# 2012 Annual Meeting of the Linguistic Society of America
Symposium: Psycholinguistic Research on Less-Studied Languages

Experimental Design for Field Linguists

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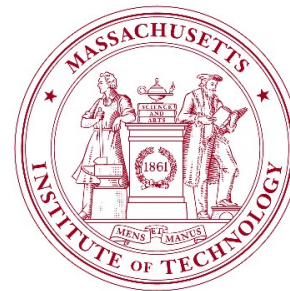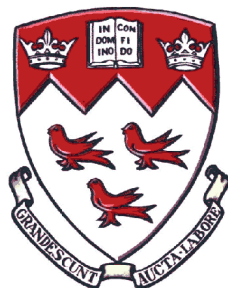
A Changing Field

- More linguists using experimental methods
- Findings applied to linguistic theory
- Developing an integrated theory of language

A New Objective

- Field work standards
  Samarin 1967, Dixon 1989, Matthewson 2004, Vaux et al. 2007, Crowley 2007, Bowern 2008

- Experimental standards
  Cowart 1998, Schutze 1996, Gibson & Fedorenko 2010, Sprouse & Almeida forthcoming, a.o.

- Goal: Maintain standards from both traditions   while collecting quantitative data in the field

Plan for Today

- General considerations for linguistic experimentation in the field

- Specific techniques and lessons learned from our processing work in two Mayan languages

SOME GENERAL PRINCIPLES

General Principles

- Manage your resources and those of your host community
  - No fishing expeditions: formulate a testable hypothesis with clear implications
  - Have a back-up plan
  - Make sure there is no way of answering your question without experimenting in the field

General Principles

- Expect testing conditions to be maximally different from familiar experimental settings
  - Be personally familiar with the place where the experiment will be run
  - Be personally familiar with the community
    - Experience with outsiders
    - Approval from community leaders
    - Cultural norms with regard to payment

General Principles

- Be prepared for population variability
  - Assess experience
    - Education, literacy, multilingualism
    - Familiarity with testing equipment
  - Assess dialectal variation
  - Collect demographic information in order to asses the extent of variance

General Principles

- Experimenting is time consuming, field work is time consuming, experimenting in the field is extra time consuming
  - Run a pilot
  - Budget time for being a gracious guest
  - Budget time for the unexpected

General Principles

- Be prepared to articulate the goals of your project to the host community
  - Speakers are not vending machines
  - Communicate to participants what their participation involves
  - Engage hosts in a conversation about potential beneficial outcomes for their community

TECHNIQUES FOR EXPERIMENTAL WORK IN THE FIELD

Comprehension Research:
A Common Paradigm

- Self-paced reading (SPR), an established tool

  Just et al. 1982, Mitchell 2004

- Timing is regular except for areas of difficulty
- How can one extend this paradigm to populations that do not read?

Non-Reading Populations

- Potential issues regarding literacy
  - A language that is exclusively spoken
  - General illiteracy
  - Literacy only in culturally dominant language

Possible Solutions

- Taking lessons from researchers for whom reading is irrelevant, inappropriate, or an unwelcome confound
  - Sign language research
  - Child language acquisition research
  - Research on clinical populations
  - Phonological investigations

Another Common Paradigm in Comprehension

- Sentence-picture matching (SPM), also well-established

  Bamber 1969, Carey & Lockhart 1973, Clark & Chase 1972, Frost 1972, Seymour 1974, Shepard 1967, a.o.

- Present acoustic stimuli and record response time for a stimulus-to-picture matching task

- Common in the fields of aphasiology and child language acquisition

Comparing SPR and SPM

- An unknown: Do SPR and SPM produce comparable results?

- Test case: Relative clause processing

Relative Clause Processing

- Subject relatives are easier to process

    SPR: Traxler et al. 2002; ERP: King & Kutas 1995; PET: Stromswold et al. 1996; fMRI: Just et al. 1996; Eye-tracking: Traxler et al. 2002…

- Cross-linguistic advantage of subject relatives

    Dutch: Frazier 1987; German: Mecklinger et al. 1995; Hebrew: Arnon 2005; Japanese: Miyamoto & Nakamura 2003; Korean: Kwon et al. 2006; Russian: Polinsky 2011…

Comparing SPR and SPM: Russian

- Subject preference in the processing of relative clauses in Russian

  Levy et al. 2007, submitted; Polinsky 2011, 2012

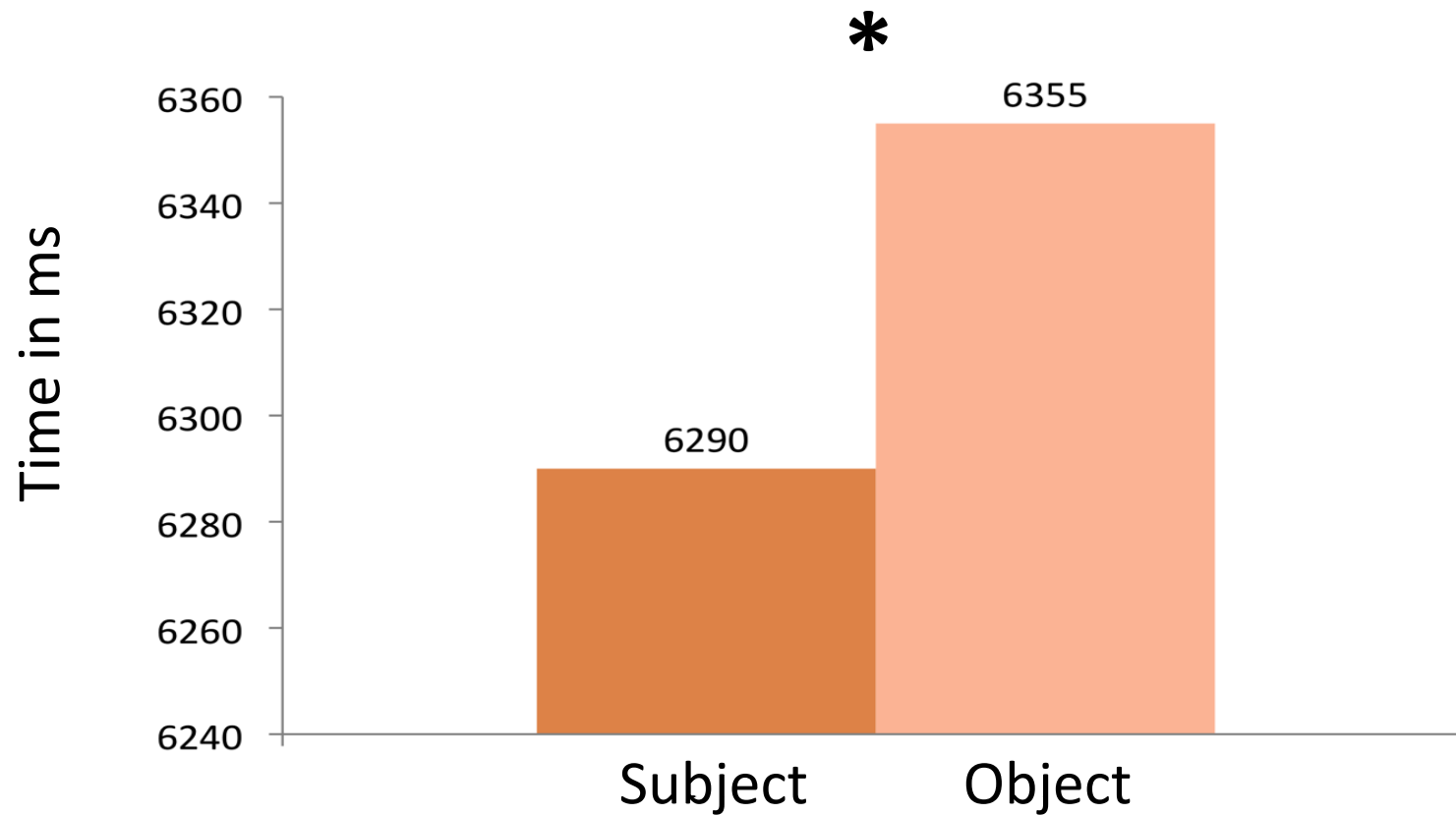- Subject and object RCs can have the same word order

  NP_i [which$_{NOM}$ ___$_i$ Verb NP_{ACC}]   = Subject Relative
  NP_i [which$_{ACC}$ ___$_i$ Verb NP_{NOM}]   = Object Relative

Russian: Self-paced Reading
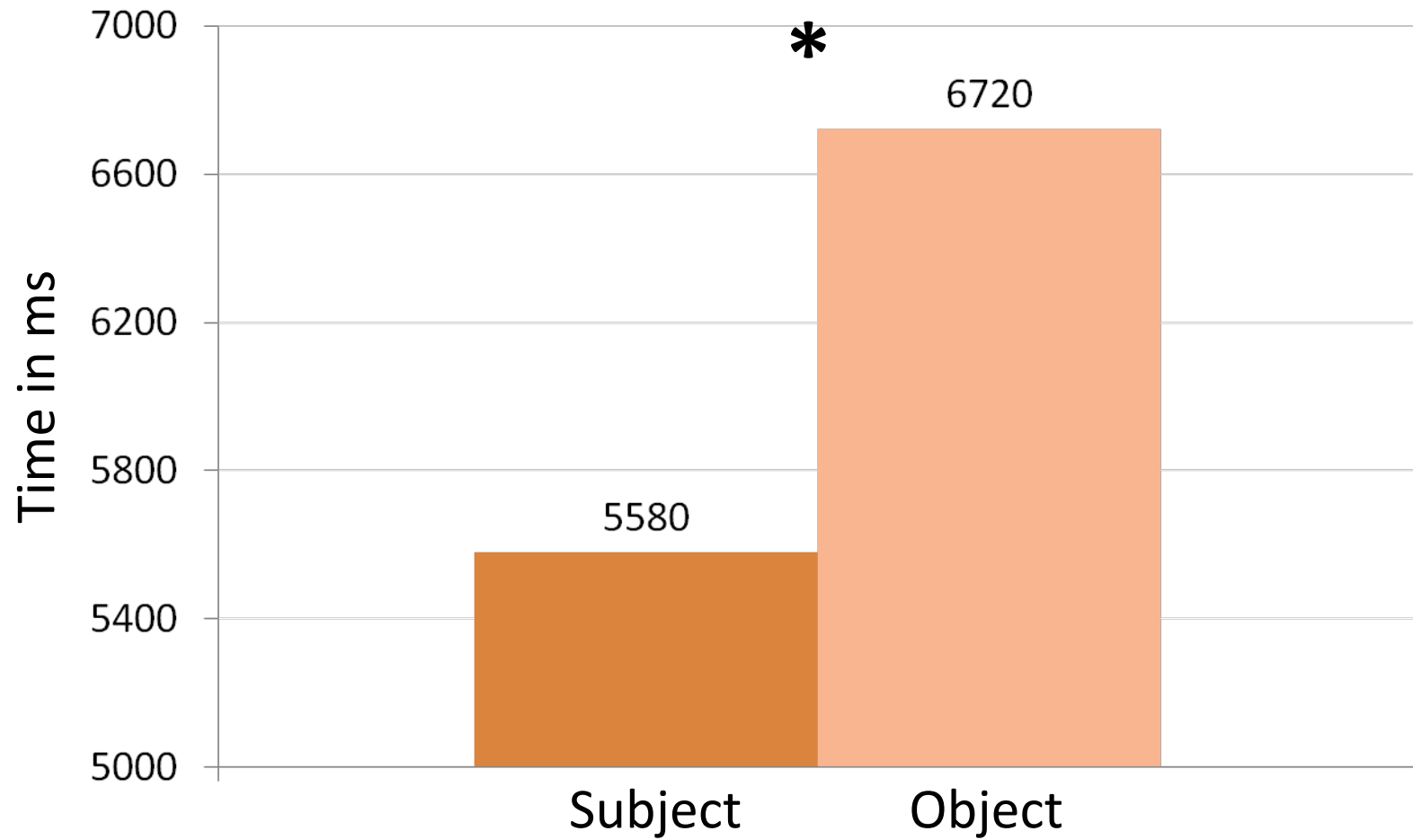

Polinsky 2012; Polinsky & Fedorova in prep.

Russian: Sentence-Picture Matching

- Subjects see two pictures on computer screen followed by a sound file

Russian: Sentence-Picture Matching

Polinsky & Fedorova in prep.

Where We Are…

- Proof of principle: We have shown comparable results from research using different paradigms

    Polinsky 2011, Polinsky & Fedorova in prep.

- Subject preference, again: Russian illustrates a well-documented processing preference for subject extraction

Where we are going…

- Russian confirms a well-documented processing preference for subject extraction
- Is the subject preference due to grammatical function preference or case hierarchy?
  - Subject > Object > ….
  - Nominative gap > Accusative gap > …

Where we are going…

- Is the subject preference due to **grammatical function** or **case**?

	TRANS	INTRANS
SUBJECT		
OBJECT		N/A

Where we are going...

- Is the subject preference due to **grammatical function** or **case**?

	TRANS	INTRANS
SUBJECT	NOM	NOM
OBJECT	ACC	N/A

- In accusative languages, case **aligns** with grammatical role.

Where we are going…

- Is the subject preference due to **grammatical function** or **case**?

	TRANS	INTRANS
SUBJECT	ERG	ABS
OBJECT	ABS	N/A

- In ergative languages, grammatical functions and cases **align differently**.

Where we are going…

- Is the subject preference due to grammatical function or case?

- Investigate the processing of relative clauses in an ergative system:
  - Ch'ol, Q'anjob'al (Mayan)
  - Avar (NE Caucasian)
  - Niuean, Tongan (Austronesian)

Mayan Languages

Ch'ol (aka Chol)

- VOS, morphologically ergative language
- Grammatical relations encoded via agreement

(1) Ta' i-japä-ø   kajpej jiñi x'ixik.
     ASP 3ERG-drink-3ABS coffee the woman
     'The woman drank coffee.'

(2) Ta' wäyi-ø   jiñi x'ixik
     ASP sleep-3ABS the woman

     'The woman slept.'

- All core arguments freely relativize with a gap

Subject Relatives

(3) Ta' y-ilä-yety   jiñi x'ixik

ASP 3ERG-see-2ABS   the woman

'The woman saw you.'

(4) Ta' juli   jiñi x'ixik$_i$ [ta'-bä   y-ilä-yety   ___$_i$]

ASP arrive **the woman**   **ASP-REL 3ERG-see-2ABS**

'The woman [who saw you] arrived.'

Object Relatives

(5)   Ta' aw-ilä-ø   jiñi x'ixik

ASP 2ERG-see-3ABS the woman

'You saw the woman.'

(6)   Ta' juli   jiñi x'ixik$_i$ [ta'-bä   aw-ilä-ø   ___$_i$]

ASP arrive   the woman   ASP-REL 2ERG-see-3ABS

'The woman [who you saw] arrived.'

Ambiguity

- Ambiguity results when both DPs are third person:

(7) Ta' juli   **jiñi x'ixik**$_{subj/obj}$ [ta'-bä   i-tsäk'ä-$\emptyset$ **{t$_{obj}$}** jiñi wiñik **{t$_{subj}$}**]
ASP arrive the woman   ASP-REL 3ERG-cure-3ABS   the man

'I saw the woman [who cured the man].'   (= Subject relative)
'I saw the woman [who the man cured].'   (= Object relative)

Because both DPs begin post-verbally, and no case is marked on nouns, it is possible to interpret the gap in either subject or object position.
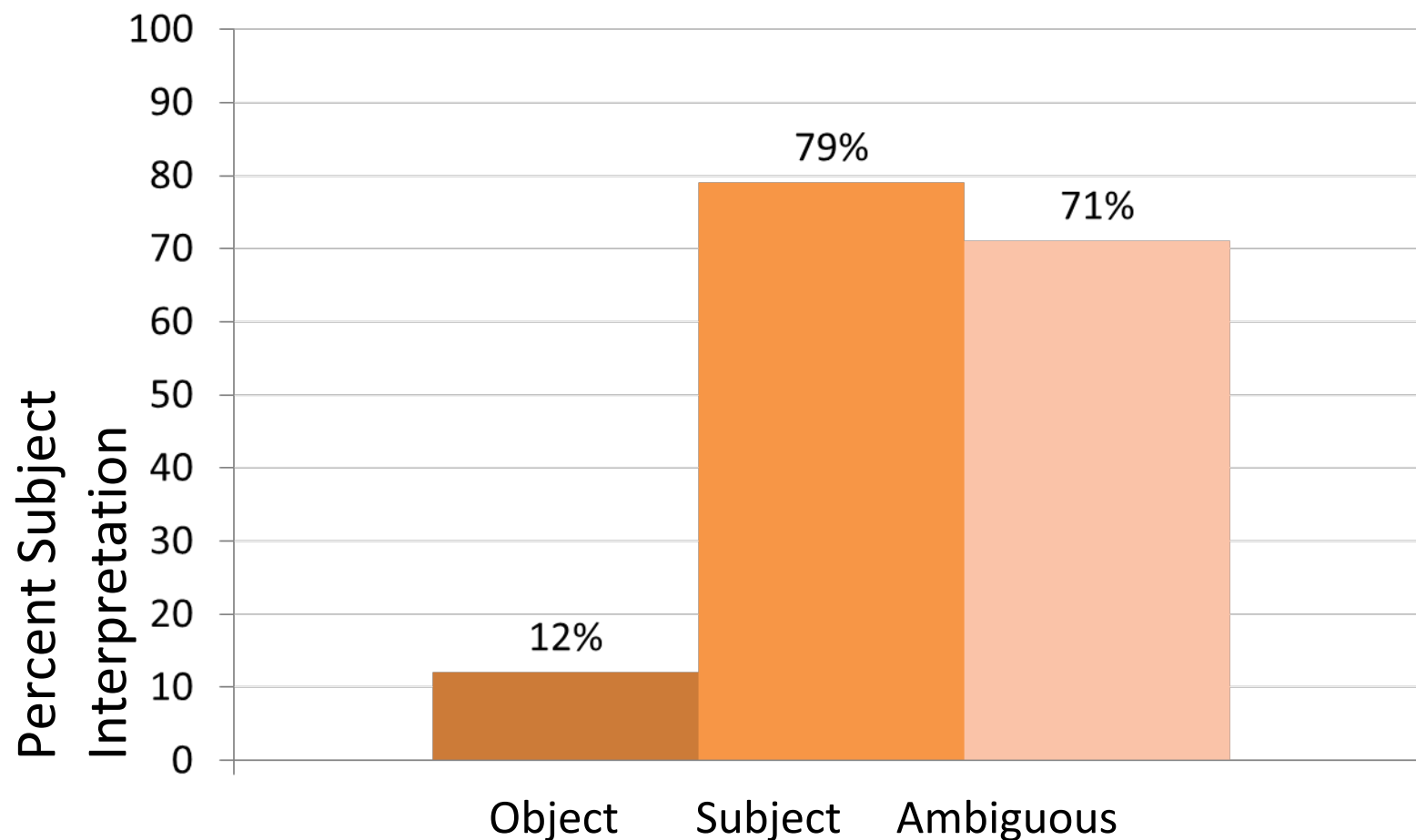
Sentence-Picture Matching

- Participants hear the ambiguous relative clause
    - … choose the image that corresponds
    - … indicate their choice with a binary button box
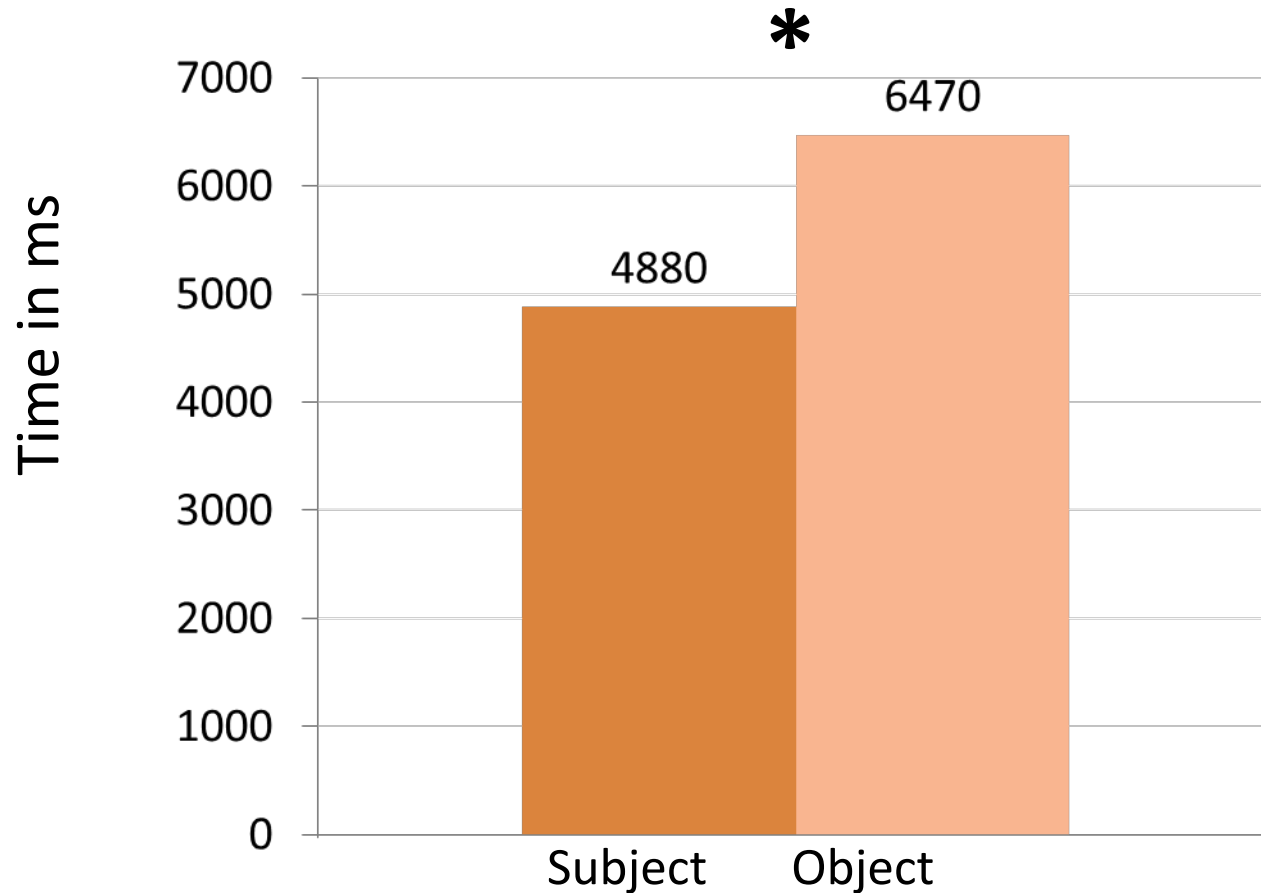
Ch'ol: Preliminary Results, Percentage interpreted as subject RCs

(monolingual Chol speakers)

Coon et al. in prep.

Ch'ol: Preliminary Results, Response Time

(for clauses in perfective aspect)

Coon et al. in prep.

Preliminary Results

- An ergative language, Ch'ol still shows subject preference in the processing of relative clauses

- Similar processing results for Q'anjob'al (not presented here)

Taking Stock

- New linguistic results:
  - Subject preference in a head-initial ergative language
  - Grammatical function matters in relativization

- New methodological proposal:
  - Re-appropriating well-established paradigms in experimental fieldwork (picture matching)

- Some general tips for experimenting in the field:
  - Get creative and stay flexible
  - Be prepared for a significant time investment
  - Plan in advance as much as possible

Thank you * Wokox awälä' * Yuj wal tyoxh

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  - Pedro Gutiérrez Sánchez
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References

Bamber, D. (1969). Reaction times and error rates for "same"-"different" judgments of multidimensional stimuli. *Perception & Psychophysics* 6, 169-74.

Bowern, C. (2008) Linguistic Fieldwork: A Practical Guide. London: Macmillan.

Carey, S. T. & Lockhart, R. S. (1973). Encoding differences in recognition and recall. *Memory & Cognition* 1, 297-303.

Chase, W. G. & Clark, H. H. (1972). Mental operations in the comparison of sentences and pictures. In Lee W. Gregg (Ed.) *Cognition in learning and memory.* New York: Wiley.

Clark, H. H. & Chase, W. G. (1972). On the process of comparing sentences against pictures. *Cognitive Psychology* 3, 472-517.

Clark, H. H. & Chase, W. G. (1974). Perceptual coding strategies in the formation and verification of descriptions. *Memory & Cognition 2,* 101-111.

Coon, J., Clemens, L., Mateo Pedro, P., Morgan, A.M., Polinsky, M., Wagers, M. & N. Arcos Lopez (in prep.). An experimental investigation of Chol relativization.

References, cont.

Cowart, W. (1998). *Experimental syntax: Applying objective methods to sentence judgments*. Thousand Oaks: Sage Publications.

Crowley, T. (2007). *Field linguistics: A beginner's guide*. Oxford: OUP.

Dixon, R.M. W. (1989). *Searching for Aboriginal languages: Memoirs of a field worker*. Chicago: University of Chicago Press.

Fedorenko, E. & Gibson, E. (2010). Adding a third wh-element does not increase the acceptability of object-initial multiple-wh questions. *Syntax 13*, 183-195.

Frost, N. (1972). Encoding and retrieval in visual memory tasks. *J of Experimental Psychology* 95, 317-26.

Gibson, E. & Fedorenko, E. (2010). Weak quantitative standards in linguistics research. *Trends in Cognitive Sciences 14*, 233-234.

Jorgensen, C. C. & Kintsch, W. (1973). The role of imagery in the evaluation of sentences. *Cognitive Psychology* 4, 110-116.

Just, M. A., Carpenter, P. A., & Woolley, J. D. (1982). Paradigms and processes in reading comprehension. *J of Experimental Psychology* 111, 228-238.

References, cont.

Matthewson, L. (2004). On the methodology of semantic fieldwork. *International Journal of American Linguistics* 70, 369-415.

Polinsky, M. (2012). The role of case in the processing of long-distance dependencies. Submitted.

Polinsky, M. & O. Fedorova (in prep.). Self-paced reading matches sentence-picture matching.

Polinsky, M., C. Gomez Gallo, P. Graff & E. Kravtchenko (2011). Subject preference and ergativity. *Lingua* 121.

Samarin, W. J. (1967). *Field linguistics: A guide to linguistic field work*. New York: Holt, Rinehart & Winston.

Seymour, P. H. K. (1974). Pictorial codings of verbal descriptions. *Quarterly Journal of Experimental Psychology* 26, 39-51.

Shepard R. N. (1967). Recognition memory for words, sentences and pictures. *J of Verbal Learning and Verbal Behavior* 6, 156-63.

References, cont.

Schütze, C. (1996). *The empirical base of linguistics. Grammaticality judgments and linguistic methodology*. Chicago: University of Chicago Press.

Sperling, G. A. (1963). A model for visual memory tasks. *Human Factors 5,* 19-31.

Sprouse, J & Almeida, D. (forthcoming). Assessing the reliability of textbook data in syntax: Adger's Core Syntax. *J of Linguistics.*

Sprouse, J & Almeida, D. (submitted). Power in acceptability judgment experiments and the reliability of data in syntax.

Tversky, B. (1969). Pictorial and verbal encoding in a short-term memory task. *Perception & Psychophysics* 6, 225-33.

Tversky, B. (1974). Breadth of pictorial and verbal codes in memory. *Bulletin of the Psychonomic Society,* 4, 65—8.

Vaux, B., J. Cooper & E. Tucker (2006). *Linguistic field methods*. Eugene: Wipf & Stock.

Contexts of relativization in Q'anjob'al			
Verb types	Prog (=Animacy)	Prog (non=animacy	Com(=animacy)
RTVs	3 (ambigous)	8 (unambiguous)	7 (unambiguous)
DTVs	7 (ambigous)	----	6 (unambiguous)
Unaccusatives	6 (unambiguous)	----	7 (unambiguous)
Unergatives	5 (unambiguous)	----	6 (unambiguous)
Positionals	4 (unambiguous)		4 (unambiguous)
Fillers (198)	---	---	---
Total	25	8	30

In progress…

- Processing of relative clauses in Q'anjob'al
    - VSO and ergative language
    - Ambiguity in the progressive *lanan*

- B'aytalil ay   no' wakax [lanan-∅   s-tek'-on   no' chej]?

    where   exist the cow   [ASP-3ABS 3ERG-kick-AF
    the horse]

    'Where is **the cow** that is kicking the horse?'
    'Where is **the horse** that is kicking the cow?'