Landscape and Spatial Reference: Variation across three communities of Isthmus Zapotec speakers

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Introduction

• How does local landscape influence descriptions of small-scale space?
  • Combine large-scale data analysis of spatial reference practices in discourse
  • With ethno.physiographic studies
Background

- Huge variation in preferred use of **spatial reference frames**
  - Strategies for locating or orienting objects
  - Vary by what anchors the reference frame
    - Speakers’ bodies
    - Environmental features
    - The objects themselves
Reference frame use in small-scale horizontal space across languages (Bohnemeyer & Levinson ms.)
Background

• Debate over source of variation, or what influences frame use
  • Is it individuals’ levels of education/bilingualism/literacy, their local landscape or community size? (Li & Gleitman 2002; Li et al 2011)
  • OR is it the cultural practices and first language that enable convergence of a community on a preferred strategy? (Pederson et al 1998; Levinson 2003; Levinson et al 2002; Bohnemeyer et al 2014, 2015)
The Current Study

• Combine quantitative and qualitative methods
• Large-scale analysis of spatial reference practices in discourse
  • 40 pairs of speakers per community, allowing for analysis of multiple predictor variables
• Ethnophysiographic study of landscape
  • Listing task shows what’s salient to people in each community
The Current Study: Isthmus Zapotec

- Zapotecan branch of Otomanguean language family
- Verb-initial; Tonal Language
- ~100,000 speakers
- High rate of bilingualism in Spanish
- Unique for Zapotec languages
  - Many speakers over a range of communities
  - Allowed for by the topography of the Isthmus of Tehuantepec (vs. Oaxaca)
3 communities of Isthmus Zapotec speakers

- Isthmus of Tehuantepec, Oaxaca, Mexico
  - La Ventosa
  - Juchitán de Zaragoza
  - Santa María Xadani
La Ventosa

- Subject to particularly strong North-South “Tehuano” winds
- Pop.: 4,884 (INEGI 2010)
Juchitán de Zaragoza

- Urban center of the Isthmus
- Most of data collected in Cheguiigu ‘across the river’
- Pop. I: 74,825 (INEGI 2010)
Santa María Xadani

- On the Laguna Superior; Salient hill situated in the middle of town
- Town name: zha’na-dani means ‘bottom-hill’
- Pop. l: 7,613 (INEGI 2010)
Describing small-scale space: Talking Animals

- Pairs of speakers describe three-dimensional objects in small-scale space
  - Referential communication task (Clark & Wilkes-Gibbs 1990)
- Used to elicit spatial reference frames
SPATIAL REFERENCE FRAMES

• Strategies for locating or orienting objects
  • Relative (speakers' bodies)
  • Geocentric (environmental features)
  • Intrinsic (objects themselves)
Talking Animals Spatial Descriptions

Percentage of Stimuli Described by Frame Type

- **La Ventosa**
  - Average of Geocentric: 93%
  - Average of Relative: 8%

- **Juchitán**
  - Average of Geocentric: 78%
  - Average of Relative: 17%

- **Xadani**
  - Average of Geocentric: 79%
  - Average of Relative: 13%
What predicts frame use?

• Generalized linear mixed-effects models (lme4 package, R) test influence of
  • Community membership
  • Use of Spanish as a second language
  • Education Level
  • Frequency of reading or writing
  • (Population density)
  • (Topography)
Results of Predictive Models

• Geocentric frame use
  • Predicted by Community membership ($p<0.0125$)

• Relative frame use
  • (approaching significance)
Talking Animals Spatial Descriptions: A closer look at Geocentric frame usage

<table>
<thead>
<tr>
<th>Community</th>
<th>Average of Absolute</th>
<th>Average of Landmark-based</th>
</tr>
</thead>
<tbody>
<tr>
<td>La Ventosa</td>
<td>91%</td>
<td>6%</td>
</tr>
<tr>
<td>Juchitán</td>
<td>44%</td>
<td>46%</td>
</tr>
<tr>
<td>Xadani</td>
<td>22%</td>
<td>62%</td>
</tr>
</tbody>
</table>
The need for Ethnophysiography (and qualitative data in general)

- We've seen
  - Community membership is a significant predictor of Geocentric frame use
  - Variation exists in type of Geocentric frame preferred in each community
- Why do these communities differ?
  - Ethnophysiography helps find the answer
Ethnophysiography: Listing task

• Speakers asked (in Zapotec) to name things that are “part of the environment, like ‘hill’, ‘river’, and ‘forest’”
• 10 speakers per community
• Responses reflect the local landscape of each community
  • The strong wind (a physiographic cue) in La Ventosa
  • The nearby ocean in Xadani
  • A general lack of salient landscape features in urban Juchitán
### Word list data
(prompt words in grey)

<table>
<thead>
<tr>
<th>La Ventosa</th>
<th>Juchitán de Zaragoza</th>
<th>Santa María Xadani</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yaga ‘tree’ (13)</td>
<td>Yaga ‘tree’ (12)</td>
<td>Nisa do’ ‘sea’ (10)</td>
</tr>
<tr>
<td>Dani ‘hill’ (13)</td>
<td>Guiigu ‘river’ (9)</td>
<td>Dani ‘hill’ (9)</td>
</tr>
<tr>
<td>Bi ‘wind’ (12)</td>
<td>Dani ‘hill’ (9)</td>
<td>Guiixhi ‘forest/jungle’ (7)</td>
</tr>
<tr>
<td>Mani ‘animal’ (9)</td>
<td>Mani ‘animal’ (8)</td>
<td>Ranya ‘milpa’ (6)</td>
</tr>
<tr>
<td>Nisa ‘water’ (7)</td>
<td>Yuu ‘house’ (5)</td>
<td>Guiigu ‘river’ (6)</td>
</tr>
<tr>
<td>Guiigu ‘river’ (7)</td>
<td>Nisa ‘water’ (5)</td>
<td>Bize ‘well’ (6)</td>
</tr>
<tr>
<td>Nisa do’ ‘sea’ (5)</td>
<td>Guixi ‘trash’ (5)</td>
<td>Esteru ‘marsh/swamp’ (5)</td>
</tr>
<tr>
<td>Guie ‘rock/soil’ (5)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What influences frame use?

• In this study, statistical analysis of frame use in discourse (Talking Animals) shows that community membership predicts a preference for Geocentric
  • Previous crosslinguistic studies show similar findings (Bohnemeyer et al 2014, 2015)
• Within Geocentric, we see a more nuanced picture of how community membership is working
  • Speakers in La Ventosa strongly prefer Absolute vs. other communities
• Ethnophysiography helps us explain why these communities show these preferences
Conclusion

• Communities draw on the local landscape to create community-specific linguistic practices in their spatial descriptions
Thank you!
Xquixe pe’ laatu!

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REFERENCES


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