Cognitive Diversity

BCS 153, Spring 2018
WEIRD populations  
(Henrich, Heine, Norenzayan)

- Typical sample in psychology studies:
  - Western
  - Educated
  - Industrialized
  - Rich
  - Democratic
  - (Other features?)

- Some statistics:
  - 68% of subjects in studies come from the US
  - 96% are from Western industrialized countries
  - 96% of psychological samples come from 12% of the world’s population
Example: the Pirahã
The Pirahãs

- Key features:
  - Very little contact
  - Isolated
  - No bilinguals
  - Traditional lifestyle
  - Resistant to cultural borrowing
  - Little/no permanent artifacts

- Language
  - Smallest phoneme inventory
  - Possibly no recursive syntax
  - Can be whistled!
The Pirahãs

- **Interesting cognitive features:**
  - No number words, quantifiers, etc.
  - No afterlife (spirits are a funny story)
  - No origin myths
  - Very different system of cultural values (e.g. strong independence – birth story)
Yoon et al.
Figure 2. Müller-Lyer results for Segall et al.’s (1966) cross-cultural project. PSE (point of subjective equality) is the percentage that segment a must be longer than b before subjects perceived the segments as equal in length. Children were sampled in the 5-to-11 age range.
Why are there differences in low-level perception?

- Ideas?
Core knowledge of Geometry in an Amazonian Indigene Group
(Dehaen, Izard, Pica, Spelke, 2006)

• Question: do all humans have geometrical intuitions (think: core knowledge)
  (Even those without schooling?)
Euclidean geometry (84%; □)

- **Straight line**: 93% 19s
- **Curve**: 73% 27s
- **Alignment of points in lines**: 100% 19s
- **Parallel lines**: 66% 30s
- **Secant lines**: 80% 28s
- **Right angle**: 93% 17s
Geometrical figures (79%; △)

- Quadrilateral
- Trapezoid
- Parallelogram
- Rectangle
- Square
- Equilateral triangle
- Right-angled triangle
- Circle
- Convex shape
Symmetrical figures (67%;•)

- Vertical axis (66%; 30s)
- Horizontal axis (50%; 33s)
- Oblique axis (86%; 23s)

Chiral figures (56%;○)

- Vertical axis (86%; 25s)
- Oblique axis (23%; 23s)

Metric properties (62%;○)

- Distance (93%; 20s)
- Equidistance (55%; 20s)
- Increasing distance (45%; 28s)
- Center of circle (68%; 23s)
- Center of quadrilateral (48%; 28s)
- Middle of segment (36%; 32s)
- Fixed proportion (86%; 22s)

Geometrical transformations (35%;△)

- Translation (59%; 20s)
- Homothecy (fixed orientation) (52%; 23s)
- Homothecy (fixed size) (20%; 22s)
- Symmetry (horizontal, vertical or oblique) (41%; 33s)
- Point symmetry (18%; 35s)
- Rotation (25%; 28s)

Topology (76%;◆)

- Inside (93%; 27s)
- Closure (77%; 22s)
- Connectedness (68%; 23s)
- Holes (66%; 34s)
Language

- Prescriptive – how you “should” speak
- Descriptive – how you do speak
- Cognitive science is interested in what people naturally do.
  - This means, grammars, words, processing mechanisms, etc.
  - We are NOT interested in the “rules of grammar” your English teacher uses.
    - These are ill-conceived, not understood, and essentially historical accidents.
    - Read:
      Geoff Pullum's *50 years of Stupid Grammar Advice*
      Steven Pinker's: *The Language Mavens*
Some prescriptive rules

- Don’t split infinitives -- “To boldly go...”
  - This originates from trying to make English like Latin, where infinitive cannot be split because they are marked morphologically.

- No double negatives -- “There ain’t nobody who can...”
  - These “cancel out” right?
  - What about in French? Je ne veux pas...

- Don’t use passive voice: The test was taken by the student..
An example: African American Vernacular English (AAVE)

<table>
<thead>
<tr>
<th>Structure</th>
<th>Urban AAVE</th>
<th>Rural AAVE</th>
<th>Earlier AAVE</th>
<th>Southern EAVE</th>
<th>Northern EAV</th>
</tr>
</thead>
<tbody>
<tr>
<td>copula absence</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>(✓)</td>
<td></td>
</tr>
<tr>
<td>e.g. <em>She nice</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>completive <em>done</em></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>e.g. <em>She done did it</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>negative concord</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>e.g. <em>She didn’t do nothing</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>preverbal indefinite</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>(✓)</td>
</tr>
<tr>
<td>e.g. <em>Nobody don’t like it</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>negative inversion</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>(✓)</td>
<td></td>
</tr>
<tr>
<td>e.g. <em>Didn’t nobody like it</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>ain’t for be + not have + no</em></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>e.g. <em>I ain’t been there</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>regularized <em>was</em> for past <em>be</em></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>e.g. <em>We was there</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>irregular verbs</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>past for participle</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>e.g. <em>I had went</em></td>
<td></td>
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</tr>
</tbody>
</table>

See Wofram (2000)
Language documentation & preservation

- There are about 6,000 languages spoken today
- 3,000 have less than 10,000 speakers
- 417 are considered on the verge of extinction

Why language preservation is important
- Sociological/cultural preservation
- Each language tells us something about cognitive mechanisms
  - The space of possible humans
Studies across languages reveal huge diversity in how they work

- Not all languages have:
  - The same set of speech sounds
  - Fixed word order (like English)
  - Noun-verb distinctions
  - Hierarchical structures
  - Phrasal categories (e.g. Noun Phrase, Verb Phrase)
  - Phonemic orthography
  - Number/quantity words
Relationship between language and thought?

- **Sapir-Whorf hypothesis:**
  - Strong version: the language you speak determines how you think.
  - Weak version: the language you speak influences how you think.

- Some of Whorf's illustrations...
ENGLISH
"CLEAN" "WITH" "RAMROD"

THE THREE ISOLATES FROM EXPERIENCE OR NATURE USED IN ENGLISH TO SAY "I CLEAN IT (GUN) WITH THE RAMROD."

SHAWNEE
"PEKW" (DRY SPACE) "ALAK" (INTERIOR OF HOLE) "H" (BY MOTION OF TOOL, INSTRUMENT)

THE THREE ISOLATES FROM EXPERIENCE OR NATURE USED IN SHAWNEE TO SAY "NIPÉKWÁLKHA", MEANING "I CLEAN IT (GUN) WITH THE RAMROD."

HOPI - ONE WORD (MASA'YTAKA)
ENGLISH - THREE WORDS

ENGLISH - ONE WORD (SNOW)
ESKIMO - THREE WORDS

HOPI - PÄHE
ENGLISH - ONE WORD (WATER); HOPI - TWO WORDS
<table>
<thead>
<tr>
<th>OBJEKTIVE FIELD</th>
<th>SPEAKER (SENDER)</th>
<th>HEARER (RECEIVER)</th>
<th>HANDLING OF TOPIC, RUNNING OF THIRD PERSON</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITUATION 1a.</td>
<td></td>
<td></td>
<td>ENGLISH... &quot;HE IS RUNNING&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HOPI... &quot;WARI&quot; (RUNNING, STATEMENT OF FACT)</td>
</tr>
<tr>
<td>SITUATION 1b.</td>
<td></td>
<td></td>
<td>ENGLISH... &quot;HE RAN&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HOPI... &quot;WARI&quot; (RUNNING, STATEMENT OF FACT)</td>
</tr>
<tr>
<td>OBJECTIVE FIELD BLANK DEVOID OF RUNNING</td>
<td></td>
<td></td>
<td>ENGLISH... &quot;HE IS RUNNING&quot;</td>
</tr>
<tr>
<td>SITUATION 2</td>
<td></td>
<td></td>
<td>HOPI... &quot;WARI&quot; (RUNNING, STATEMENT OF FACT)</td>
</tr>
<tr>
<td>SITUATION 3</td>
<td></td>
<td></td>
<td>ENGLISH... &quot;HE RAN&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HOPI... &quot;ERA WARI&quot; (RUNNING, STATEMENT OF FACT FROM MEMORY)</td>
</tr>
<tr>
<td>SITUATION 4</td>
<td></td>
<td></td>
<td>ENGLISH... &quot;HE WILL RUN&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HOPI... &quot;WARIKNI&quot; (RUNNING, STATEMENT OF EXPECTATION)</td>
</tr>
<tr>
<td>SITUATION 5</td>
<td></td>
<td></td>
<td>ENGLISH... &quot;HE RUNS&quot; (E.G. ON THE TRACK TEAM)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HOPI... &quot;WARIKNGWE&quot; (RUNNING, STATEMENT OF LAW)</td>
</tr>
</tbody>
</table>

Figure 11. Contrast between a “temporal” language (English,) and a “timeless” language (Hopi). What are to English differences of time are to Hopi differences in the kind of validity.
Fig 1. Results of cross-language surveys. Top panels: Library survey. (a) Locations associated with 13 languages that use the same term for ice and snow, and (b) 37 languages that use different terms. (c) Temperatures associated with the locations shown in (a) and (b). Bottom panels: IDS+ data. (d) Locations associated with 21 languages that use the same term for ice and snow, and (e) 145 languages that use different terms. (f) Temperatures associated with the locations shown in (d) and (e). Map data for this and all subsequent figures are from naturalearthdata.com.