Speaker and addressee in spatial deixis: Experimental evidence from Ticuna

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Joint work with David Peeters (Tilburg University & MPI for Psycholinguistics)

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The stakes

Why study deixis and demonstratives?

- Significant universals
- Significant diversity
- Infrastructure for interaction
Plan for today

1. Background
2. Methods
3. Results: Ticuna (with a cameo by Dutch)
4. Discussion
5. Conclusions
Exophoric demonstrative: Picks out referent from surround of discourse.

Traditional analyses of exophoric demonstratives say:

Demonstratives convey distance of Ref from Spkr.

(Fillmore 1973; Lyons 1977; Anderson and Keenan 1985; Diessel 1999)
Traditional theories

'Distance from speaker' claim includes 2 distinct sub-claims:

1. Only content concerns distance - Distance-Based
Traditional theories

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1. Only content concerns distance - Distance-Based
2. Only participant who matters is Spkr - Egocentric
Traditional theories

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1. Only content concerns distance - Distance-Based
2. Only participant who matters is Spkr - Egocentric

Neither of these claims is true for Ticuna.

1. Content includes visibility as well as distance
2. Can relate Ref to Addr as well as Spkr
Traditional theories: Predictions

Egocentric, distance-based theories predict that:

- Location of addressee doesn't impact demonstrative use.
- In a system with exactly 2 demonstratives, distance has linear relationship with proportion of use of distal.

![Figure 1: Spkr/distance-oriented prediction for all Refs](image-url)
Alternatives to Distance

Long Americanist tradition (dating from Boas 1911a,b): Demonstratives can encode information about the visibility of the referent, as well as about space.

- Visibility is not a function of distance.
- → Incompatible with distance-only theories.
Visibility

Distance-only vs. distance + visibility theories diverge:

- **Distance-only**: Visibility never impacts demonstrative use independent of distance.
- **Distance + visibility**: Visibility does impact use
  - Categorically
  - Probabilistically -- precursor to encoded contrasts (e.g. Coventry et al. 2014)
Alternatives to Egocentricity

- Hanks (1990): Apparent proximal demonstratives relate referent to the dyad of Spkr + Addr -- not just to the Spkr.
  - Spkr + Addr theory is sociocentric, in contrast to egocentric.

- Sociocentric and egocentric theories diverge in only some contexts.
Sociocentricity

Spkr and Addr are far apart:
- Space within dyad =/ Space close to Spkr.
- Egocentric: Only Refs near Spkr get proximal.
- Sociocentric: All Refs within dyad get proximal (Jungbluth 2003; Peeters et al. 2015)
Sociocentricity

Figure 2: Dyad-oriented predictions
Language Background

Ticuna is an isolate, spoken by \( \sim 60,000 \) people (all ages) in Peru, Colombia, and Brazil.

I have done 11 months of fieldwork, entirely in Peru.
**Demonstrative Inventories**

Ticuna has 4 exophoric demonstratives (Skilton in prep):

<table>
<thead>
<tr>
<th>Dem</th>
<th>Label</th>
<th>Origo</th>
<th>Deictic Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>ṅa⁴a²</td>
<td>Proximal</td>
<td>Spkr</td>
<td>In reach of Spkr</td>
</tr>
<tr>
<td>ṅe³a²</td>
<td>Medial</td>
<td>Dyad</td>
<td>Between Spkr &amp; Addr and Visible to Spkr</td>
</tr>
<tr>
<td>ṣe³a²</td>
<td>Distal</td>
<td>Spkr</td>
<td>Out of reach of Spkr and Visible to Spkr</td>
</tr>
<tr>
<td>ṅe³ma² - (a)</td>
<td>Addr-</td>
<td>Addr</td>
<td>In reach of Addr</td>
</tr>
<tr>
<td>ṅe³ma² - (b)</td>
<td>Invisible</td>
<td>Spkr</td>
<td>Not visible to Spkr</td>
</tr>
</tbody>
</table>
Independent variables

We want to manipulate 3 independent variables:

1. Distance of Ref from Spkr
2. Visibility of Ref
3. Location of Addr (face-to-face vs. side-by-side)
Experimental paradigm: 'Memory Game'

Experimental procedure adapted from Coventry et al. (2008).

- Spkr sits at end of cloth marked with 12 location cards, has 48 Ref cards.
- In each trial:
  1. Addr (experimenter) gives Ref to Spkr.
  2. Addr tells Spkr to place Ref on given location.
  3. In 50% of trials, Spkr covers Ref with an opaque lid.
  4. Spkr places Ref (and lid) & returns to end.
  5. Spkr points to Ref & refers to it using **exactly 2 words** (Det/Dem N).

- Spkr is required to point, but **not** required to use demonstrative.
Experimental paradigm: 'Memory Game'
Experimental paradigm: 'Memory Game'
Independent variables

This design manipulates all of the desired variables:

1. ✔ Distance of Ref from Spkr (continuous)
   - Values 25-300 cm

2. ✔ Visibility of Ref (categorical)

3. ✔ Location of Addr (categorical)
   - Addr face-to-face with Spkr: all 12 locations are inside of dyad
   - Addr side-by-side with Spkr: no location is inside of dyad
Participants

20 participants completed the experiment and were included in analyses

- 4 additional participants were excluded
- Tested in CCNN Cushillococha, Peru
- Mean age: 32

20 Dutch-speaking participants, exact-matched for age and gender, were tested in Nijmegen
**Procedure**

- Task presented to participants as study of memory, **not** of demonstratives
- All instructions given in object language (Ticuna or Dutch)
- Participants completed:
  1. 3 training trials
  2. Experimental procedure
  3. Memory post-test
- Procedure audio- and video-recorded
Results: Ticuna - Face-to-Face

- Distance matters for $na^4a^2$ ("proximal"), $je^3a^2$ ("distal")
- Distance doesn't appear to matter for $je^3a^2$ ("medial"), $je^3ma^2$ ("Addr/invisible")
Results: Ticuna - Side-by-Side

- Distance still matters for $na^4a^2$ ("proximal") and $je^3a^2$ ("distal")
- Distance only now matters for $je^3a^2$ ("medial"): 50-175cm only
- $je^3ma^2$ ("Addr/invisible"): absent
Bayesian Analysis: Ticuna

- Because of multinomial variables and repeated-measures design, chose Bayesian analysis (over ANOVA)
- No a priori baseline → must relevel, using each demonstrative as baseline
  - 4 separate analyses
## Analysis Results: Ticuna

<table>
<thead>
<tr>
<th>Variable</th>
<th>Effect Polarity</th>
<th># Analyses Significant (max: 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\eta a^4a^2) - Distance</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>(\eta e^3a^2) - Distance</td>
<td>+</td>
<td>3</td>
</tr>
<tr>
<td>(\eta e^3ma^2) - AddrLocation</td>
<td>+</td>
<td>2 (BL (\eta e^3a^2, \eta e^3a^2))</td>
</tr>
<tr>
<td>(\eta a^4a^2) - Visibility</td>
<td>-</td>
<td>1 (BL (\eta e^3a^2))</td>
</tr>
<tr>
<td>(\eta e^3a^2) - AddrLocation</td>
<td>+</td>
<td>1 (BL (\eta e^3ma^2))</td>
</tr>
<tr>
<td>(\eta e^3a^2) - Distance</td>
<td>-</td>
<td>1 (BL (\eta e^3a^2))</td>
</tr>
<tr>
<td>(\eta e^3a^2) - Visibility</td>
<td>+</td>
<td>1 (BL (\eta a^4a^2))</td>
</tr>
</tbody>
</table>
Results Highlights: Dutch

We also observe robust effects of visibility in Dutch
  - Visible referents more likely to get *die* ("distal")
    - Identical to Ticuna
    - Opposite pattern from English (Coventry et al. 2014)

Visibility is by far the most robust effect in Dutch -- over Addr location and distance
Discussion: Egocentricity

For **Ticuna**, we support sociocentric/interactive theories over egocentric ones.

- Largest effect, across the board, is Addr location on $\eta e^3 ma^2$ ("Addr centered")
- Effects of Addr location on $\eta e^3 a^2$ - not "medial", but sociocentric proximal

We don't observe any effect of Addr location in Dutch.
Discussion: Distance

For both languages, we support distance + visibility theories over distance-only ones.

- "Distal" demonstratives more likely for visible referents
- "Proximal" more likely for invisible referents

Dutch: Possible discourse basis for encoded visibility contrasts.
Conclusions

Deictic content of demonstratives is not about referent's distance from Spkr.

- Visibility always matters. It can be as important as distance -- or more important.
- Can relate referent to Addr as well as to Spkr.
Conclusions

Consistent with view of demonstrative reference as joint activity, adapted for management of joint attention.

- Addr origo: Narrows spatial extension of Addr's search for Ref
- Visibility: Tells Addr what sense(s) to use to search for Ref
Thank you!

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Views are those of the authors and do not necessarily reflect those of the NSF.


Coventry, Kenny R, Berenice Valdés, Alejandro Castillo and Pedro Guijarro-Fuentes. 2008. Language within your reach:


In F. Lenz (ed.), *Deictic conceptualizations of space, time, and person*, 13--40. Amsterdam: John Benjamins.


Peeters, David, Peter Hagoort and Aslı Özyürek. 2015. Electrophysiological evidence for the role of shared space in online comprehension of spatial demonstratives. *Cognition* 136. 64--84.

Sociocentricity

Spkr and Addr are close together:

- Space within dyad = Space close to Spkr.
- Egocentric and sociocentric predictions same.
Participants use definite articles in 81% of trials; very rarely use indefinite (1%)

*die* ("distal") outperforms *deze* ("proximal") at all distances
Results: Dutch - Invisible Refs

- Participants use definite articles in 84% of trials, indefinite 4%
- *die* ("distal") does not significantly outperform *deze* ("proximal") at any distance
Bayesian Analysis: Dutch

3 analyses: articles (collapsed) as baseline, *deze* ("proximal") baseline, *die* ("distal") baseline.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Effect Polarity</th>
<th># Analyses Significant (max 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>die</em> - Visibility</td>
<td>+</td>
<td>2</td>
</tr>
<tr>
<td>Article - Distance</td>
<td>+</td>
<td>1</td>
</tr>
<tr>
<td>Article - Visibility</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td><em>deze</em> - Distance</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td><em>deze</em> - Visibility</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>
Discussion: Demonstratives vs. Articles

Speakers of different languages can vary in whether they use demonstratives vs. definite articles.

- **Definite articles** predominate, demonstratives are marginal for Dutch speakers.
- **Not** simply due to presence/absence of definite article in lexicon.
  - Dutch speakers have demonstratives, but don't use them in this task.