Meronymy and reference frames: Preliminary evidence

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with contributions from the MesoSpace team of researchers

Meronymy Across Languages

September 28, 2013

Outline

- Introduction
  - Spatial frames of reference
  - MesoSpace: team, goals, tools
- Tasks for data collection
  - Reference Frames: Ball & Chair
  - Meronymy: Novel Objects I
- Findings
- Discussion

Spatial Frames of Reference

- two kinds of *place functions* (Jackendoff 1983)
  - i.e., functions from reference entities into regions
    - *topological* (Piaget & Inhelder): perspective- or frame-free
      - independent of the orientation of the ground, the observer, and the figure-ground array (the configuration)

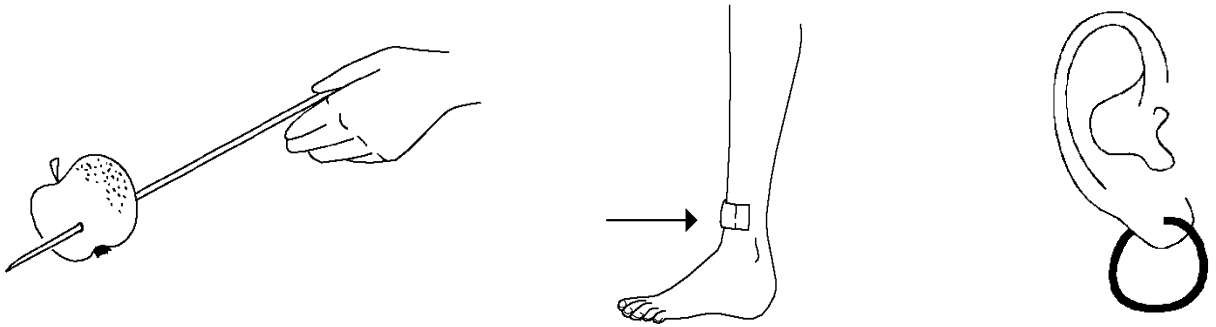

Fig. 1. *Some configurations that might be described in terms of topological place functions*

(1.1) *The apple is on the skewer*

(1.2) *The band aid is on the shin*

(1.3) *The earring is in the ear (lobe)*

- *projective* – framework-dependent
  - the place function returns a region defined in a coordinate system centered on the reference entity
  - the axes of the coordinate system are derived from an **anchor**
    - » in **intrinsic** frames, the anchor is the reference entity/ground
    - » in **relative** frames, it is the body of an observer
    - » in **absolute** frames, it is some environmental entity/feature

Intrinsic — *The ball is front of the chair.*

Relative — *The ball is to the right of the chair.*

Absolute — *The ball is east of the chair.*

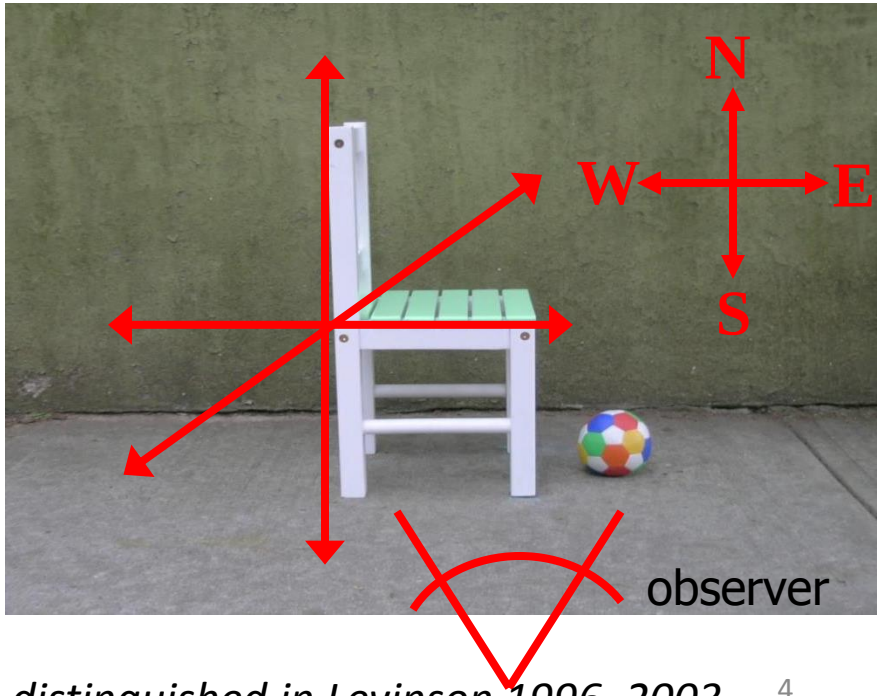

Fig. 2. *The three types of spatial reference frames distinguished in Levinson 1996, 2003*

- Reference frames are used in the interpretation of spatial relators

	true in a relative frame?	true in an intrinsic frame?
The ball is in front of the chair	Yes	No
The ball is left of the chair	No	Yes

Fig. 3. *Truth conditions of intrinsic and relative descriptions of Ball & Chair 3.9*

- No grammatical restrictions on what frames may be used
- However, a possible lexico-syntactic factor that may influence frame use
  - the productive use of shape-based meronyms in the representation of space

Research Questions

- How do preferences for reference frame types interact with systems of meronym assignment?
  - Is there a significant (i.e. predictable) correlation?
  - Is there a causal relationship?

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MesoSpace: team, goals, tools

- *Spatial language and cognition in Mesoamerica*
- 13 Mesoamarican (MA) languages (Campbell, Kaufman, & Smith-Stark 1986)
  - Mayan
    - Chol (J.-J. Vázquez)
    - K'anjob'al (E. Mateo)
    - Tseltal (several variants; G. Polian)
    - Yucatec (PI: J. Bohnemeyer)
  - Mixe-Zoquean
    - Ayutla Mixe (R. Romero)
    - Soteapanec (S. Gutierrez)
    - Tecpatán Zoque (R. Zavala)
  - Oto-Manguean
    - Isthmus (Juchitán) Zapotec (G. Pérez)
    - Otomí (N. Hernández, S. Hernández, E. Palancar)

Fig. 6. *MesoSpace: Field sites*

  - Huave (S. Herrera)
  - Purépecha (A. Capistrán)
  - Totonac-Tepehuan
    - Huehuetla Tepehua (S. Smythe)
  - Uto-Aztecan
    - Pajapan Nawat (V. Peralta)

- 6 non-MA "controls"
  - Seri (C. O'Meara)
  - Cora (Uto-Aztecan; V. Vázquez)
  - Mayangna (E. Benedicto, A. Eggleston in collaboration with the Mayangna Yulbarangyang Balna)
  - Mexican, Nicaraguan, and Barcelonan Spanish (R. Romero; E. Benedicto, A. Eggleston)
- 2 (interrelated) domains
  - **frames of reference**
  - **meronyms**

Fig. 7 The *MesoSpace team (most of them)*

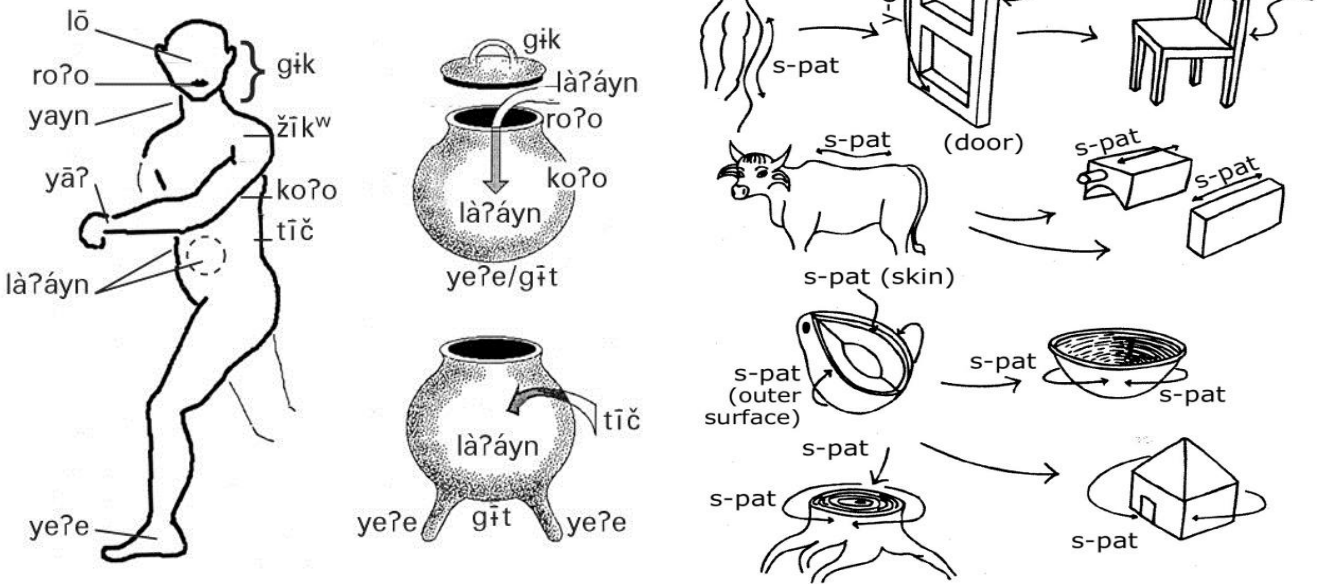

Fig. 8 *Meronyms in Ayoquesco Zapotec (left) and Tenejapa Tseltal (adapted from MacLaury 1989 and Levinson 1994)*

Some MesoSpace Goals

- Observed co-occurrence of
  - bias against relative (observer-projected) frames of reference
  - highly productive use of meronymic terminologies that are based primarily on object geometry across the languages of the Mesoamerican (MA) area.

Hypothesized correlation

- Speakers of languages with productive meronymy systems are habituated to object-geometry; a thinking-for-speaking effect then causes them to disfavor the relative
- Therefore, if a language has productive meronyms (measured by lexical meronyms in the Novel Objects task), their relative use should be low (measured by the percentage of pictures for which a relative frame was used).

Mesoamerican Confound

- The causal effect of productive meronymy on frame use is masked by the Mesoamerican area, since these properties may be shared via historical contact
- Evidence from outside Mesoamerica is needed

MesoSpace 1b

"Spatial language and cognition *beyond* Mesoamerica"
(NSF award #BCS 1053123)

- Meronym data from outside Mesoamerica
  - Jahai (Mon-Khmer, Malaysia; N. Burenhult)
  - Kujireray (Joola, Senegal; R. Watson)
  - Vietnamese (Mon-Khmer; J. Lovegren)
  - Wan (Mande, Côte d'Ivoire; T. Nikitina)
  - Bashkir (Turkic, Russia; T. Nikitina)
  - Yurakaré (isolate, Bolivia; R. van Gijn and V. Hirtzel)

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The Ball & Chair study

- Task for studying reference frame use in discourse
  - a referential communication task: Ball & Chair (B&C)
    - replacing Men & Tree (M&T) in Pederson et al (1998) etc.
    - B&C allows us to discover selection preferences for any of the reference frame types
    - 4 sets of 12 photos; ~5 pairs per population

Fig. 9. *Design of the Men and Tree task (Pederson et al. 1998: 562)*

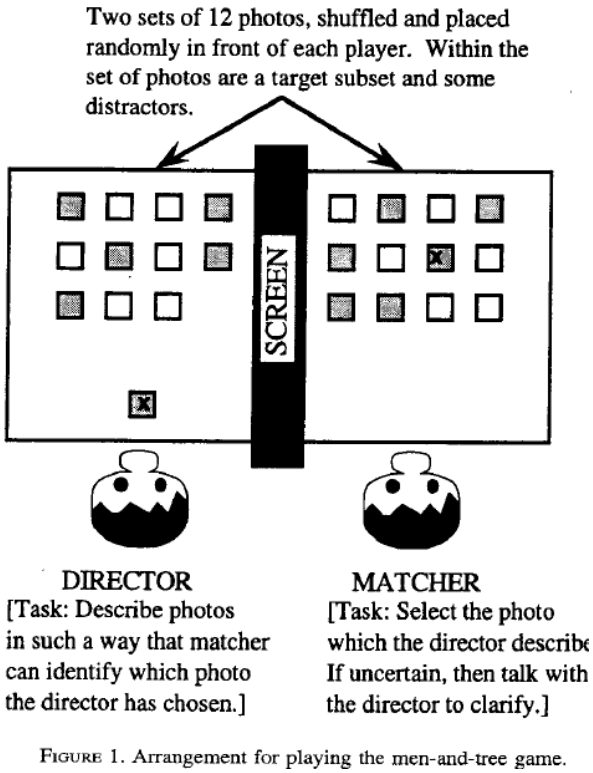

FIGURE 1. Arrangement for playing the men-and-tree game.

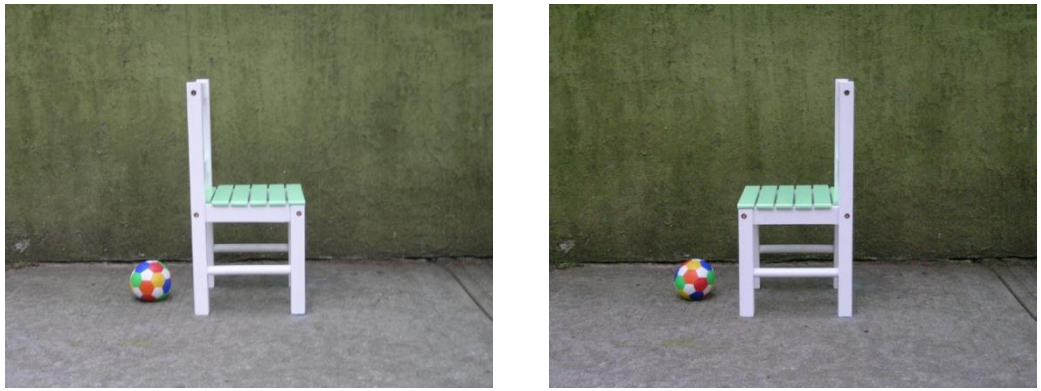

Fig. 10. *Two of the Ball & Chair photos, featuring an intrinsic contrast*

- the present study - B&C data from 12 varieties
  - 7 Mesoamerican languages
    - Yucatec Maya (J. Bohnemeyer)
    - Ayutla Mixe (R. Romero)
    - San Ildefonso Tultepec Otomí (N. Hernández, S. Hernández, E. Palancar)
    - Purépecha (or Tarascan; A. Capistrán)
    - Chacoma Tseltal (G. Polian)
    - Juchitán (Isthmus) Zapotec (G. Pérez)
    - Tepehua (S. Smythe-Kung)
  - 2 non-Mesoamerican indigenous languages
    - Seri (C. O'Meara)
    - Sumu-Mayangna (E. Benedicto, A. Eggleston, Mayangna Yulbarangyang Balna)
  - 3 varieties of Spanish
    - from Barcelona (A. Eggleston), Mexico (R. Romero), and Nicaragua (A. Eggleston)

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Novel Objects

- Referential communication tasks
  - Part identification task (NO I)
    - Identify parts that are 'landing sites' for playdough
  - Placement task (NO II)
    - Use relators and meronyms to describe placement of playdough around the object

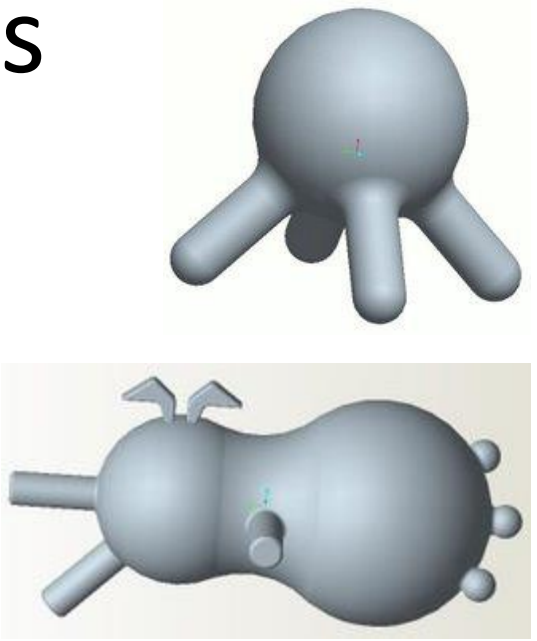

Fig. 11. *Some Novel Objects*

Meronymy Data

- Novel Objects I data from 12 languages:
  - 7 Mesoamerican languages
    - Yucatec Maya (J. Bohnemeyer)
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    - San Ildefonso Tultepec Otomí (N. Hernández, S. Hernández, E. Palancar)
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Findings: Reference Frames

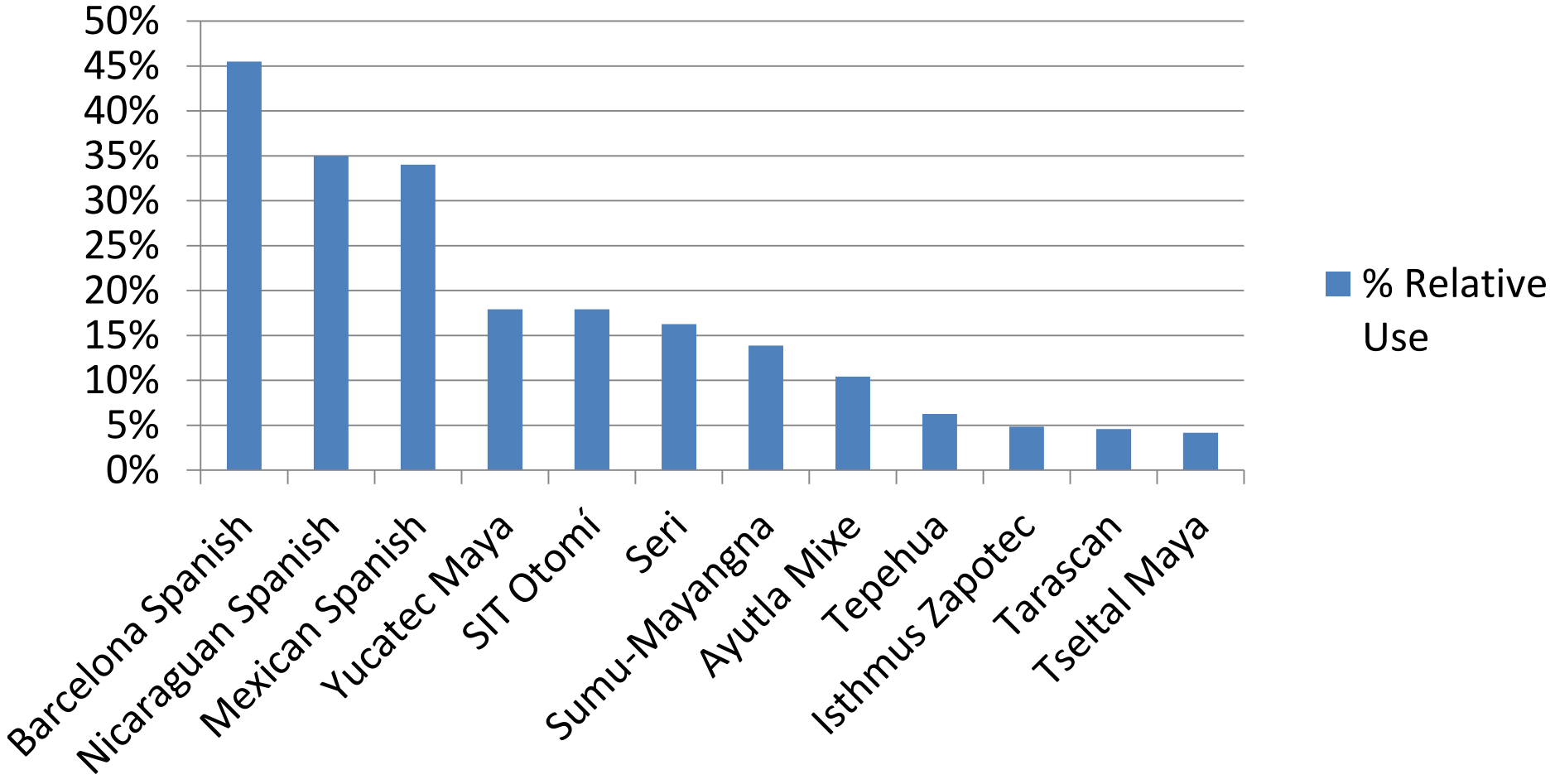

Fig. 12 Percentage of photos with relative use

Findings: Reference Frames

Language	Relative %	Pictures w/ Relative Usage	Total Pictures
Barcelona Spanish	45%	131	288
Nicaraguan Spanish	35%	84	240
Mexican Spanish	34%	49	144
Yucatec Maya	18%	43	240
SIT Otomí	18%	43	240
Seri	16%	39	240
Sumu-Mayangna	14%	40	288
Ayutla Mixe	10%	25	240
Tepehua	6%	9	144
Isthmus Zapotec	5%	14	288
Tarascan	5%	11	240
Tseltal Maya	4%	10	240

Fig. 13 Percentage and raw frequencies of photos with relative use

Findings: Lexical Meronym Use

- ¿Qué porcentaje de las partes nombradas por los participantes se nombraron a través del uso de merónimos?
- Como merónimos solo consideramos expresiones léxicas (que sean simples o complejas) que describan un tipo de entidad como parte de otra entidad.

Findings: Lexical Meronym Use

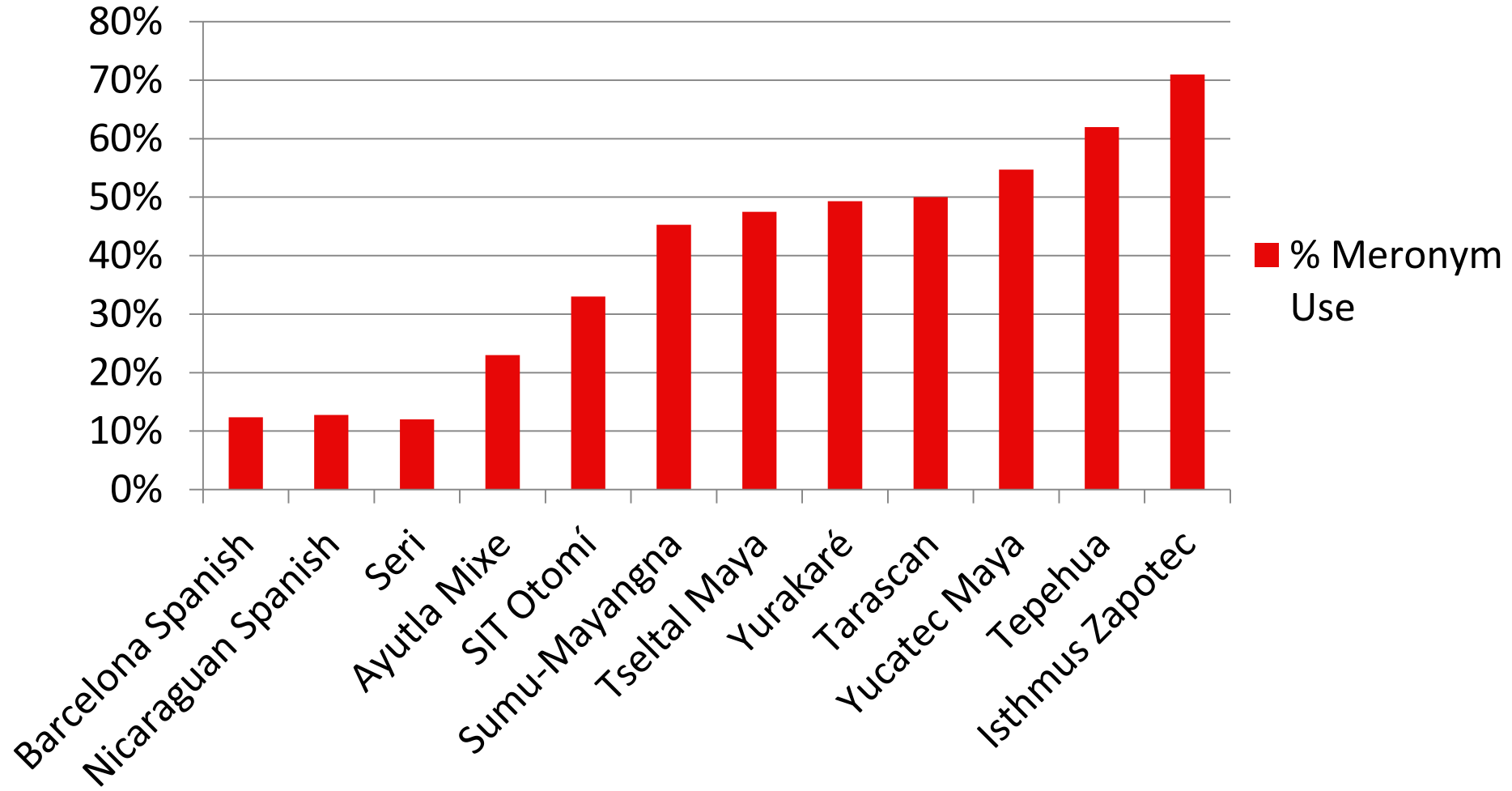

Fig. 14 *Percentage of meronym use*

Meronymy and frame use

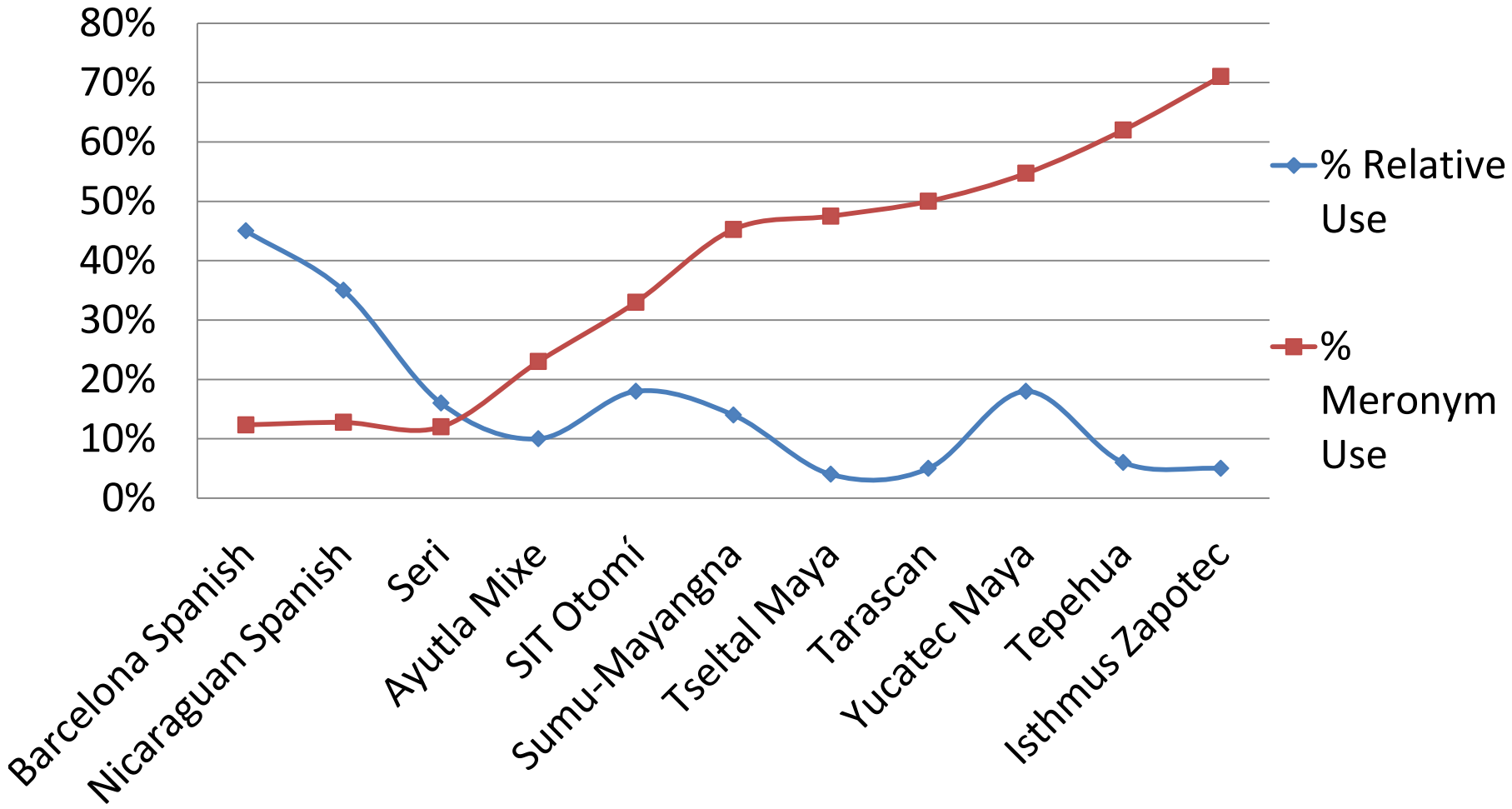

Fig. 15 *Percentage of meronym use and relative use*

Meronymy and relative use

- Correlation of meronym use to relative use

  -0.710129109
- Significant!

  P-value < 0.01**
- Suggests an effect

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Future Directions

- Perform analyses using finalized meronymy results
- Include data from more languages
- Compare meronymy use in NO I and frame use in NO II
- Further investigations of the relationship between meronymy and reference frame use

Thanks!

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- Semantic Typology lab members
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