

# My co-authors



# Introduction

- **Lexical semantics** (Pustejovsky 1995): the lexicon should not be treated as a static set of word senses because the creative use of words in novel contexts allows for an interesting examination of semantic compositionality.
- **Metonymy** (Transfer of Reference, ToR) is the mental and linguistic process where a word or phrase denoting one thing or person shifts in meaning to represent a related thing or person.
- The different meanings are called ‘senses,’ a literal one and a shifted one.

# Introduction

- An example of **regular metonymy** is the name of the author standing for the book:  
*e.g. Plato is up there on the top shelf, next to Wittgenstein.*

- Apart from regularly available meaning shifts, there are more **ad-hoc shifts** that are **productive** but have to be interpreted **depending on the situation and context**:

e.g. Two waitresses are talking in a diner. One says to the other:

***- The ham sandwich in the corner wants another coffee.***

# A recent example of ad-hoc metonymy, or Mittonymy

On October 16, 2012, in the second presidential debate between President Obama and Governor Romney, the following phrase was produced:

“And I—and I went to my staff, and I said, ‘How come all the people for these jobs are—are all men.’ They said: ‘Well, these are the people that have the qualifications.’ And I said: ‘Well, gosh, can't we—can't we find some—some women that are also qualified?’ And—and so we—we took a concerted effort to go out and find women who had backgrounds that could be qualified to become members of our cabinet. I went to a number of women's groups and said: ‘Can you help us find folks,’ and they brought us **whole binders full of women.**”

- While this is absolutely no endorsement for the candidate, one might say that he used a legitimate linguistic means of Transfer of Reference, or metonymy, where

*binders full of women*

actually stands for

*binders full of women's CVs, or dossiers.*

- However, the reaction of the public shows that this transfer, completely legitimate in the language but novel, ad-hoc, not-heard-before, may not be that readily available ...

**WOMEN**

**WOMEN**

**WOMEN**



Hey I just met you  
and this is crazy

where did you get  
a binder this big

please let me out



# Binders full o'Women just 77 cents on the dollar.



Come  
get 'em!





# Linguistic Analysis

- Theoretical accounts of how and why regular metonymy arises divide into two major approaches.
- One approach models metonymy as the **application of lexical rules** (e.g. producer for product, cf. Ostler & Atkins 1992; Copestake & Briscoe 1995; Pustejovsky 1995; Murphy 1997), application of such rules in the syntax (Borer 2005) or in the semantics (Döling 1995).

# Linguistic Analysis

- Alternatively, “**radical pragmatic**” approaches (Fauconnier 1985; Nunberg 1979, 1995; Papafragou 1996) place concepts such as noteworthiness, centrality, and salience at the basis of metonymy: it arises because the literal and the shifted senses are centrally and saliently related to one another.
- Accounts of the second type would predict similar metonymy acceptability across languages of the world, while accounts of the first type allow for more language variation.

# Productive novel ToR

*The ham sandwich in the corner wants some more coffee.*

- The subject of this sentence refers to a customer who has ordered or is eating a ham sandwich. It would be absurd to claim that the lexical entry *ham sandwich* is polysemous between a “ham sandwich” and a “customer.”
- Nunberg 1997: The interpretation in context involves a pragmatic principle called Transfer of Reference, which allows one to interpret *ham sandwich* (the source reading) as ‘THE PERSON CONTEXTUALLY ASSOCIATED WITH THE HAM SANDWICH’ (the shifted reading).

# Syntactically transparent semantic composition

- All elements of content in the meaning of the sentence are found in the **Lexical Conceptual Structures** (LCSs) of the lexical items composing the sentence.
  - (i) The internal structure of LCSs play no role in determining how the LCSs are combined.
  - (ii) Pragmatics plays no role in determining how the LCSs are combined.

Jackendoff 1997: 48

# Syntactically transparent semantic composition

- Jackendoff 1997: ch. 3, based on Pustejovsky (1991, 1995), argues that Logical Form cannot be taken to encode semantic distinctions directly.
- The effects of syntactic structure on conceptual structure interleaves intimately with the effects of word meanings and pragmatics.



# Jackendoff's Enriched Composition

(Jackendoff 1997, 2002)

- The conceptual structure of a sentence may contain, in addition to the conceptual content of its Lexical Conceptual Structures (LCSs), other material that is not expressed lexically, but that must be present in Conceptual Structure either:
  - (i) in order to achieve well-formedness in the composition of the LCSs (Pustejovsky's coercion), or
  - (ii) in order to satisfy the pragmatics of the discourse or extralinguistic context.

# Jackendoff's Enriched Composition

(Jackendoff 1997, 2002)

Cases of enriched composition include:

- Aspectual coercion: e.g. *The light flashed until dawn.*
- Mass-count coercion: e.g. *I'll have a coffee.*
- Complement coercion: e.g. *Mary began the beer/  
the book.*
- Transfer of reference: e.g. *The ham sandwich ...*
- Control
- Anaphora
- etc.

# Experimental Results on enriched composition interpretation

- Complement coercion (CC) is related to higher processing costs in self-paced reading (McElree et al 2001), eye-tracking (Traxler et al 2005), and speed-accuracy trade-off measures (McElree et al 2006). As some other explanations have been ruled out, the reading time delay has been directly attributed to shifting one meaning to another.
- CC (tested through MEG) elicited increased activity in a frontal lobe area outside of Broca's area (the anterior midline field) (Pykkänen et al 2008).

# Experimental Results on enriched composition interpretation

- Aspectual coercion was also proved to incur processing costs over and above those of baseline sentences without enriched composition (Brennan & Pylkkänen 2008, Piñango et al. 1999, Piñango et al. 2006)
- as did concealed questions tested by eye-tracking and Magnetoencephalography (MEG) (Harris et al. 2008).
- **Bottom line:** enriched composition cases are processed in a qualitatively different part of the brain and incur higher processing costs!

# What is the learning task in L2A?

- Enriched composition, which has only been tested in English, utilizes universal semantic composition mechanisms that should be available to all languages.
- We would expect learners to be able to comprehend such sentences, aided by their native grammar or UG.
- However, if their native grammar allows less freedom (assuming the analysis of lexical rules), learners will have some semantic acquisition to do.
- Additional processing costs may also be a factor in L2A.

# Our research questions

- Are there differences in the way the three languages treat novel metonymy?
- Are there differences in which the languages treat regular metonymy?
- Do learners behave differently in their second language than they do in their native language?
- Are there differences in the ways learners treat novel and regular metonymy?



# Our experimental study

Participant Groups	N	Mean proficiency (out of 50)	Range
English NSs	36		
Korean NSs*	19		
Spanish NSs*	23		
Korean Intermediate learners of English	16	25	15-30
Korean advanced learners of English	24	35.83	31-47
Spanish advanced learners of English	28	43	33-50

\* All native speakers tested in their native language

**Spanish advanced >> Korean advanced**

# Experimental Tasks

- **Paraphrase Task**

e.g. *The first violin has the flu.*

☒ The first violinist is sick with the flu

☐ The first violin is not working properly because of an illness

☐ Both

☐ Neither

- **Acceptability Judgment Task**

e.g. *The soldiers began to move up the field during battle. The colonel gave the cannon the signal to fire.*

1

2

3

4

5

# Experimental Tasks

## Paraphrase Task

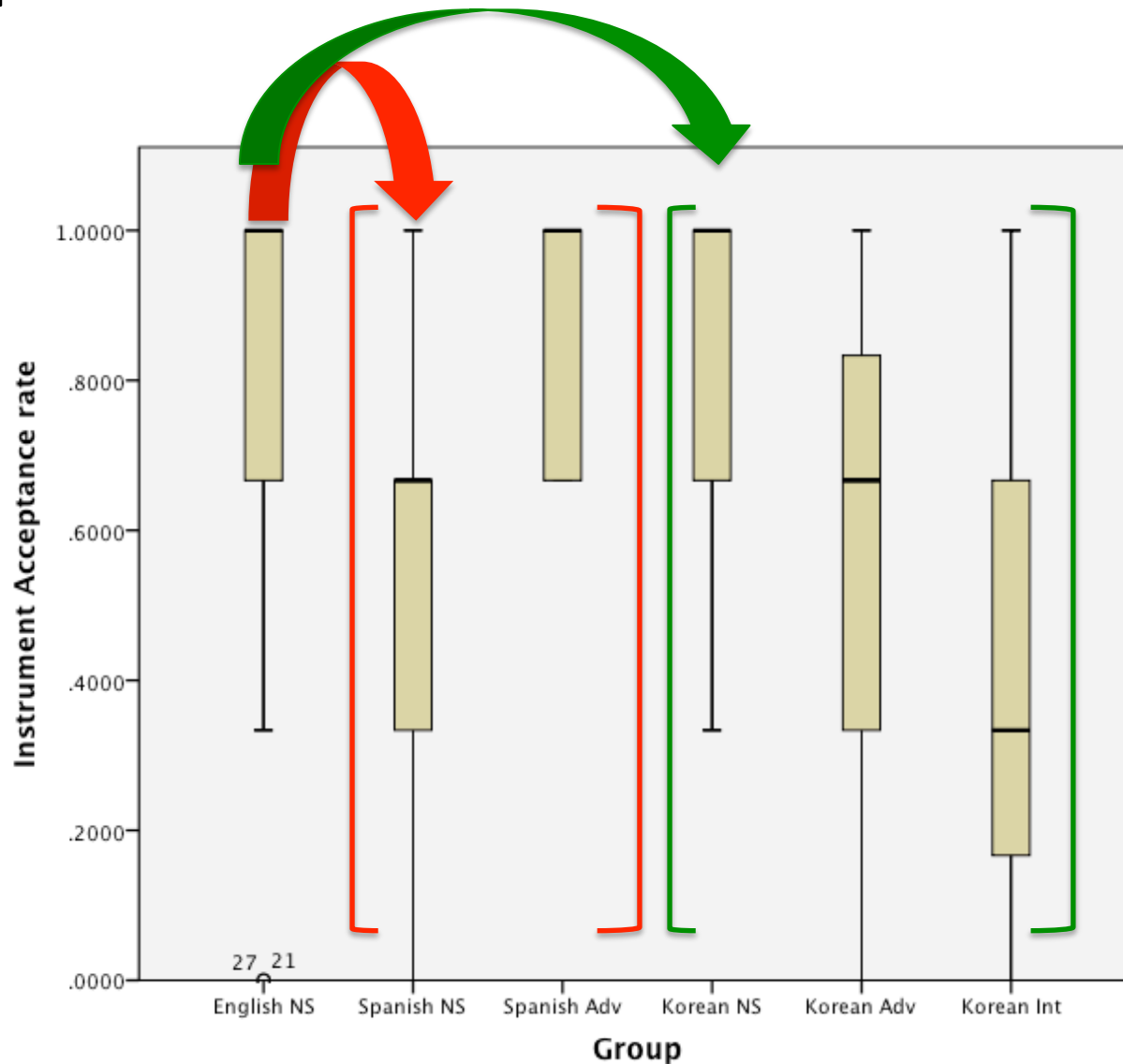
- Instrument for Agent (n = 4): *The first violin has the flu.*  
Loose Association (n = 9): *Bill is in the Guinness Book of World Records.*
- Producer for product (n = 4): *Proust is on the top shelf.*
- Possessed for possessor: (n = 4)  
(while a telephone is ringing) *Is that you?*
- Baseline (n = 21): *The piano player has the flu.*
- Fillers (n = 12)

# Experimental Tasks

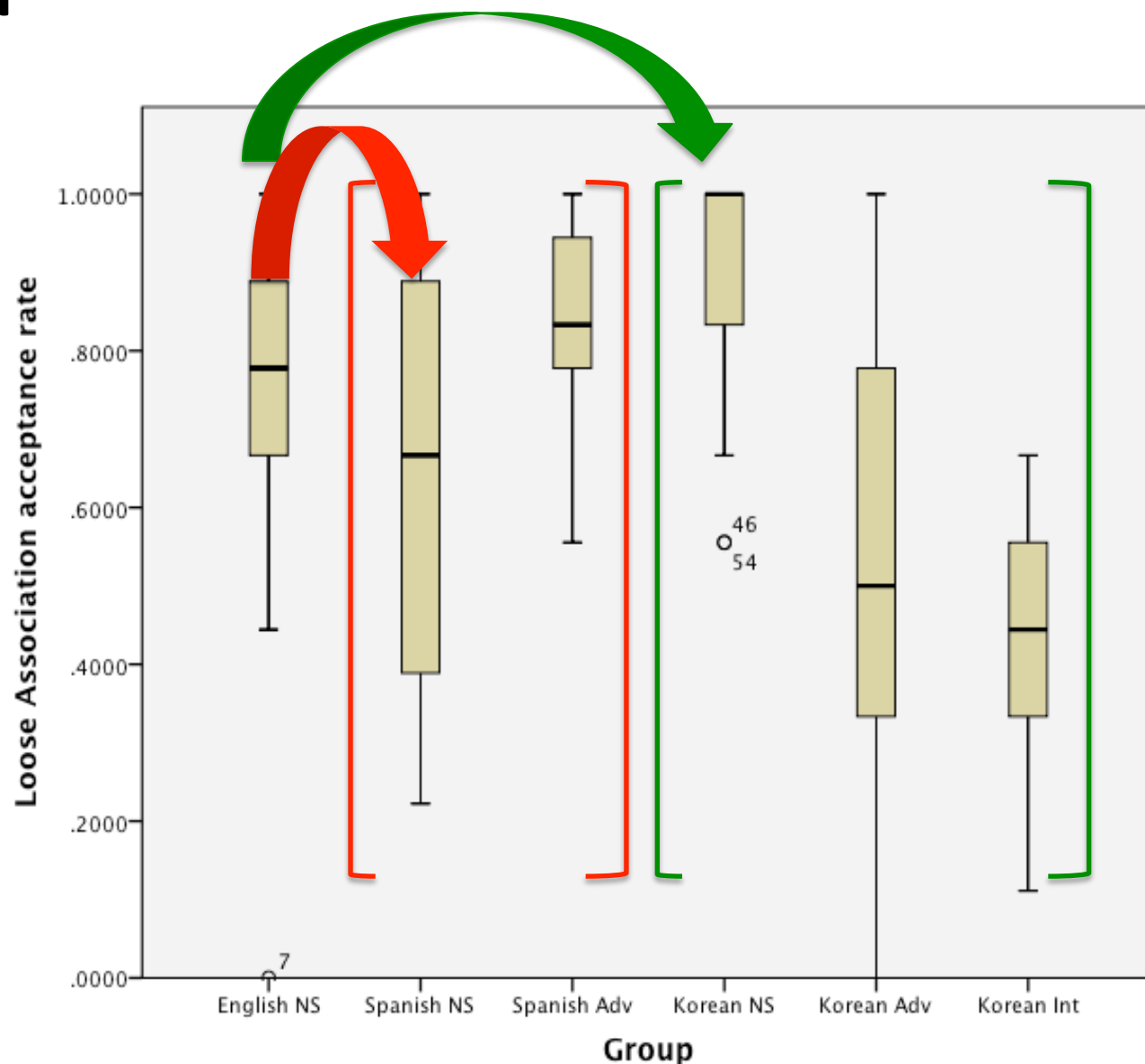
## Acceptability Judgment Task

- Instrument for Agent (n = 4): ...*The Mac showed the PC how to download the software.*
- Loose Association (n = 4): ... *The exit row is prepared to help in case of emergency.*
- Producer for product (n = 4): ... *I love to curl with a good Agatha Christie.*
- Baseline (n = 12) ... *The older passengers are prepared to help in case of emergency.*
- Experimental bad sentences (n = 12): *I did all my laundry this morning and hung it out to dry in the yard. The clothes dryer was not very happy.*
- Fillers (n = 14)

# Paraphrase Task: Instrument for Person

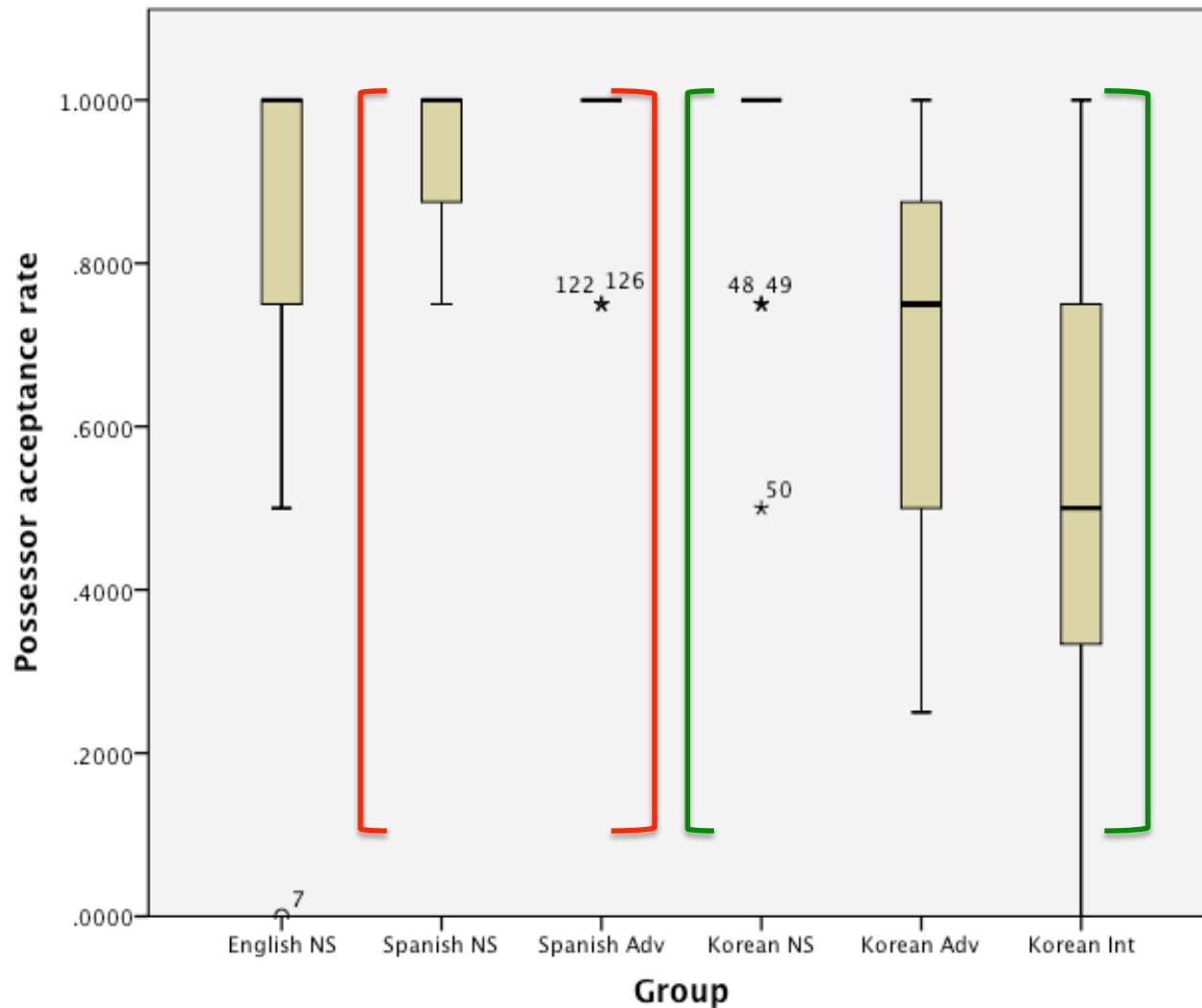


# Paraphrase Task: Loose Association

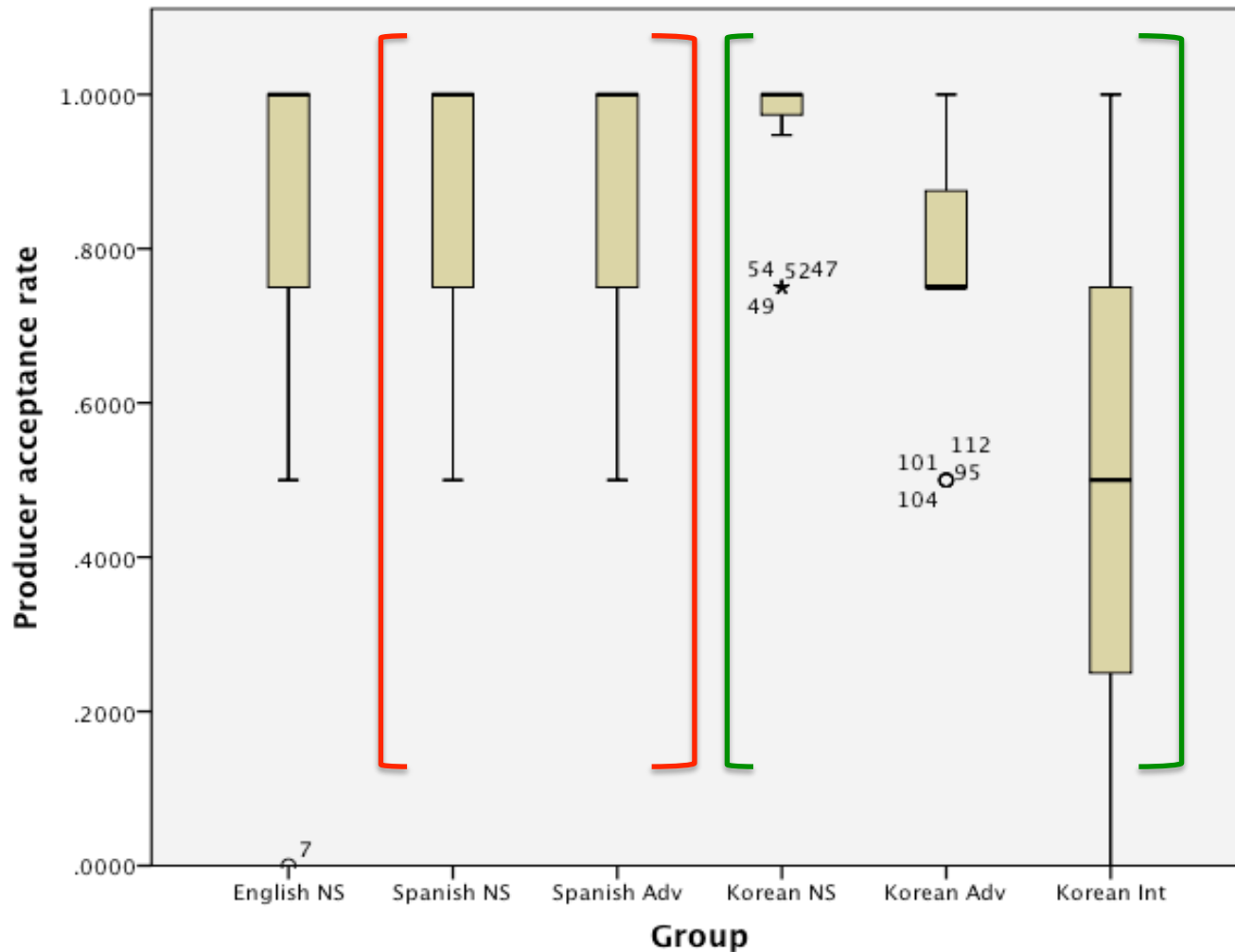




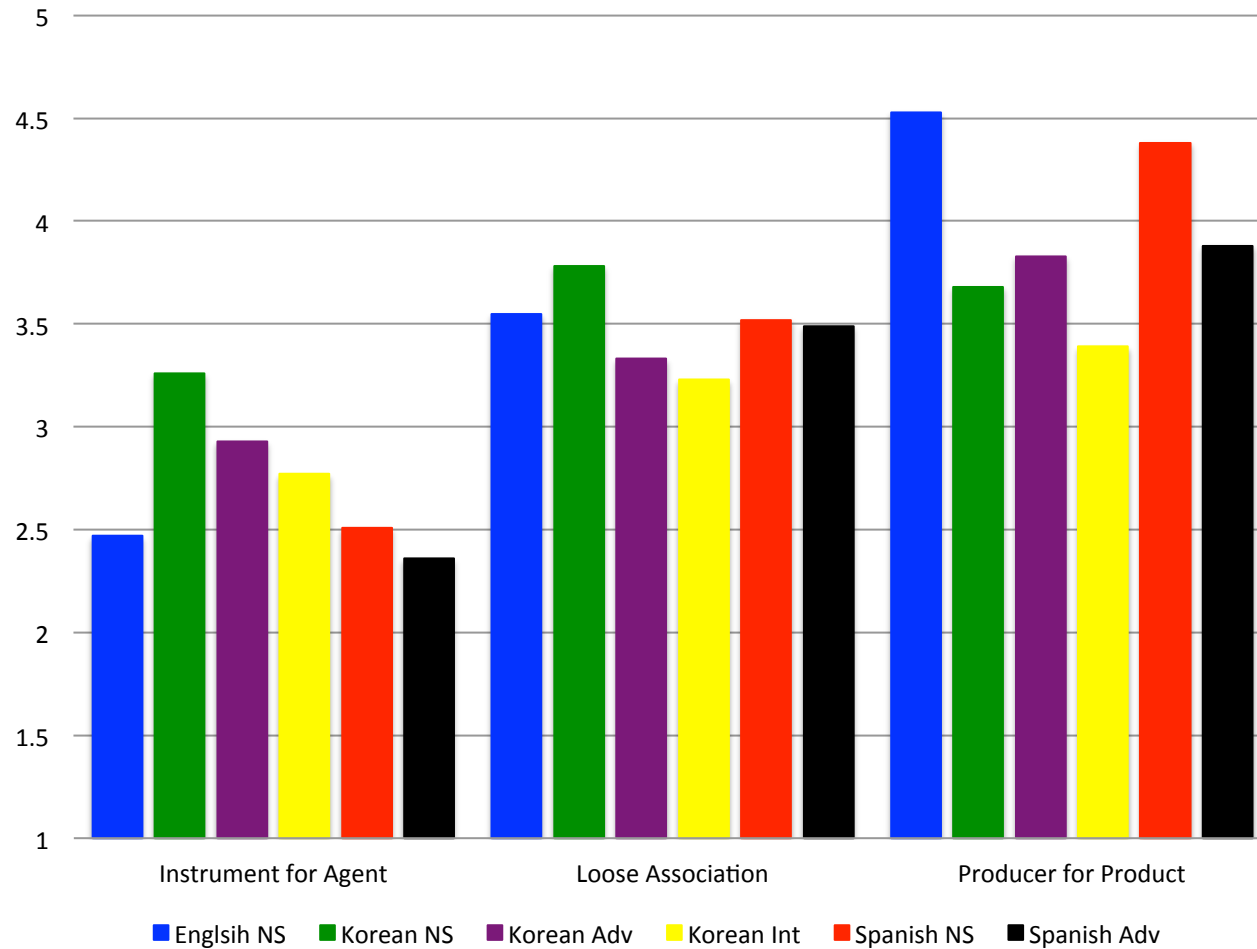
# Paraphrase Task: Possessed for Possessor



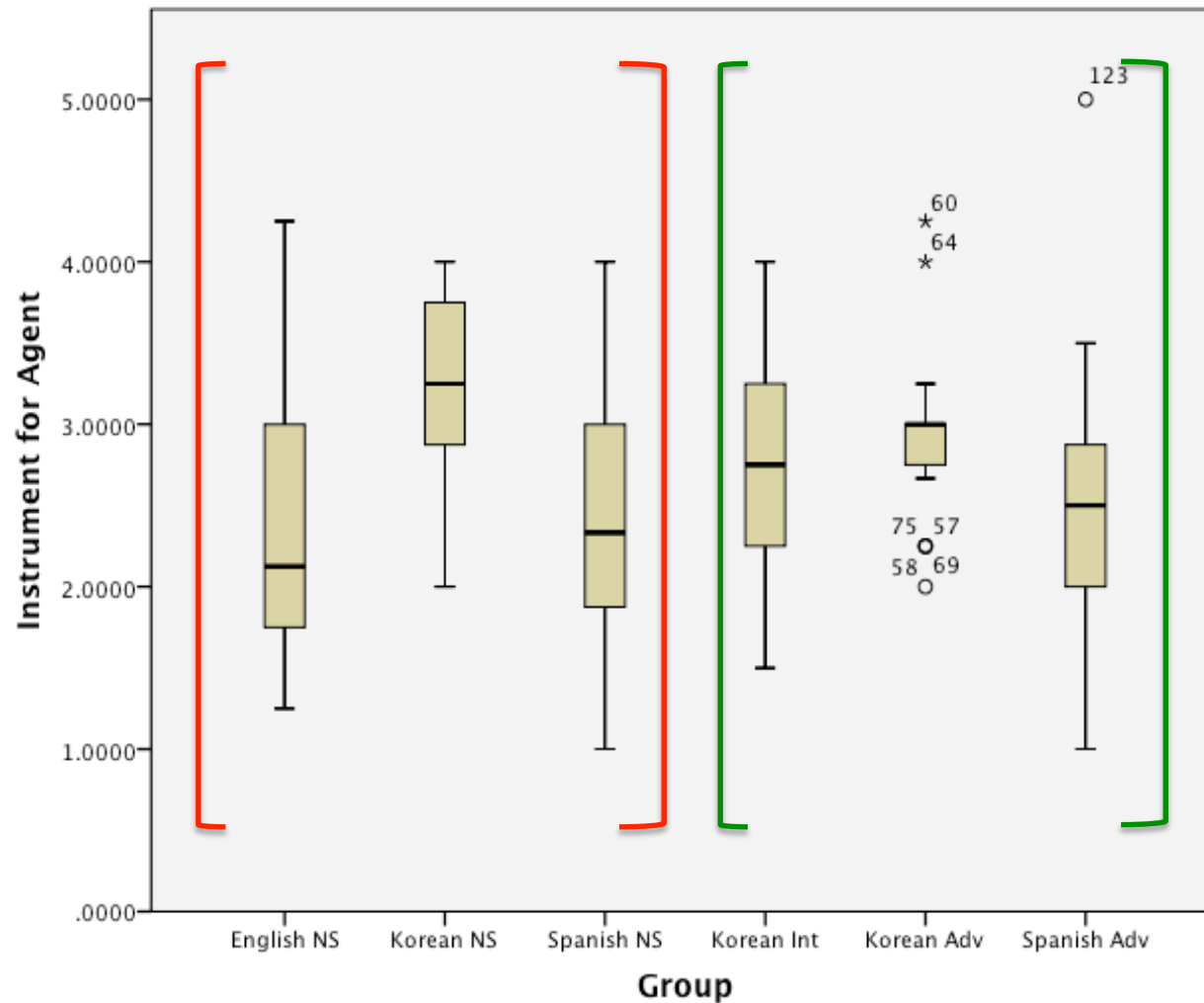
# Paraphrase Task: Producer for Product



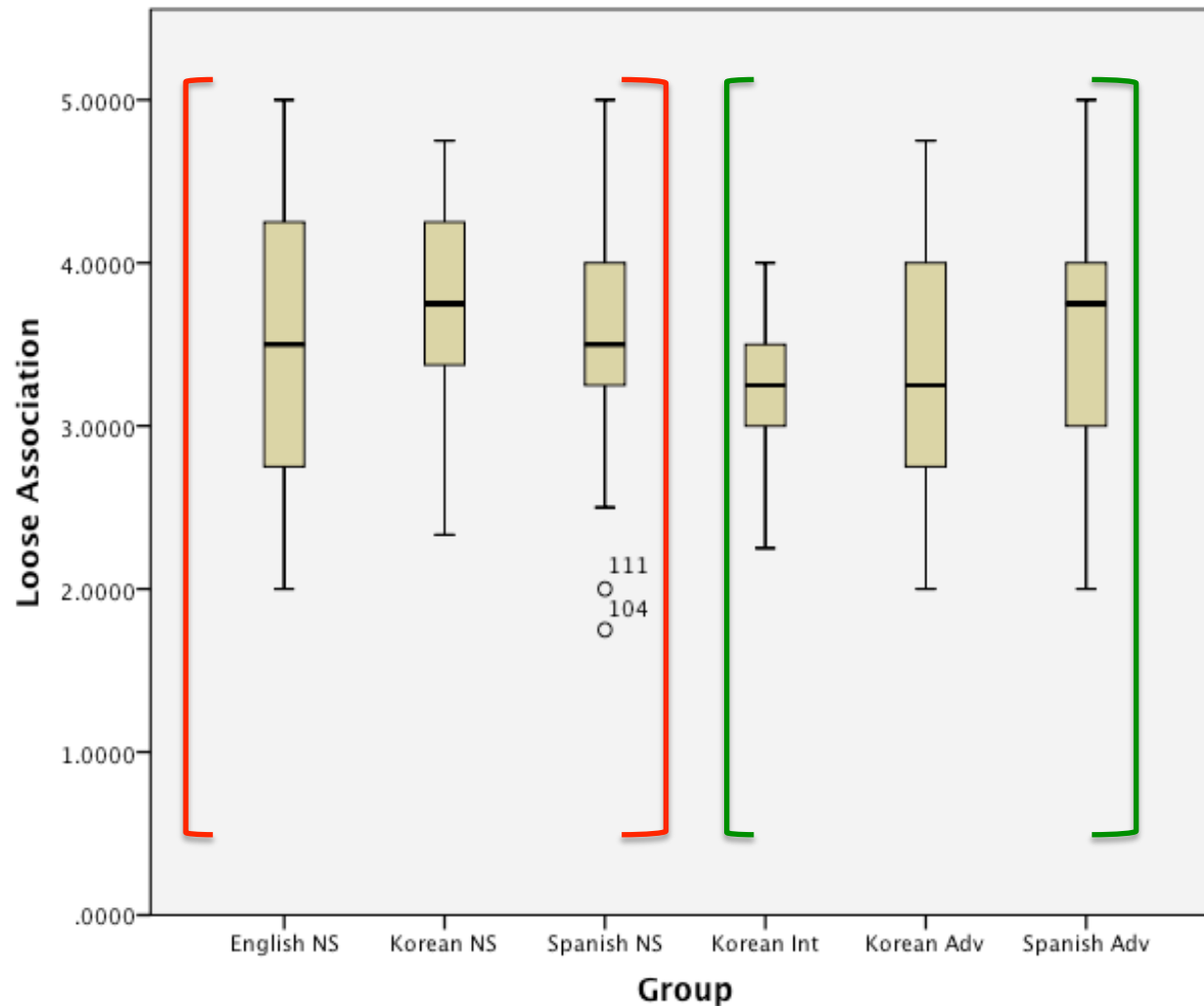
# Judgment Task: Means (out of 5)



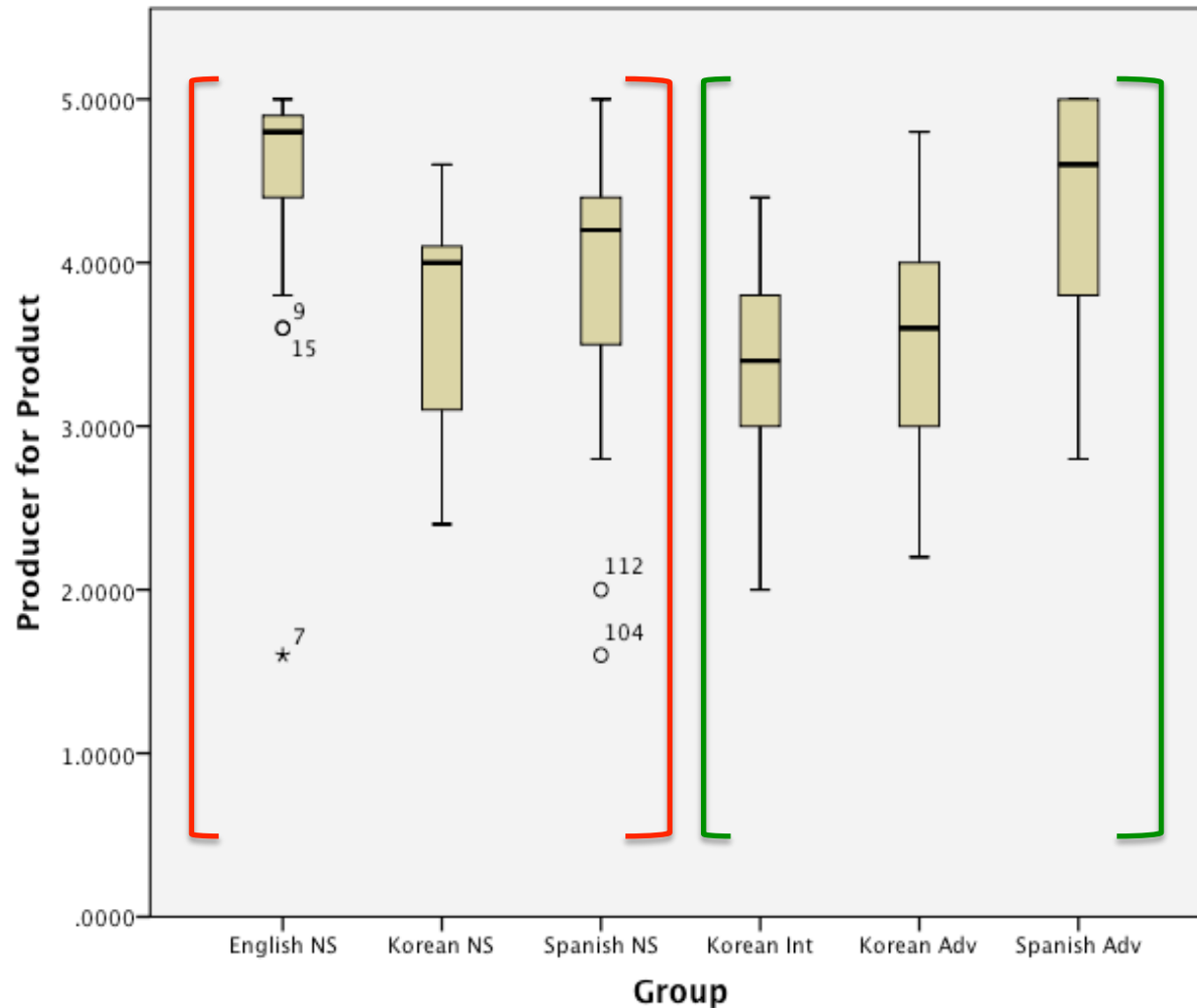
# Judgment Task: Instrument for Agent



# Judgment Task: Loose Association



# Judgment Task: Producer for Product





# Statistical results (GLM ANOVA with RMs)

	Judgment Task	Paraphrase Task
Effect of Condition	$F_{(2, 138)} = 123.99, p < .0001$	$F_{(3, 138)} = 26.492, p < .0001$
Effect of Group	$F_{(5, 138)} = 2.196, p = .058ns$	$F_{(5, 140)} = 24.522, p < .0001$
Condition by Group Interaction	$F_{(10, 278)} = 6.667, p < .0001$	$F_{(15, 420)} = 2.382, p = .003$
Multiple Comparisons	EngNS = SpNS = KorNS = KorInt = KorAdv = SpAdv	EngNS = SpNS = KorNS = SpAdv EngNS $\neq$ KorAdv EngNS $\neq$ KorInt

# Summary of Results: Natives

- There is quite a lot of variation in the native judgments and choices across conditions.
- However, there is a clear distinction between regular metonymy conditions (Producer for Product, Possessed for Possessor) and novel metonymy conditions (Instrument for Agent, Loose Association = ToR).
- Instrument for Agent was the worst accepted type of metonymy (M for EngNS = 2.47 out of 5; KorNS = 3.26; SpNS = 2.51 in the Judgment Task).
- The Loose Association condition was accepted with higher means than the Instrument condition (EngNS = 3.54; KorNS = 3.78; SpNS = 3.52).
- The Producer for Product regular metonymy was accepted with the highest means (EngNS = 4.53; KorNS = 3.68; SpNS = 4.38).

# Summary of Results: Learners

- The learners of English generally performed very well, and according to their proficiency levels.
- There was no effect of group on the Judgment Task, probably because this was the task where the test sentences appeared in context.
- The Spanish-native advanced group performed as well as the natives on both tasks, unlike the Korean groups, but they were the learner group with the highest proficiency in English.

# Discussion: The test

- There are three sets of data that should be statistically different in the data of the Judgment Task: the mean ratings on the Loose Association (the novel metonymy) condition, the baseline condition, and the experimental bad sentences, where the metonymy cannot go through because there is no salient association between a person and the thing. Compare:

*The exit row is prepared to help in case of emergency.*

*The older passengers are prepared to help in case of emergency.*

*The clothes dryer was not very happy.*

# Discussion: The test

- These were rated as significantly different (measured by paired t-test) by the English NSs, by the Spanish NSs, and by the Spanish advanced group in English. For the Korean NSs, the novel metonymy cases are not different from the baseline sentences (both rated around 3.8 of 5), but the difference between novel and unlicensed metonymy is reliable.
- Based on these results, one can say that our test has uncovered a true distinction between classes of sentences.
- One can also say that the Spanish advanced group performs exactly like the English NSs in all respects.

# Discussion: Native judgments

- Are there differences in the way the three languages treat novel metonymy? **No** (by paired t-tests).
- Are there differences in which the languages treat regular metonymy? **Yes**, the Producer for Product condition is rated higher in English and in Spanish than in Korean. (This could be culture-based.)

# Discussion: Learner achievements

- Do the learner groups behave differently than they do in their native language? In other words, have they changed their behavior due to exposure to English?  
**Not all groups.**
- On the novel metonymy condition, Korean natives in Korean give higher ratings than the advanced and intermediate speakers of English.
- This finding suggests that novel ToR, where the pronounced NP is loosely associated with the intended NP, is a mechanism available to learners, but either it takes time to develop, or processing difficulties lead to lower accuracy.
- The Spanish advanced group, however, shows that complete acquisition of this mechanism is possible.

# Discussion: Learner achievements

- Are there any differences in the ways learners treat novel and regular metonymy? **Yes**, and they do this **in line with the native judgments and also with proficiency levels**.
- This convergence is to be expected if the enriched composition calculation mechanism is universal,
- but of course processing the highest-cost sense shifts will take time to develop.



# Future work

- This was a pilot study of three native groups (English, Spanish and Korean) and three different proficiency levels of learners.
- In order to answer the processing resources question, we need to look next at the online comprehension of such sentences, using tasks such as self-paced reading, eye-tracking and ERPs.

# Take-Home Message

Can you curl up with a good Agatha Christie in your second Language?

Yes, but that ham sandwich may have to wait for that extra coffee.

THANK YOU!

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