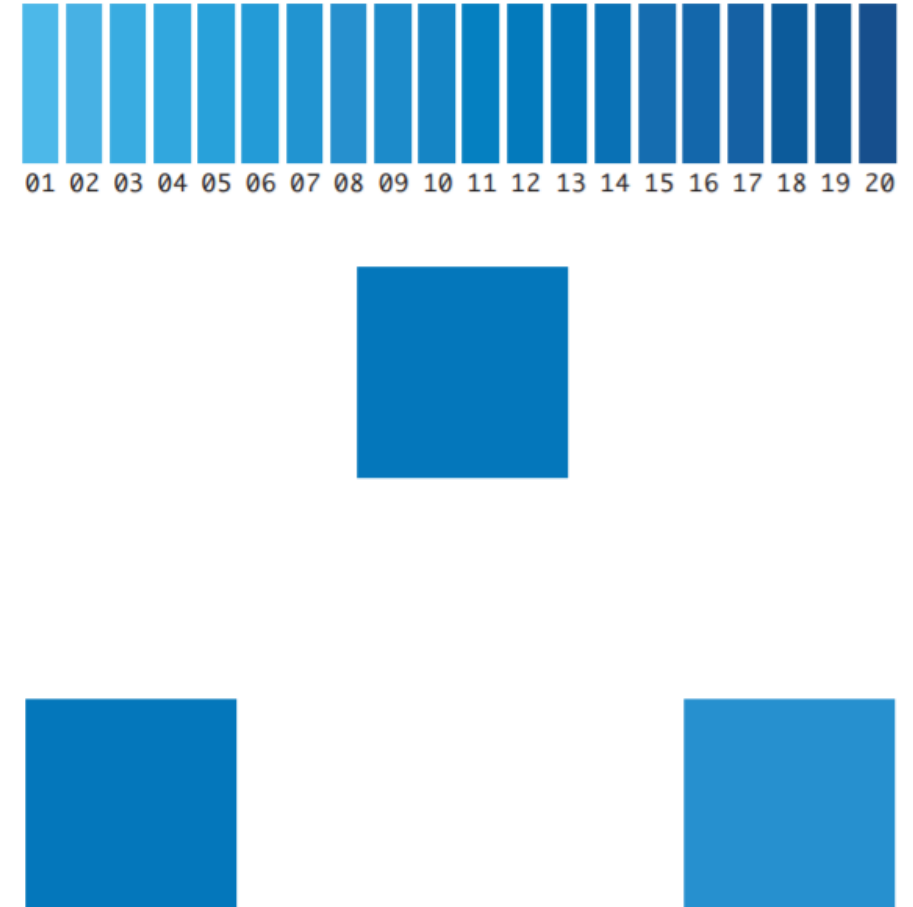
Language and thought

- English and Russian have different color terms
 - Russian *goluboy* and *siniy*
 - English *blue*
- Russian speakers faster at making the matching decision than English speakers (Winawer et al. 2007)
- And this difference is detectable neurally (Thierry et al. 2009)



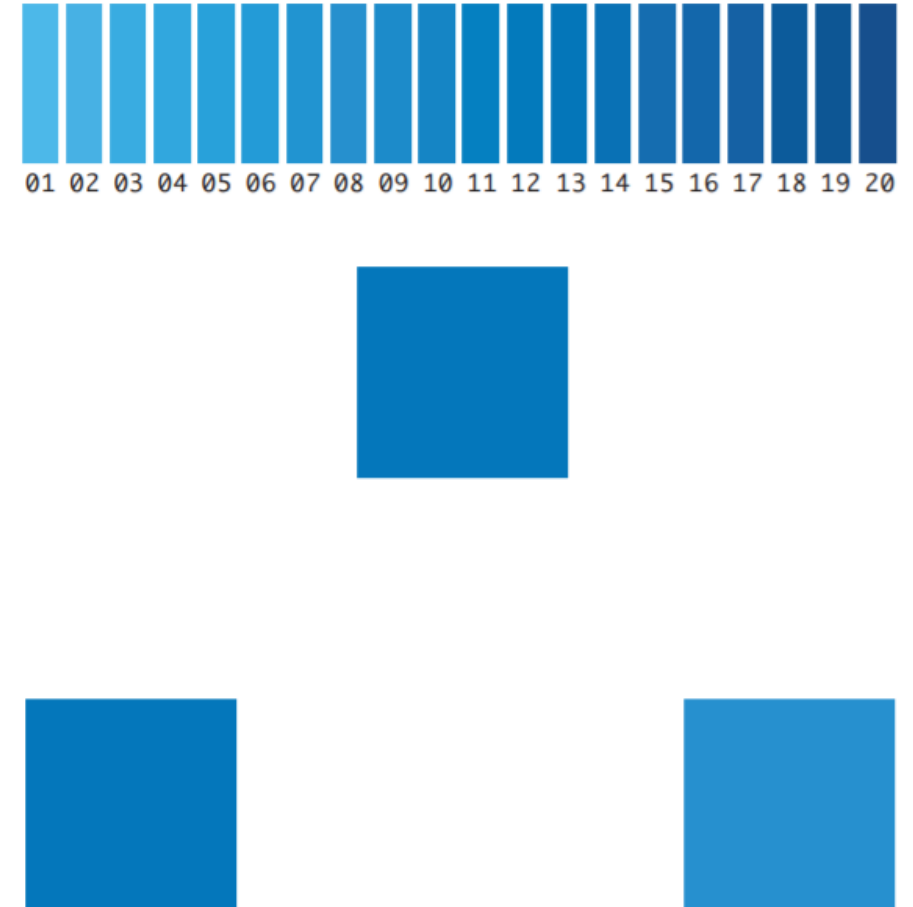
Language and thought

- Caveats!
- If participants were given an 8 digit number to remember, then performed the color-matching task, then repeated the number, there was no Russian/English difference
- Why might this be?



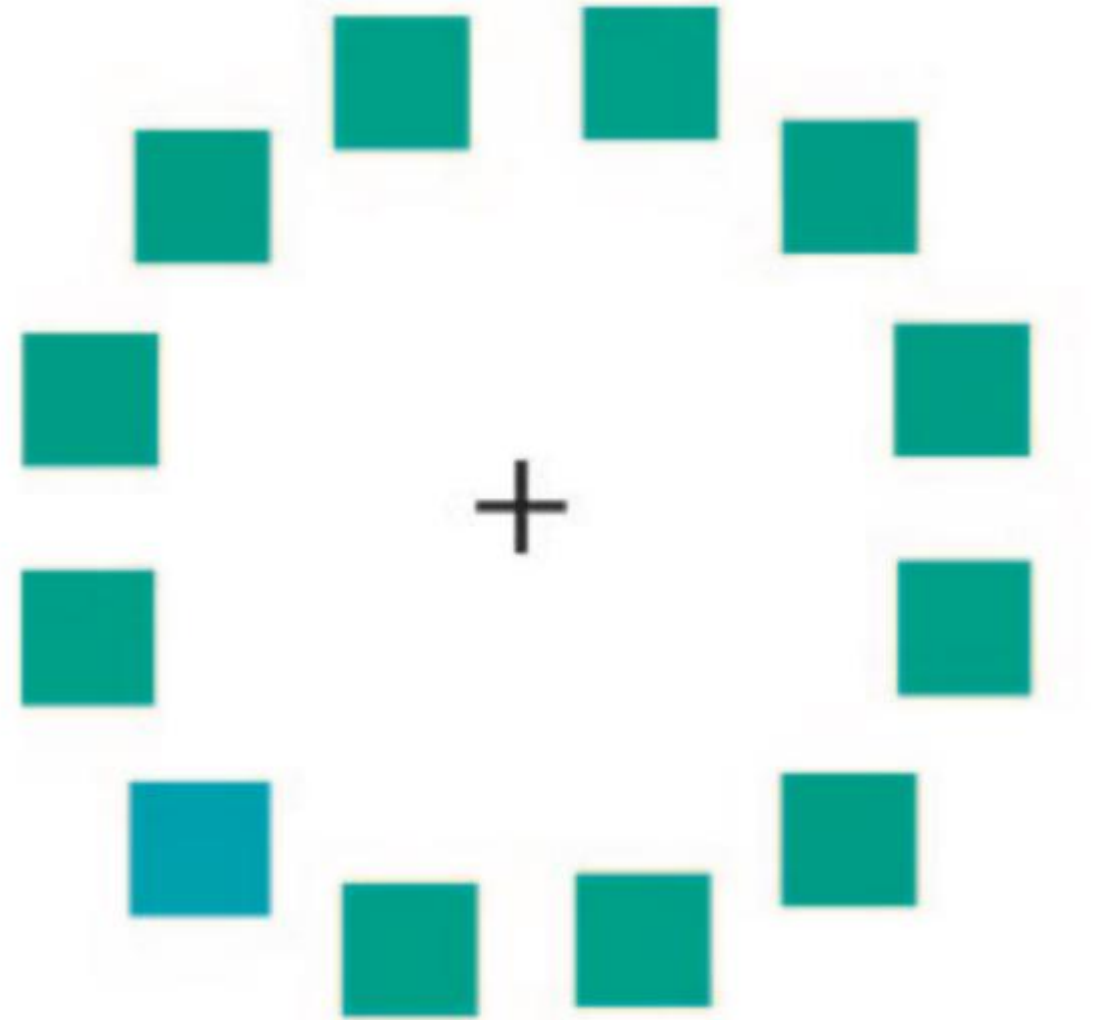
Language and thought

- Caveats!
- If participants were given a spatial grid pattern, then performed the color-matching task, then recreated the spatial grid pattern, there was a significant Russian/English difference
- Why might this be?



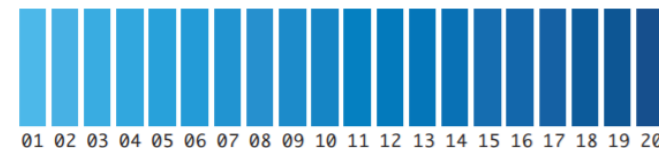
Language and thought

- Caveats!
- If an array like → was shown to participants' left eye, there was no color category boundary boost; if it was shown to participants' right eye, there was a color category boundary boost (Gilbert et al., 2006)
- Why might this be?

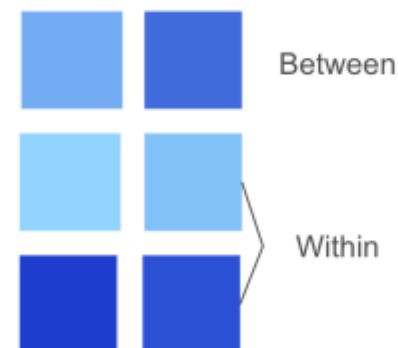


Language and thought

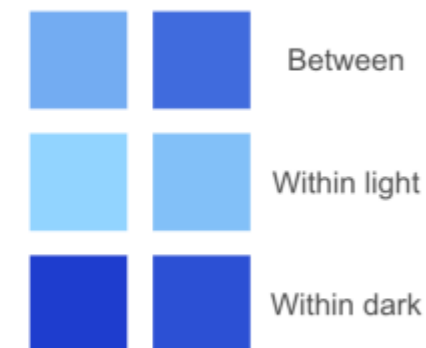
- Caveats!
- A reanalysis of the original 2007 Russian vs. English data found that the original finding was probably inaccurate as well (Chen et al., 2023)
 - Original data compares *between* vs. *within*
 - New analysis compares *between* vs. *within-light blue* vs. *within-dark blue*
 - Only one actually longer



Categories in Winawer et al. (2007)



Categories proposed in this paper



Language and thought

- Thinking for speaking (Slobin, 1996)
- The language that we speak doesn't permanently and necessarily change the way we think and see the world
- Instead, we learn to use language for thought
- Effects of language on thought manifest when we use language for thought
 - Which winds up being most of the time, since that's how we learn to do it!
- If we can find clever ways to “block” the use of language, the effect goes away

Discuss

- On the next slide, there will be three other categories which, like color terms, can differ between languages
- Come up with a way to test whether the linguistic difference would affect cognition in some way

Discuss

- **Kinship terms** – languages differ in the way they label familial relationships
 - in Hawaiian: one word for *father* and *uncle*, one word for *sibling* and *cousin*
 - in many languages: different words for *father's brother* and *mother's brother*
- **Body parts** – languages differ in the way they label body parts
 - in Jahai: no word for *arm* or *leg*, instead *upper arm*, *lower arm*, *hand*
 - in Lavukaleve: one word for both *arm* and *leg* (like *limb*)
 - in many languages: one word for both *finger* and *hand*; one word for *lower arm* and *hand*
- **Mental states**
 - English distinguishes between *mind* and *heart*, some languages have one word for both of these
 - Malay has no neutral word for *surprise*, only a negative version
 - English has one verb meaning *to know*, some languages have two: knowing information vs. being familiar with someone/some place