Typology of spatial representation
Lecture 3: Topological relations and disposition

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SYNOPSIS

- Situating today’s lecture
- The semantic makeup of locative and motion descriptions
- The typology of topological relators
- The typology of locative predicates
- Dispositionals: Thinking for Speaking
- Summary
SITUATING TODAY’S LECTURE

- the course: overview

Figure 1.1. A classification of spatial concepts
SYNOPSIS

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THE SEMANTIC MAKEUP OF LOCATIVE AND MOTION DESCRIPTIONS

‣ locative predication (= locative description)

‣ an utterance asserting that (or asking whether, etc.) an entity is in a particular place (= location)

(2.1) Where is the cup?

The cup is

lates to the object to be located

over there

where you left it

on the table

 refers to the place of the object

Figure 2.1. Locative descriptions (with BowPed 1)
how is the place determined?

- by a place name (= toponym)

(2.2)  *Roberto is in Mérida / on Venus*

- deictically/indexically

(2.3)  *Barbara is over there*

- through some state of affairs involving the place

(2.4)  *The book is wherever you put it*

- with respect to some reference entity

(2.5)  *The cup is on the table*
figure and ground

the case we’ll be focusing on: one entity – the **figure** – is located with respect to another – the **ground**

Where is the cup? –

**The cup** is **on the table**

2.6) **Figure**: “The Figure is a moving or conceptually movable entity whose site, path, or orientation is conceived as a variable the particular value of which is the relevant issue.” (Talmy 2000: 184)

2.7) **Ground**: “The Ground is a reference entity, one that has a stationary setting relative to a reference frame, with respect to which the Figure’s site, path, or orientation is characterized.” (Talmy 2000: 184)
figure and ground (cont.)

- often, either object in a spatial configuration can be described as figure/ground

(2.8)  
  a. *The lamp* is over *the table*
  b. *The table* is under *the lamp*

- but generally, some objects make for better figures and others for better grounds

(2.9)  
  a. *The cat* is under *the table*
  b. *The table* is over *the cat*

(2.10)  
  a. *The dog* is next to *the dog house*
  b. *The dog house* is next to *the dog*

- cf. Talmy (2000: 183) for criteria for figure-ground assignment
place functions vs. locative functions

- to locate a figure with respect to a ground
  - at least two conceptual prerequisites are needed
    - define a region of space with respect to the ground
    - express inclusion of the figure’s eigenspace in this region

place functions vs. locative functions (cont.)

in Jackendoff’s (1983) framework each of these is represented as a semantic/conceptual function

- one that maps the ground into a place (a region defined wrt. it)
- one that maps the place into the state of the figure being located there

(2.11) a. The mouse is under the table

\[ \text{State BE ([Thing MOUSE], ([Place UNDER ([Thing TABLE])]))} \]
place functions vs. locative functions (cont.)

the same place function may occur in locative and in motion descriptions

(2.12) a. The mouse is under the table
   b. \[\text{State } \text{BE} ([\text{Thing MOUSE}], ([\text{Place UNDER} ([\text{Thing TABLE}]]))]\]

(2.13)a. The mouse went under the table
   b. \[\text{Event } \text{GO} ([\text{Thing MOUSE}], ([\text{Path TO} ([\text{Place UNDER} ([\text{Thing TABLE}]]))]))\]
   c. \[\text{Event } \text{GO} ([\text{Thing MOUSE}], ([\text{Path VIA} ([\text{Place UNDER} ([\text{Thing TABLE}]]))]))\]

Figure 2.5. Locative function in (2.12)

Figure 2.6. Path functions in (2.13a) (left) and (2.13b)
place functions vs. locative functions (cont.)

many languages express place and path functions separately

example: Estonian

(2.14) a. \([\text{State BE} ([\text{Thing MOUSE}], ([\text{Place UNDER} ([\text{Thing TABLE}]])])]\)

b. Hiir on laua al-l

EST mouse COP.NPAST table:GEN under-ADE

‘The/a mouse is under the table’ (lit. at the table’s under)’

(2.15) a. \([\text{Event GO} ([\text{Thing MOUSE}], ([\text{Path TO} ([\text{Place UNDER} ([\text{Thing TABLE}]])])])]\)

b. Hiir jooks-is laua al-la

EST mouse run-3SGPAST table:GEN under-ALL

‘The/a mouse ran under the table’ (lit. to the table’s under)

(2.16) a. \([\text{Event GO} ([\text{Thing MOUSE}], ([\text{Path VIA} ([\text{Place UNDER} ([\text{Thing TABLE}]])])])]\)

b. Hiir jooks-is laua al-t läbi

EST mouse run-3SGPAST table:GEN under-ABL through

‘The/a mouse ran under the table (lit. from the table’s under through)’
place functions vs. locative functions (cont.)

(2.16) a. \[ \text{Event GO ([Thing MOUSE], \text{Path VIA ([Place UNDER ([Thing TABLE])])})} \]

b. Hiir jooks-is laua al-t läbi

EST mouses run-3SGPAST table:GEN under-ABL through

The/a mouse ran under the table
(lit. from the table’s under through)

Table 1. Place and locative/path functions in Avar (North Caucasian; Azerbaijan) based on Lehmann 1992: 630
place functions vs. locative functions (cont.)

- excursus: **path** functions
  - constrain the set of paths compatible with a given motion description
    - by fixing their beginning (**source**) or final region (**goal**), some region passed through in between (**route**), etc.
  - may be expressed
    - outside the verb root, in prepositions, adverbs, particles, and case markers => **S(atellite)-framing**
    - in the roots of ‘path verbs’ => **V(erb)-framing**
    - V-framing is canonic in most Romance languages
    - and in Hebrew, Turkish, Japanese, ...
    - S-framing is dominant in most Germanic and Slavic languages (Talmy 2000)
  - more on path encoding and framing typology in Lecture 4
the ground phrase

- semantically, locative/motion *predicates* are polyadic
  - comprising a representation of a kind of a state of affairs
    - plus representations of one or more grounds
  - the state of affairs is expressed by the head of the predicate
- **ground phrases** are co-constituents of the head
  - that express (or contain the expression of) the representation of a ground
the ground phrase (cont.)

- the syntactic status of the ground phrase is subject to a great deal of crosslinguistic variation
- this correlates with variation in the locus of encoding of place and path functions
  - which can be in the head, the ground phrase, both, or neither
- in V-framed descriptions, the ground phrase is either an object of the verb or an oblique

(2.17) **La pelota entró en la caja**
SPA the ball entered in(to) the box
‘The ball entered (lit. in(to)) the box’

more in Lecture 4!

**Figure 2.7.** The ground phrase is the highest node that dominates the NP/DP describing the ground,
topological vs. projective place functions

- a distinction introduced by Piaget & Inhelder 1956
- **projective** place functions involve a perspective or frame of reference – more in Lecture 5!
- **topological** place functions are perspective-free
  - Piaget & Inhelder claimed that children universally acquire topological functions first (but see Lecture 6)

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(2.18) **Topological place function** (working definition):
A place function is topological if and only if it applies independently of the orientation of ground, observer, and figure-ground array

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(Figure 2.8. *Examples of “topological” relations* (BowPed 70, 69, 35))

(Figure 2.9. Jean Piaget (1896 - 1980) soc.enotes.com)
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THE TYPOLOGY OF TOPOLOGICAL RELATORS

- Levinson & Meira 2003

- based on BowPed data, but analysis independent of Bowerman & Pederson ms.

- focus on the expression of topological relations specifically in adpositions

- “orthodox assumptions” = straw men to knock down

- topological relations are conceptual primitives

  - or straightforwardly decompose into conceptual primitives (e.g., Jackendoff 1983; Miller & Johnson-Laird 1976)

- there is a simple homomorphism between internal cognitive representations of topological relations and their linguistic expressions

  - so the former can be straightforwardly read off adpositions and case markers (e.g. Jackendoff & Landau 1992)
“orthodox assumptions” (cont.)

- specifically, it is often assumed that there are three “basic” topological place functions AT, ON, and IN
  - AT for proximity to a “1-dimensional” ground (point)
  - ON for contact to a “2-dimensional” ground (surface)
  - IN for inclusion in a “3-dimensional” ground (body)

  e.g., Clark 1973, Herskovits 1986, Jackendoff & Landau 1992

Table 3.1. Place and path functions in English prepositions according to Clark 1973: 41 (adapted to the framework of Jackendoff 1983)

<table>
<thead>
<tr>
<th>Place function</th>
<th>Ground</th>
<th>Locative (BE)</th>
<th>Goal (TO)</th>
<th>Source (FROM)</th>
<th>Route (VIA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT</td>
<td>1D</td>
<td>at</td>
<td>to</td>
<td>from</td>
<td>via</td>
</tr>
<tr>
<td>ON</td>
<td>2D</td>
<td>on</td>
<td>onto</td>
<td>off</td>
<td>across</td>
</tr>
<tr>
<td>IN</td>
<td>3D</td>
<td>in</td>
<td>into</td>
<td>out of</td>
<td>through</td>
</tr>
</tbody>
</table>
stimuli and design

the 71 “BowPed” line drawings (Bowerman & Pederson ms.)

- designed for the crosslinguistic study of categorization in the domain of topological relations
- most scenes fall along a constructed conceptual continuum between contact/support (“ON”) and containment (“IN”)
- based on observations about the development of topological relations in Dutch, English, and Korean child language (cf. Choi & Bowerman 1991; Bowerman 1996; Choi 1997)

Figure 3.1. Partial superposition-support continuum illustrated by BowPed items 1, 5, 62, 14, and 2 (Levinson & Meira 2003: 488)

- a few scenarios designed to elicit ‘projective’ relations are included as well
procedure

for each image

find close cultural equivalents of figure and ground

negotiate culturally plausible interpretations

elicit in a way most appropriate to the target language contextualized locative descriptions

(3.1) A possible elicitation frame for BowPed: “Imagine you’re talking to somebody who is looking for the [FIGURE]. This person knows where the [GROUND] is, but doesn’t know where the [FIGURE] is. You know where the [FIGURE] is; but neither of you can see the [FIGURE] and the [GROUND] right now. The person asks you Where is the [FIGURE]? Imagine you want to tell the person where the [FIGURE] is. How do you respond?”
scope of the analysis

- topological information may be expressed in the ground phrase, the head of the locative predicate,
  - and in ‘satellites’ and ‘serial verbs’
- L&M restrict their analysis to the ground phrase
- in the ground phrase, topological information can be expressed by adpositions, case markers, and meronyms

(3.2) **Spatial adposition**: “A spatial adposition is any expression that heads an adverbial phrase of location in ...
... answers to where-questions... This definition is not designed to exclude spatial nominals, since they so often gradually develop into ‘true’ adpositions that boundary problems would plague a comparative exercise of this sort.” (L&M 2003: 486)
L&M restrict their analysis to the head of the ground phrase, whether it is an adposition or a meronym.

However, they ignore meronyms that combine with an adposition, e.g., they code (3.3) as falling into the domain of the generic preposition *ti’*

(3.3)  
Te’l kul-ukbal u=pèek’-il  
YUC there sit-DIS(B3) A3=dog-REL  
*tu=pàach* le=nah=o’  
PREP:A3=back DEF=house=D2  
‘There the dog is sitting outside the house’

Justification: the failure to confirm the “orthodox assumptions” couldn’t have been different had adposition-meronym combinations been treated separately.

Probably true: the analysis artificially inflates the extension of adpositional categories and yet they still turn out to be narrower than predicted.
9 mutually unrelated languages all of which have spatial adpositions and at most 1 or 2 general locative cases

Table 3.2. Language sample of Levinson & Meira 2003

<table>
<thead>
<tr>
<th>LANGUAGE</th>
<th>AFFILIATION</th>
<th>LOCATION</th>
<th>DEMOGRAPHY</th>
<th>CONSULTANTS</th>
<th>RESEARCHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basque</td>
<td>Isolate</td>
<td>Europe</td>
<td>660,000</td>
<td>26</td>
<td>I. Ibarretxe</td>
</tr>
<tr>
<td>Dutch</td>
<td>Indo-European</td>
<td>Europe</td>
<td>20,000,000</td>
<td>10</td>
<td>D. Wilkins, C. de Witte</td>
</tr>
<tr>
<td>Ewe</td>
<td>Niger-Congo</td>
<td>West Africa</td>
<td>3,000,000</td>
<td>5</td>
<td>F. Ameka</td>
</tr>
<tr>
<td>Lao</td>
<td>Tai-Kadai</td>
<td>Southeast Asia</td>
<td>3,000,000</td>
<td>3</td>
<td>N. Enfield</td>
</tr>
<tr>
<td>Lavukaleve</td>
<td>Isolate</td>
<td>Solomon Islands</td>
<td>1,150</td>
<td>1</td>
<td>A. Terrill</td>
</tr>
<tr>
<td>Tiriyó</td>
<td>Cariban</td>
<td>South America</td>
<td>2,000</td>
<td>10</td>
<td>S. Meira</td>
</tr>
<tr>
<td>Trumai</td>
<td>Isolate</td>
<td>South America</td>
<td>50</td>
<td>3</td>
<td>R. Guirardello</td>
</tr>
<tr>
<td>Yéfí Dnye</td>
<td>Isolate</td>
<td>Papua New Guinea</td>
<td>3,750</td>
<td>4</td>
<td>S. Levinson</td>
</tr>
<tr>
<td>Yukatek</td>
<td>Mayan</td>
<td>Mesoamerica</td>
<td>700,000</td>
<td>5</td>
<td>J. Bohnemeyer, C. Stolz</td>
</tr>
</tbody>
</table>

the comparability problem

how does one compare one Lavukaleve speaker to 26 Basque speakers?
the fix in Levinson & Meira 2003: “average” responses within each population

a picture was assigned to a particular adposition if

- Tiriyó, Basque, Dutch:
  more than half of the consultants converged on the adposition for this pic
- languages w/ 4-5 consultants:
  two or more consultants converged on the adposition for this pic
- languages w/ fewer than 4 consultants:
  any consultant used the adposition for this pic

this doesn’t solve the problem
that the categorization is vastly better evidenced for some languages than for others
analysis I: visualizing the variation

sparse semantic typology data can be profitably graphed using Venn diagrams

Figure 3.6. Semantic categorization of a subset of the BowPed pictures in the use of prepositions by two speakers of Mexican Spanish (data elicited by Osamu Ishiyama (left) and Arthur Photidiadis (right)).
analysis I: visualizing the variation (cont.)

L&M’s data is not sparse...

Figure 3.7. Steve Levinson drives home another point: extensional map of adpositional categories in 4 of the languages on 2D “minimal stress” grid (L&M p.500-501). There is no single 2D arrangement of the 71 pix that allows to represent all categories as contiguous areas.
analysis II: multi-variate statistics

- there is a standard set of ‘unsupervised’ algorithms for the descriptive (non-inferential) analysis of similarity data
  - including Cluster Analysis, Correspondence Analysis, Factor Analysis, Principal Component Analysis
  - and Multi-Dimensional Scaling (MDS)

- all of these start out from a spatial interpretation of the similarities in the categorizations at issue
  - and then simplify this spatial model (*dimension reduction*)
  - until the most powerful dimensions/factors of variation emerge
analysis II: MDS (cont.)

- the first step: the construction of a **similarity matrix** comparing the categorizations to one another

- the unit of analysis for this can be
  - the stimulus items (Levinson & Meira; Majid et al 2008)
  - languages or linguistic properties (work elsewhere in typology; cf. Moore et al (2015: 6) for references)
L&M constructed a similarity matrix that compared the 71 BowPed pix to one another in terms of their semantic categorization in the sample languages. First a matrix was calculated for each language. Every pair of pix was assigned a dissimilarity value b/w 0 (perfectly similar) and 1 (perfectly dissimilar). The value for pix i and j is calculated according to (3.4)

\[ D_{ij} = \left( N_{\text{total adpositions}} - N_{\text{adpositions shared b/w i & j}} \right) / N_{\text{total adpositions}} \]

So similarity increases with the number of shared adpositions by a factor that depends on the size of the overall adposition set. Then a composite matrix was created for the sample by summing the D coefficients for each pair of pix across the nine languages.
the second step: **dimension reduction**

interpret the similarity between every pair of items as distance/proximity in a spatial model

now let an algorithm crank out a two- or three-dimensional map that fits these distances

at minimal “stress” or loss of information

i.e., minimizing the overall amount of inaccuracy in the reproduction of the individual distances
analysis II: MDS (cont.)

- a very useful analogy (courtesy of James Boster)
  - or strictly speaking, an illustration
  - draw a map of an area on the basis of a distance table

![Figure 3.8. A distance table of European cities grabbed from the internet (http://www.itsmarc.com)]
analysis II: MDS (cont.)

- L&M fed the composite matrix into the ALSCAL algorithm of SPSS 7.5
- interpreting the D coefficients as Euclidian distances
- this is actually not the most conservative approach

**Figure 3.9. ALSCAL plot based on the composite dissimilarity matrix of the nine languages of the sample (L&M p.505)**
analysis II: MDS (cont.)

- the interpretation of MDS plots is driven by two questions
  - how do the data points (here: the items) cluster?
  - do the dimensions of the plot align with any identifiable properties/variables?

Figure 3.9. ALSCAL plot based on the composite dissimilarity matrix of the nine languages of the sample (L&M p.505)
THE TYPOLOGY OF TOPOLOGICAL RELATORS (CONT.)

- findings
  - there’s an IN cluster as predicted
    - but many containment items are not in it
      - but instead wind up on the left margin together with protrusion and circumference
  - there are up to three ON clusters: an ON-TOP cluster of support items; an ON/OVER cluster of support and superposition items
    - and a large ATTACHMENT cluster
  - there is a NEAR/UNDER cluster which doesn’t clearly correspond to any of the hypothetical primitive relations
discussion

L&M: the best crosslinguistic predictors of linguistic categorization in the topological domain

- are not the hypothetical primitives AT, ON, and IN
- but are more fine-grained notions such as support, superposition, attachment, etc.
- which typically do not map isomorphically into adpositional meanings
- and arguably aren’t purely spatial notions
these more fine-grained conceptual properties support implicational generalizations and evolutionary scales

Figure 3.10. One-dimensional implicational scale à la Berlin & Kay 1969 (L&M p.510)

Figure 3.11. Evolutionary stages à la Kay 1975 (L&M p.512)
critique: Objection I

- the clusters of L&M’s MDS plot reflect not only the categorization of the pix in the sample languages

- but also Bowerman & Pederson’s choices in composing the contents of the BowPed pictures

- the BowPed set wasn’t designed for this type of analysis

  - there is no underlying ‘etic grid’ of variables

  - and no attempt at balancing the realization of all possible variable-value combinations (‘grid cells’)
critique: Objection II

by treating the items as units of analysis and creating a composite matrix

L&M’s analysis obscures the differences among the languages

the same holds for Majid et al 2008
new work: Khetarpal et al 2009 - optimality of the categorizations captured in L&M’s BowPed sample

- create a conceptual similarity space of the BowPed pix
  - based on pile sort data obtained from speakers of Dutch and English

- compare the semantic categorizations of each population in the BowPed sample against this conceptual similarity space
  - in terms of how well it maximizes within-category similarity and minimizes across-category similarity

- compare against versions of the conceptual similarity space obtained by rotation of the actual space
new work: Khetarpal et al 2009 (cont.)

- finding: all of the nine languages of the L&M sample appear to behave near-optimally in their categorizations vis-à-vis the conceptual space of the pile sort

Figure 3.11. “Well-formedness” of the semantic categorizations of the nine populations when compared to rotations of the similarity space around the x-axis (Khetarpal et al 2009)
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THE TYPOLOGY OF LOCATIVE PREDICATES

- the localizability hierarchy
  - Wilkins (1998, 1999) compares locative descriptions across 11 unrelated languages based on BowPed data
  - his findings indicate that a prototypical locative description
    - refers to an “easily moved inanimate figure located in non-attached fashion with respect to [inanimate, JB] ground”
    - as one moves away from this prototype along each of a number of conceptual parameters
      - one is more and more likely to encounter constructions other than locative predications
Wilkin’s **localizability hierarchy** comprises six types of scenes

- **the Basic Locative Construction (BLC):** the construction preferred at Level VI

---

**Figure 4.1.** Localizability hierarchy  
(Wilkins 1998: 58)
Wilkins then asks how far the BLC is extended to other types of scenes much crosslinguistic variation a chain of implicational generalizations emerges with some discontinuities

Figure 4.2. Extension of the BLC in 11 languages (Wilkins 1998: 59)

Figure 4.3. The localizability hierarchy interpreted as a hierarchy of likelihood of BLC use (Levinson & Wilkins 2006: 516)
example (Bohnemeyer & Brown 2007):

- Tseltal: BLC (dispositional stative predicate construction) covers Level-6 and Level-1-4 scenes
  - but not Level-5 ‘adornment or clothing’ scenes

- Yucatec: BLC (generic existential/locative predicate construction) covers scenes of Levels 1-3 and 5-6
  - but not Level-4 ‘part-of-whole’ scenes
Levinson & Wilkins 2006 offer a breakdown of the hierarchy into seven independent scales.

- most localizable
  - close contact
  - independent Figure
  - contained Figure
  - inanimate Figure/Ground
  - small Figure/Ground size ratio
  - stereotypical Figure-Ground relation

- least localizable
  - separation
  - part-whole configuration
  - contained Ground
  - animate Figure/Ground
  - large Figure/Ground size ratio
  - atypical Figure-Ground relation

3D-object Figure

1-2D-object Figure

negative-space Figure

Figure 4.4. Dimensions of localizability (after Levinson & Wilkins 2006: 515)
finally, let’s take a look at what constructions are used as BLCs across languages

3.5 + 1 types

Type III: posture verbs have a classificatory function

e.g., a cup in Dutch can be said to “sit” on the table by default even if it is actually “lying” on its side

Type II: dispositionals used non-classificatorily, describing the figure’s actual disposition

<table>
<thead>
<tr>
<th>Typology of locative predication:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 0: No verb in basic locative construction: Turkish (one construction)</td>
</tr>
<tr>
<td>Type I: Single locative verb (or suppletion under grammatical conditioning)</td>
</tr>
<tr>
<td>Type Ia: Copula (i.e., dummy verb used in many other constructions): English, German, Tamil</td>
</tr>
<tr>
<td>Locative + Existential: Yukatek</td>
</tr>
<tr>
<td>Type Ib: Locative verb: Japanese, Chinese, Ewe</td>
</tr>
<tr>
<td>Type II: Large set of “dispositional” verbs: Likpe, Tzeltal, Zapotec</td>
</tr>
<tr>
<td>Type III: Small, contrastive set of posture or positional verbs: Arrernte, Guugu Yimithirr, Yélî Dnye, Dutch, Goemai</td>
</tr>
</tbody>
</table>

Figure 4.5. The typology of predicate types in the BLC
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DISPOSITIONALS: THINKING FOR SPEAKING

- Thinking-for-Speaking (TfS) effects
  - effects from grammar and lexicon onto speech production
- Slobin’s test case: Talmy’s (1985, 2000) typology of motion event “framing”
  - “S(atellite-framed)” languages encode the path of motion outside the main verb
  - which thus becomes free to express the manner of motion

(5.1) The bottle floated into the cave
      figure manner path ground
“V(erb-framed)” languages require the main verb to encode the path of motion so manner information gets bumped to a second verb (5.2) \( \text{La botella} \text{ entró en la cueva flotando} \)

the bottle entered in the cave floating

The extra verb makes the expression of manner “heavier” and thus less \textbf{codable} in V-languages

- and since the manner verb is syntactically optional
  - speakers of V-languages are less likely than speakers of S-languages to mention manner, all else being equal

- put differently, speakers of V-languages require a stronger pragmatic reason to mention manner
some data (Slobin 2003: 165-166)

from a corpus of *Frog Story* narratives

collected with the picture book *Frog Where Are You?* (Mayer 1969)

from children age 3-11 and adults

Table 5.1. *Use of manner verbs in Frog Story narratives (after Slobin 2003: 166)*

<table>
<thead>
<tr>
<th>Language</th>
<th>Percentage of manner verb use (all ages combined)</th>
<th>Mean number of manner verbs per narrator (adults)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>V-language</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spanish</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>Turkish</td>
<td>25</td>
<td>4</td>
</tr>
<tr>
<td>Hebrew</td>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td><strong>S-languages</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>45</td>
<td>7</td>
</tr>
<tr>
<td>Mandarin</td>
<td>62</td>
<td>11</td>
</tr>
<tr>
<td>Russian</td>
<td>69</td>
<td>16</td>
</tr>
</tbody>
</table>
in what sense is this “Thinking-for-Speaking”? 

- it can be interpreted as language (grammar + lexicon) affecting an internal cognitive representation

- the “preverbal message” formed by the “conceptualizer” (Levelt 1989)

- at the onset of speech production

Figure 5.1. Tfs effects in Levelt’s (1989) production model
are TFS effects “Whorfian” effects, then?

- depends on the precise formulation of the Linguistic Relativity Hypothesis
- TFS effects may, but need not, be thought of as the “shallowest” kind of relativistic effects
- in any case, TFS phenomena are patterns of language use that provide a critical causal link
  - between language and possible “deep impact” Whorfian effects on farther removed cognitive systems

follow-up question

- what properties of language cause TFS effects?
  - Slobin: obligatory grammatical encoding; syntactic patterns/constraints as in the motion framing case
  - but what about lexicalization?
  - this is where our study comes in!
A new domain: spatial dispositions

• from *positionals* = expressions of posture...

(2.1) Te’l kul-ukbal u=pèek’-il tu=pàach le=nah=o’

YUC there sit-DIS(B3) A3=dog-REL PREP:A3-back DET=house=D2
disposition figure place ground

‘There the dog is sitting outside the house’

Figure 2. *BowPed 6 (dog next to kennel)*

• ... to *dispositionals* = expressions of any spatial “disposition” – a generalization

(2.2) Nok’-okbal hun-p’éel pòote

YUC supported.face.down-DIS(B3SG) one-CL.IN mug
disposition figure

y=óok’ol le=xùux=o’
A.3=on DET=basket=D2
place ground

‘There is a mug upside down on the basket’

Figure 3. *One of our stimulus items (mug on basket)*
A new domain: spatial dispositions (Cont.)

• a working definition

Dispositions are non-inherent (= “stage-level”) spatial properties that describe the manner in which a figure is located with respect to a ground

• dispositions in Mesoamerican languages
  – many MA languages have large sets of dispositional roots
    • which may produce verb stems, stative predicate forms, classifiers, and other lexical categories
      – with the appropriate derivational morphology, depending on the particular language
  – in Mayan and Mixe-Zoquean languages, dispositional roots are a separate form class
  – attested/estimated set sizes in Mayan
    • Tzotzil: 274 (Haviland 1994); Tzeltal: 267 and Yucatec: 152 (Bohnemeyer & Brown in press)
      – Kaufman 1990 estimates upwards of 600 roots each for K’iche’ and Motosintlek
      – and Mateo-Toledo 2004, based on Martin 1977, up to 700 for Q’anjob’al
– Bohnemeyer & Brown in press on notional subclasses (cf. also Haviland 1994)
  • support/suspension
    – we think that posture/position is merely a special case of this
  • blockage of motion
    – e.g., ‘be stuck to something’, ‘be wedged between two things’
  • orientation in the gravitational field
    – e.g., ‘lie face up’, ‘lie face down’, ‘lie on side’, ‘be tilted at an angle’
  • configurations of parts of an object with respect to each other
    – e.g., ‘be scattered’, ‘be spread out’, ‘be in a pile’, ‘be lined up in a row’, ‘be bulging’, ‘be bent’, ‘be twisted’, ‘be coiled up’

– what makes this a natural class?
Dispositions in Yucatec and Spanish

- unlike Yucatec, Spanish has no form class for the lexicalization of dispositions
- however, in many cases, action verb roots can be used to convey similar meanings

(3.1) **Nok’-okbal**

YUC: supported.face.down-DIS(B3SG) one-CL.IN mug

(3.2) **Hay una taza apoyada boca abajo en la cesta**

SPA: there is a mug supported mouth down in the basket

Figure 4. One of our stimulus items (mug on basket)
• but Spanish action verb roots do not lexicalize dispositions at the same level of specificity
– example I: suspension configurations

**Figure 5.** Specificity differences in the lexicalization of dispositions in Spanish (broken lines) and Yucatec (solid lines)
— example II: leaning support configurations

*Figure 6. Specificity differences in the lexicalization of dispositions in Spanish (broken lines) and Yucatec (solid lines)*

- **nak’- ‘lean (supported at both ends)**
- **ch’eb- ‘be supported tilted/ tipped**
- **ts’an- ‘lean (supported at one end and non-terminally)**
- **inclin- ‘lean’, ‘tilt’**
- **apoy- ‘support’**
- **haw- ‘be supported face/ aperture up’**
as a result, Spanish speakers often need to add adjuncts and secondary predicates

– in order to encode disposition at the same level of specificity conveyed by a single dispositional root in Maya

\[(3.3)\] **Nok’-okbal**

YUC supported.face.down-DIS(B3SG) hun-p’éel pòote one-CL.IN mug

\[\text{disposition} \quad \text{figure}\]

\[y=óok’ol \quad \text{le}=xùux=o’\]

A.3=on DET=basket=D2

place ground

‘There is a mug upside down on the basket’

\[(3.4)\] Hay **una taza apoyada boca abajo en** la cesta

SPA there is a mug supported mouth down in the basket

figure disposition place ground

‘There is a mug upside down on the basket’
Design of our study

- our hypothesis: TfS
  - richer lexicalization makes disposition more codable in Yucatec
  - hence, Spanish speakers are less likely than Yucatec speakers to encode disposition
- under the same pragmatic conditions

- stimuli
  - 18 photographs of objects in various spatial configurations
  - plus 6 landscape shots as fillers
  - presented in randomized order

Figure 8. Six of our stimulus items

Figure 9. Three of our fillers
Design of our study (Cont.)

• participants
  – 20 native speakers of Yucatec
    • all bilingual in Spanish
    • tested in Yaxley, Quintana Roo, Mexico
  – 20 native speakers of Argentinean Spanish
    • none bilingual in Maya
    • tested in Buenos Aires

• procedure
  – participants viewed each picture for as long as they desired
  – and produced brief online descriptions of what they saw
– all participants were tested in their native language

- recording, coding, analysis
  – the descriptions were taped, transcribed, and coded for dispositional and locative information
  – we used frequency of locative encoding as a baseline for each population

– we considered any expression of dispositional information that met our working definition
  • i.e., “manner in which a figure is located”

– we distinguished between specific and generic encoding and between encoding and implicature
  • treating as generic, e.g., verb roots such as Sp. poner and Yucatec ts’a’, both ‘put’
    – and the prepositions en in Spanish and ti’ in Yucatec
Results and analysis

- Yucatec speakers encoded specific dispositional information twice as often

\[ t(38) = 6.107, \ p < .000001 \]
Results and analysis (Cont.)

• overall distribution of dispositional information

Encoding frequencies: Dispositional information

Figure 11. Encoding frequencies: All dispositional information
• Yucatec speakers also encoded specific locative information more often

Figure 12. Encoding frequencies: Explicit specific locative information

\[ t(38) = 6.107, p < .005 \]
• overall distribution of locative information

**Encoding frequencies: Locative information**

*Figure 13. Encoding frequencies: All locative information*
but the average difference b/w dispositional and locative encoding frequencies
– was significantly greater among the Yucatec speakers

Figure 14. *Average difference between dispositional and locative encoding frequencies*
• prediction confirmed
  – against a baseline of locative encoding frequencies
    • Yucatec speakers encode dispositional information significantly more often than Spanish speakers
SYNOPSIS

- Situating today’s lecture
- The semantic makeup of locative and motion descriptions
- The typology of topological relators
- The typology of locative predicates
- Dispositionals: Thinking for Speaking
- Summary
SUMMARY

- figure - an entity described as being in a certain location and/or disposition or as changing location and/or disposition

- ground - the reference point with respect to which the (change of) location/disposition is described

- locative descriptions - utterances that encode the location of a figure

- place functions - conceptual/semantic functions that map an object into a spatial region defined with respect to it

  - place functions are then mapped into locative functions in locative predications

  - and into path functions in motion event descriptions
spatial frames of reference - cognitive coordinate systems necessary to “project” certain place functions from the ground

topological place functions - place functions that do not rely on a frame of reference for their interpretation

traditional assumption about topological place functions (pace Levinson & Meira 2003)

primitive topological functions AT/ON/IN, defined purely spatially, mapping 1:1 into adpositions

not supported by the crosslinguistic evidence

suggesting a fundamental difference between semantic and conceptual representations

needed: cross-cultural cognitive studies of the conceptualization of the topological domain
linguistic typology is inherently quantitative research

- it seeks to formulate generalizations over the distribution of linguistic properties across the languages of the world
- this is by its nature quantitative data
- statistical methods have been employed in syntactic and phonological typology since the 1980s
- in semantic typology, statistical analyses have been developed during the last 15 years
the nature of the data that forms the input to statistical analyses
typically differs across morphosyntactic, phonological, and semantic typology

in morphosyntactic and phonological typology, typically data from large language samples are analyzed
but at a single data point per language, completely abstracting from inter-speaker variation

in contrast, semantic typologists draw on much smaller language samples, but on primary data
thereby gaining the ability to take into account inter-speaker variation
locative predication - predication of the state of being in a certain place

- is expressed by a variety of different means across languages
  - including copulas, dedicated locative predicates, existential predicates
    - and stative forms of posture/positional/dispositional verbs

posture, position, disposition

- disposition is a temporary ("stage-level") spatial property of a figure/theme other than location

- position or posture is a special case of disposition
  - basically involving higher animals in support configurations
localizability hierarchy - six types of states of affairs

- ordered in terms of likelihood of being described across languages by locative predications
- the prototype involves inanimate non-attached figures and grounds

basic locative construction (BLC)

- a language’s BLC is that construction preferred in descriptions of prototypical locative configurations

the BLC Typology

- Type-0/I languages: prefer a single or no “verb” in the BLC
- Type-II languages: prefer dispositional verbs in the BLC
- Type-III languages: prefer 2-4 posture verbs in a classificatory function in the BLC
Thinking-for-Speaking (TfS) effects

- causal effects from grammar and lexicon via “codability” onto the “preverbal message”
  - generated by the “conceptualizer” at the onset of speech production

- a new domain for the study of TfS: dispositions
  - stage-level spatial properties that characterize “how”, rather than “where”, a figure is located

- Mayan and other Mesoamerican languages lexicalize dispositions
  - at a level of semantic specificity unparalleled in Indo-European languages such as Spanish
what makes dispositions a particularly interesting domain for the study of TfS

- new domain, conceptually independent (in first approximation) of motion “framing”
- offers the potential of observing pure lexicalization-based effects
  - unlike motion framing, which has an important syntactic component
- populations speaking Non-Western languages are predicted to outperform
  - populations speaking Indo-European languages
- so any observed effect couldn’t easily be attributed to familiarity with test conditions, stimuli, etc.
evidence of TfS in the dispositional domain

- richer lexicalization renders dispositional information more codable in Yucatec
  - Yucatec speakers mention disposition twice as frequently as Spanish speakers
    - in descriptions of the same photographic stimuli
    - and also encode dispositional information significantly more often against locative information as a baseline

follow-up questions

- are TfS effects in the dispositional domain indeed purely lexicalization-based?
  - one possible confound: does the fact that dispositionals are a form class in Mayan influence codability?
  - compare across Mayan languages!; look for set-size effects...
PREVIEW: LECTURE 4

- motion events


- on Canvas shortly
References


References (cont.)


Thanks!