What 50 Million Drawings Can Tell Us About Shared Meaning

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How to interrogate shared meaning?

"bread"

Drawings as a window into meaning

QUICK, DRAW!

50M drawings across 345 categories (*N* = 15M)

quickdraw.withgoogle.com

Quantifying Similarity

Hausdorff Distance — drawing similarity as the maximum Euclidean distance between two sets of points (Huttenlocher, Klanderman, & Rucklidge, 1993).

Measure Validation:
- 1500 drawing pairs from two categories
- 20 pairs from each decile of similarity/item
- Rated for similarity on 7-pt. Likert Scale
- Each participant (*N* =100) rated 50 drawing pairs
- Human judgements highly correlated with Hausdorff Distance (*r* = .29; *p* < .001)

Hausdorff Distance Quintile
1
2
3
4
5
6
7
8
9
10
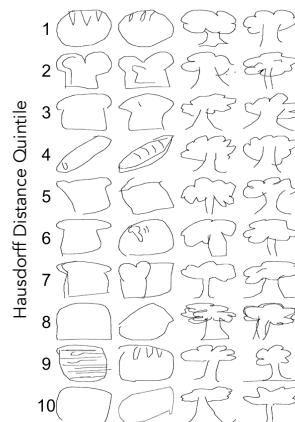
Cross-Cultural Variability in Drawings
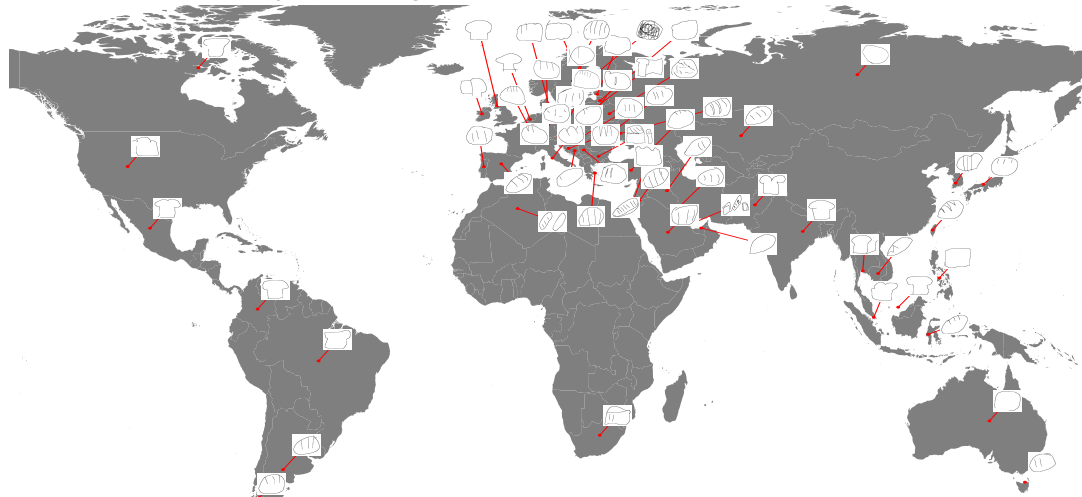
Predicting Drawing Variability with Language

Drawing Similarity:
- 50 drawings from each of 39 countries
- Items from 4 categories: food (e.g., "cake"), weather ("cloud"), artifact (e.g. "key"), place (e.g. "jail")
- For each country pair, calculated mean drawing similarity for each category.

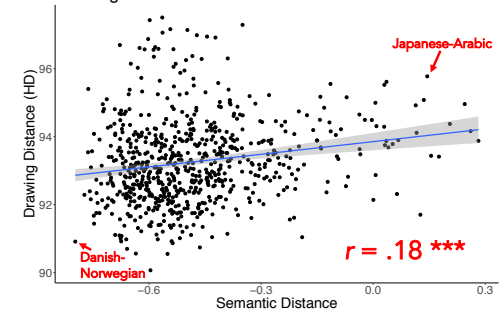Independent Cultural Similarity Measures:
- Lexical semantics – Alignment from word embedding models (Bojanowski et al., 2016)
- Lexical forms – ASJP distance (Bakker, et al., 2009'Dediu, in press)
- Grammar – WALS distance (Dediu, in press)
- Physical distance

Semantics predict independent variance in drawing distances, suggesting speakers of semantically more similar languages have more similar non-linguistic representations.

Next: What properties characterize these differences?

Drawing Distance vs. Semantic Distance

Japanese-Arabic

Drawing Distance (HD)

96

94

92

90

Danish-Norwegian

r = .18 ***

−0.6   −0.3   0.0   0.3
Semantic Distance

What predicts drawing similarity?

Standardized Regression Coefficient

0.4

0.2

0.0

−0.2

All | Food | Weather | Artifact | Place

Semantic ASJP WALS Physical

Distance Measure