Understanding Cross Cultural Expectations: Assessing Cultural Similarity Using Affective Meaning

Jonathan H. Morgan[1], Bryan C. Cannon[2], and Brent H. Curdy[3]

Fachhochschule Potsdam, Institute for Urban Futures[1]

Franklin & Marshall College, Sociology Department[2]

Duke University, Sociology Department[3]

The meanings of concepts and the associations between them vary across cultures. These understandings impact the ways actors interact within their culture, but also cross-culturally. Affect control theory has long sought to examine the ways we interact based on the affective meanings we assign concepts like identities and behaviors within a given culture. Recent data collection efforts and advancements in the theory have pushed researchers to consider cross-cultural interactions and differences in meanings. Part of this effort has focused primarily on gaining a better understanding of how we process different events and how these differences in processing impact the ongoing definition of the situation. However, this only presents one side of the issue. What still requires examination are the patterns of dimensional associations that influence the baseline expectations of a culture. Such an analysis requires creating a pairwise distance/similarity score at the concept level. Methods to determine such scores include:

- Rank order correlations
- ANOVA and/or t-tests
- Angular cosine similarity

These different methods all have potential positive and negative attributes when used for the purpose of comparing sentiment data. Here we compare different methods for looking at pairwise similarities across 4 data sets.

Measuring Cultural Differences: Four Comparisons

- US Surveyor/US MTurk
- Egypt Surveyor/Morocco Surveyor
- US Surveyor/Morocco Surveyor
- US Surveyor/Egypt Surveyor

Core Questions

1. How much agreement/disagreement is there across cultural sentiment dictionaries?
2. Where do more agreements/disagreements occur?
3. How does this vary across methods?
4. What are the benefits/costs of different methods for measuring cultural similarity/dissimilarity at the sentiment level?

Standard Methods of Comparison

Kendall Rank Order Correlations

Pros

- Easily Implemented
- Easy to Interpret

Cons

- Reliant on mean aggregation
- Focuses on rank instead of actual ratings.

Table 1. Kendall Rank Order Correlations.

Comparison	E	P	A
U.S. /U.S.	0.88	0.81	0.74
U.S./Egypt	0.65	0.47	0.23
U.S./Morocco	0.67	0.49	0.34
Egypt/Morocco	0.80	0.74	0.64

Note: All correlations are significant.

ANOVA Models

Pros

- Easy to implement
- Readily understood
- Common method

Cons

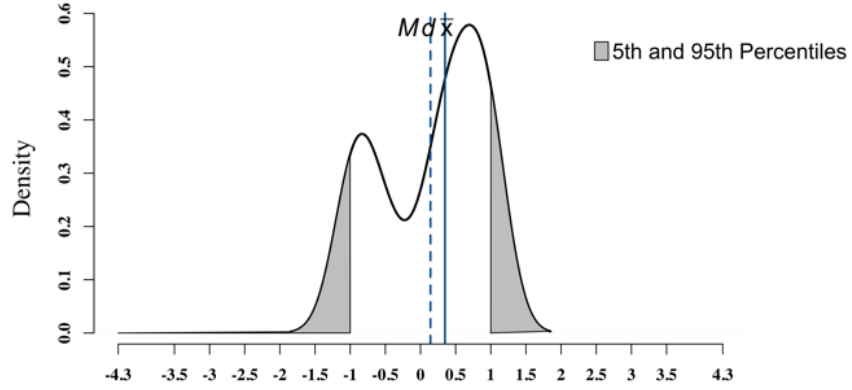
- Assumptions regarding distribution
- Reliant on mean aggregation
- Repeated tests

Table 2. ANOVA Percent Significant Differences.

Comparison	1	2	3
U.S. /U.S.	4.10	0.30	0
U.S./Egypt	33.14	8.84	1.18
U.S./Morocco			
Egypt/Morocco	1.62	0.10	0

The Distribution Assumption Problem

Figure 1: Potency Distribution of the Concept (*To Abuse*).



Cosine Similarity as an Alternative and Solution

Calculations

$$\text{similarity} = \cos(\theta) = \frac{\mathbf{A} \cdot \mathbf{B}}{\|\mathbf{A}\|\|\mathbf{B}\|} = \frac{\sum_{i=1}^{n} A_i B_i}{\sqrt{\sum_{i=1}^{n} A_i^2}\sqrt{\sum_{i=1}^{n} B_i^2}},$$

$$angular\ distance = \frac{2 * cos^{-1}(cosine\ similarity}{\pi}$$

$$angular\ similarity = 1 - angular\ distance$$

Pros and Cons

Pros:

- Not reliant on mean aggregation
- No distribution assumptions
- No repeated test adjustments

Cons

- More complex implementation
- No established significance criterion

Cross-Sample Comparisons

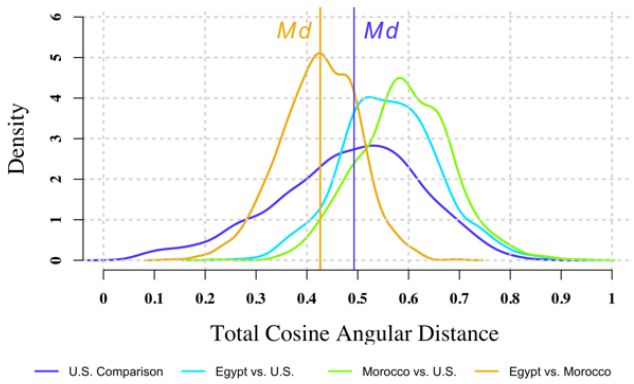


Figure 2: Total Pairwise Distance Distributions.

Pairwise Comparisons

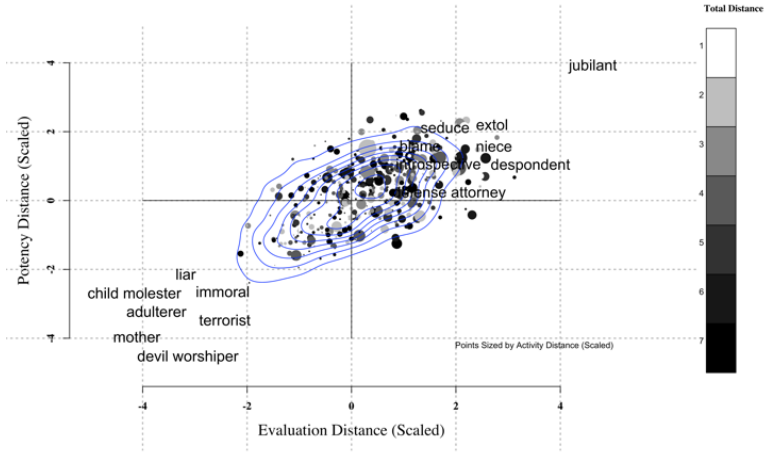


Figure 3: Concepts with Respect to Pairwise Distance in E, P, and A.

Comparing Methods

Sample Comparison of Methods – Egypt and Morocco

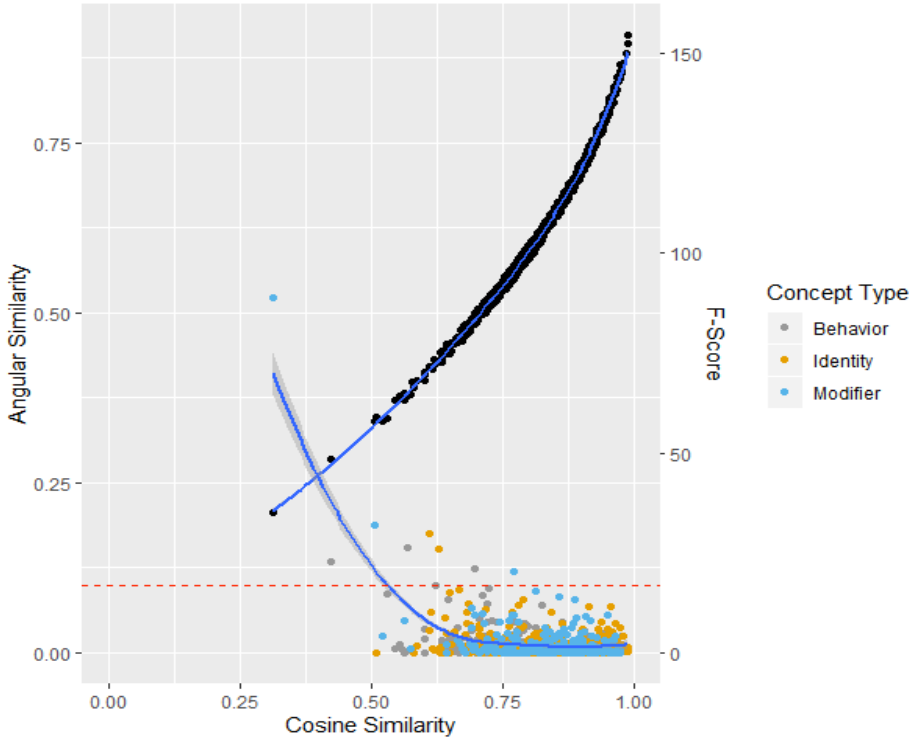


Figure 4. Measurement Alignment on Evaluation (Egypt/Morocco).

Core Findings

- Angular cosine similarity measures provide a way to compare across samples/sub-samples that provides more detailed information and avoids the issues related with previous methods for examining similarity and dissimilarity between populations in sentiment data.
- Angular similarity provides a measure that is, broadly inverse of that provided by a F-Score value from an ANOVA model without the necessity of diluting the significance of potential differences due to repeated testing (e.g., Bonferroni corrections for ANOVAs).
- Angular similarity provides a more sensitive measure compared to ANOVA models.
- We find more similarity in the affective meanings when comparing the two different countries that share a single language culture than we see when looking at within-US studies and particularly more similarity than when compared to comparisons across both nation and language.

Next Steps and Future Applications

This model provides new opportunities to examine cross-cultural and sub-cultural differences. Angular similarity provides a more robust method to measure the similarity of and associations between concepts. In combination with BayesACT, we can begin to think of concepts as occupying affective spaces rather than points, with the range and concentrations in that space conditioning interaction opportunities. For example, concepts with broader meanings provide more flexibility in interactions, but also do not have the same power to set expectations. This approach allows us to explore important cultural tensions reflected in sentiment distributions (e.g., the willingness to attribute power to negatively evaluated concepts) that likely demarcate cultural boundaries.