

# Restructuring in Heritage Grammars

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**Heritage speakers** – simultaneous or sequential bilinguals whose L1 (the language spoken at home) becomes the non-dominant language, whereas the L2 (language spoken in the community) becomes the dominant language.

# Introduction

It is well documented that heritage speakers differ in proficiency in the L1 from (monolingual) baseline speakers of the language.

- **Phonology:** differences in pronunciation and prosody (Barlow 2014; Chang 2016; Godson 2003)
- **Morphology:** difficulties with using correct gender and number agreement, tendency to eliminate irregular forms (Benmamoun et al., 2013a, 2013b), overproduction of preterite morphology (Cuza et al. 2013)

- **Semantics:** lack of quantifier scope ambiguities (Scontras et al. 2016)
- **Syntax:** tendency to impose strict word order (Isurin & Ivanova-Sullivan, 2008; Ivanova-Sullivan, 2014), difficulties with non-subject relative clauses (Polinsky 2011), lower use of *pro*-drop (Tsimpli et al. 2004)

## Zooming in on Morphology

Heritage speakers have difficulties with  $\phi$ -feature agreement (Håkansson 1995, Montrul et al. 2008, Polinsky 2008b, a.o.).

Many instances of observed differences between baseline and heritage speakers can be understood as tied to processing:

- Heritage speakers have the same *knowledge* of the grammar.
- But their *usage* of it differs due to the overwhelming load of speaking a non-dominant language.

**Are difficulties with  $\phi$ -feature agreement also caused by processing difficulties?**

## Broader Question

Are differences in behavior that we observe the result of...

- 1 ...overwhelming processing load of speaking non-dominant language?
- 2 ...deeper structural differences in the heritage grammar?

## Goals of this presentation

- To examine **number and gender agreement** in heritage Spanish as a case study.
- To demonstrate that the syntax of number and gender in the heritage grammar of Spanish is indeed different from that of the baseline grammar – an instance of “**divergent grammar**”.
- To develop, based on the above, the hypothesis that the **erosion of agreement** in heritage grammars is undergirded by the **systematic reorganization** of the syntactic representation heritage grammars.



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Case study:  $\phi$ -feature agreement in Spanish

Relevant features:

- Number
- Gender

# Spanish number and gender

Spanish **number** is much like in English:

- **Plural** is marked with -s.
- **Singular** is indicated through lack of overt number suffix.

# Spanish number and gender

Spanish has two grammatical **genders**: masculine and feminine

- **Masculine** nouns typically have the word marker *-o*.
- **Feminine** nouns typically have the word marker *-a*.
  - ▶ There are many exceptions to these general rules (Harris 1991).
  - ▶ Distribution of masculine and feminine is roughly equal (Bull 1965).

This presentation deals only with inanimate/grammatical gender (human and lexical gender may be located in different positions from each other; see Kramer 2015, Matushansky 2013 for discussion).

# Spanish number and gender

## Agreement

Nouns are obligatorily marked for number and gender.

- (1) a. *la manzana* 'the apple (fem.)'
- b. *las manzanas* 'the apples (fem.)'

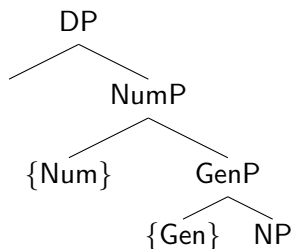
Modifiers (as well as determiners and anaphors) must **agree** with the head noun in number and gender.

- (2) a. *las manzanas rojas* 'the red apples (fem.)'
- b. *los libros rojos* 'the red books (masc.)'

# Spanish number and gender

In the syntactic representation of the baseline grammar, **number and gender are split**: the two features are projected (and therefore valued) independently (Fuchs et al. 2015; Antón-Méndez, Nicol & Garrett 2002; Carminati 2005; Picallo 1991):

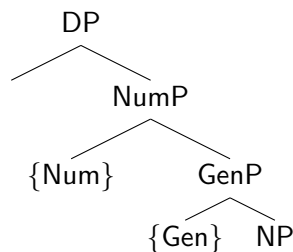
(3)



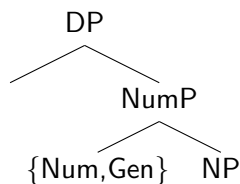
# Spanish number and gender

A theoretical structural alternative is for number and gender to be **bundled** on the same projection (cf. Carstens 2000, 2003; Ritter 1993):

(4) **Split:**



(5) **Bundled:**





# Spanish number and gender

- Are there differences between baseline and heritage Spanish in  $\phi$ -feature agreement (number and gender)?

**Research question:** Are difficulties with  $\phi$ -feature agreement due to the processing load of speaking a non-dominant language?

Predictions:

- (Null hypothesis) **Yes** → number and gender in the heritage grammar will also be split (as we will show for baseline grammar in a few slides).
- (Alternative hypothesis) **No** → number and gender in the heritage grammar will be structured differently (i.e. bundled).

**Procedure:** Replicate methodology from Fuchs et al. 2015 experimental study using agreement attraction in order to allow for direct comparison between baseline and heritage speakers.

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# Agreement attraction

In order to determine whether two features are split or bundled, we put the categories into conflict with each other and study them in a comprehension experiment.

**Phenomenon:** Agreement attraction

# Agreement attraction

## Agreement attraction:

Ungrammatical condition in which a **predicate** incorrectly enters into agreement with a **local noun** rather than the **head noun** (Bock & Eberhard 1993; Bock & Miller 1991).

(6) \*The **key** to the **cabinets** **were** lost.

(7) \***Este** **libro** sobre **las** **guerras** **son** **muy**  
this.M.SG book.M.SG about the.F.PL war.F.PL be.PRES.3PL very  
**interesantes.**  
interesting.PL  
\*‘This book about the wars are very interesting.’

## Key idea

If number and gender are **split**, then there are **two independent processes of feature valuation**; agreement attraction in one feature need not entail agreement attraction in the other feature.

If number and gender are **bundled**, then there is a **singular process of feature valuation**; agreement attraction in one feature should entail agreement attraction in the other feature.

## Stimuli

We created frame using **small clauses** that include head noun, local noun, and predicate.

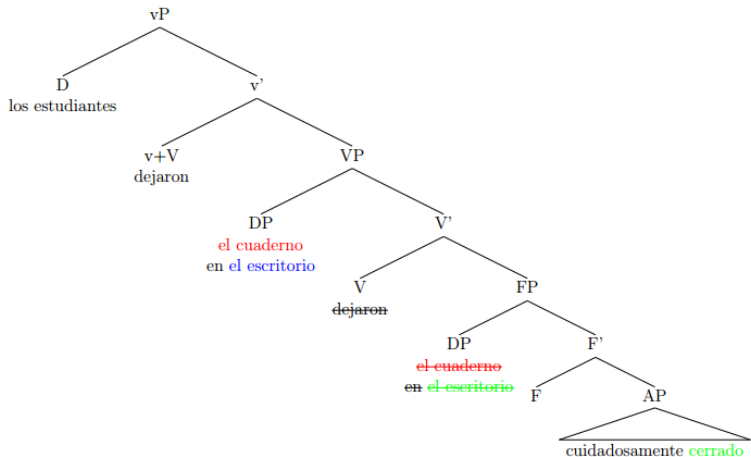
(8) (SUBJ) VERB NP1 PREP NP2 ADVERB ADJ...

- This syntactic frame allows for increased distance between the relevant constituent and increased complexity, allowing us to tax the agreement mechanism.
- Our small clauses excluded depictive constructions.



# Syntax of small clauses

Spanish: Contreras 1987, 1995 and Jiménez-Fernández & Spyropoulos 2013; beyond Spanish: Cardinalez & Guasti 1995; Basilico 2003; Progovac 2006; Citko 2011, a.o.



# Experimental design

In grammatical examples, **predicate** must agree with **head noun** in features:

- (9) Los estudiantes dejaron el cuaderno  
the.M.PL student.M.PL leave.PST.3PL the.M.SG notebook.M.SG  
en la estantería cuidadosamente cerrado.  
on the.F.SG desk.F.SG carefully closed.M.SG  
'The students left the notebook carefully closed on the desk.'

By manipulating the number and gender of the head noun, local noun, and predicate, created ungrammatical conditions with **one** or **two** agreement attraction errors.

Agreement attraction in **one** feature: **F-SG** **F-PL** **F-PL**

- (10) \*Los estudiantes dejaron la libreta  
the.M.PL student.M.PL leave.PST.3PL the.F.SG notebook.F.SG  
en las estanterías cuidadosamente cerradas.  
on the.F.PL desk.F.PL carefully closed.F.PL  
'The students left the notebook carefully closed on the desk.'

Agreement attraction in **two** feature: **F-SG M-PL M-PL**

- (11) \*Los estudiantes dejaron la libreta  
the.M.PL student.M.PL leave.PST.3PL the.F.SG notebook.F.SG  
en los escritorios cuidadosamente cerrados.  
on the.M.PL desk.M.PL carefully closed.M.PL  
'The students left the notebook carefully closed on the desk.'

## Prediction 1

If number and gender are **split**, then there are **two independent processes of feature valuation**; agreement attraction in one feature need not entail agreement attraction in the other feature.

→ **Conditions with agreement attraction in two features are rated lower than agreement attraction in one feature.**

## Prediction 2

If number and gender are **bundled**, then there is a **singular process of feature valuation**; agreement attraction in one feature should entail agreement attraction in the other feature.

→ **Conditions with agreement attraction in two features are rated same as conditions with agreement attraction in one feature.**

# Participants

## Participants:

- 160 participants were recruited through Amazon's Mechanical Turk.
- Instructions were given in Spanish.
- Experiment was preceded by a demographics questionnaire.
- Restricted IP addresses to the US in order to target heritage speakers of Latin American dialects of Spanish.



# Participants

71 participants were identified as heritage speakers on the basis of the following criteria:

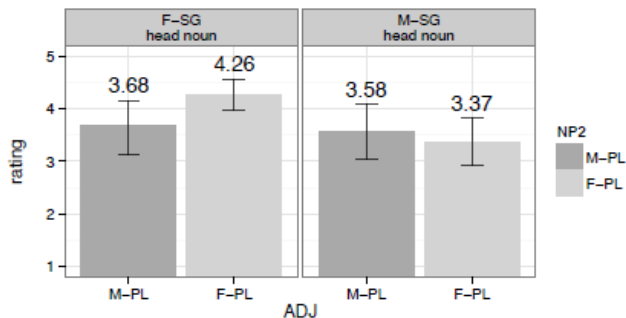
- Grew up speaking Spanish.
- Now speak mostly English.
- Have not lived in a Spanish-speaking country after the age of 8.

# Participants

- Grammatical stimuli were recorded by a speaker of Colombian Spanish.
- Ungrammatical stimuli were created by splicing parts of grammatical stimuli (in order to avoid cues to ungrammaticality).
- Each stimulus was presented auditorily (heritage speakers show slower reading times).
- Participants were asked to rate each item on a scale from 1 (*completamente inaceptable* 'completely unacceptable') to 5 (*completamente aceptable* 'completely acceptable')

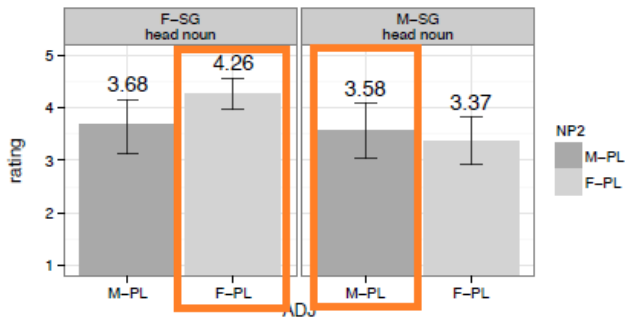
# Results

Baseline Spanish results (Fuchs et al. 2015)



# Results

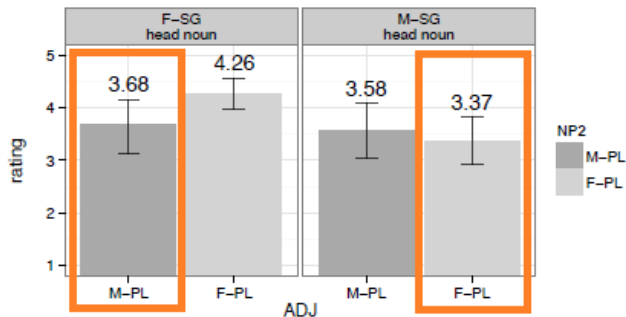
Baseline Spanish results (Fuchs et al. 2015)



Conditions with agreement attraction in **one** feature  
(F-SG F-PL F-PL; M-SG M-PL M-PL)

# Results

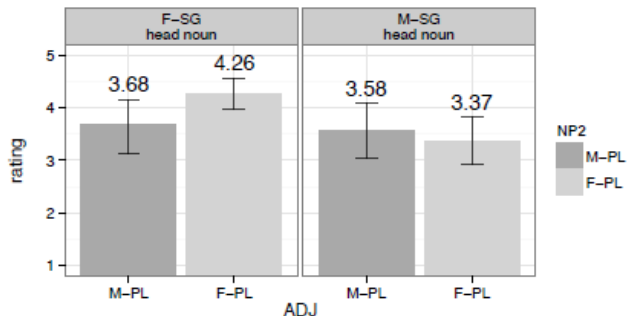
Baseline Spanish results (Fuchs et al. 2015)



Conditions with agreement attraction in **two** features  
(F-SG M-PL M-PL; M-SG F-PL F-PL)

# Results

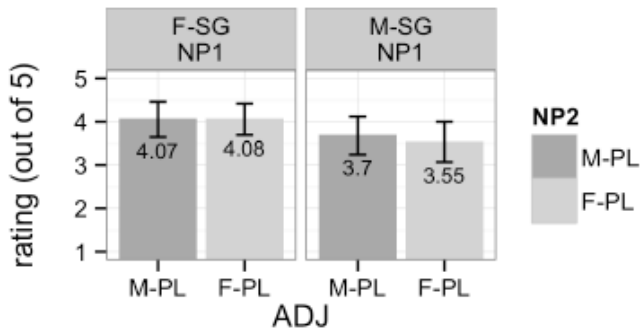
Baseline Spanish results (Fuchs et al. 2015)



Significant difference between F-SG F-PL F-PL vs F-SG M-PL M-PL.  
→ baseline grammar has **split** number and gender.

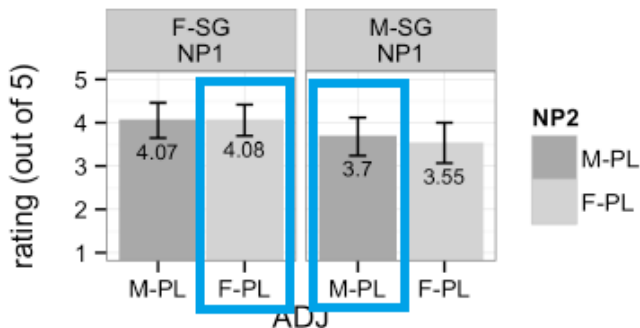
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New results for heritage speakers of Spanish:



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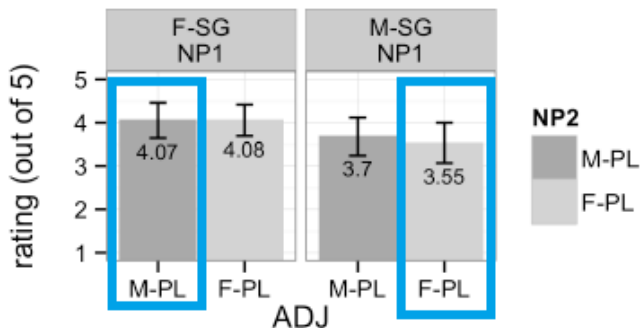


Conditions with agreement attraction in **one** feature  
(F-SG F-PL F-PL; M-SG M-PL M-PL)



# Results

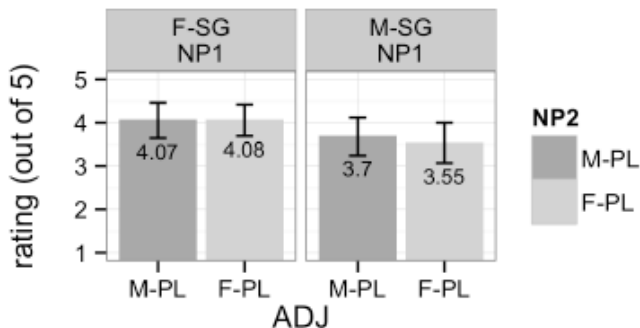
New results for heritage speakers of Spanish:



Conditions with agreement attraction in **two** features  
(F-SG M-PL M-SG; M-SG F-PL F-PL)

# Results

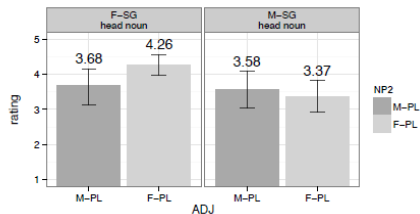
New results for heritage speakers of Spanish:



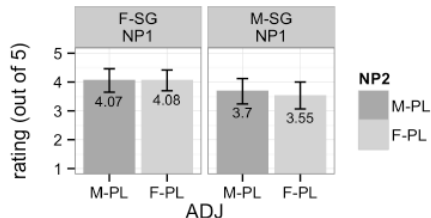
No significant difference between agreement attraction in one feature and two features.

## Side-by-side comparison

Baseline (split)



Heritage (bundled)



# Alternative hypotheses

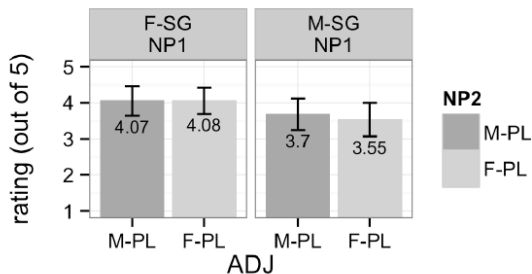
**Alternative explanation 1:** Heritage speakers are not sensitive to morphology.

**Alternative explanation 2:** Heritage speakers are only accessing number, not gender, as they process the sentence.

Under these alternatives, our results say nothing about mental representation of number and gender, only provide additional evidence for the well-documented insensitivity of heritage speakers to inflectional morphology.

# Alternative hypotheses

These alternative hypotheses predict no sensitivity to gender differences, but we already saw that this is not the case:



This suggests heritage speakers are indeed sensitive to gender, so our results are reflective of a bundled representation of number and gender in the heritage grammar.

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**Research question:** Are difficulties with  $\phi$ -feature agreement due to the processing load of speaking a non-dominant language?

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**Research question:** Are difficulties with  $\phi$ -feature agreement due to the processing load of speaking a non-dominant language?

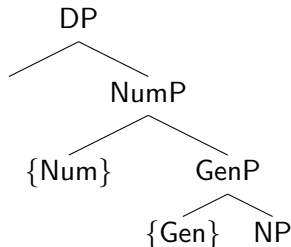
- (~~Null hypothesis~~) **Yes** → ~~number and gender in the heritage grammar will also be split.~~
- (Alternative hypothesis) **No** → number and gender in the heritage grammar will be structured differently (i.e. bundled).



# Restructuring

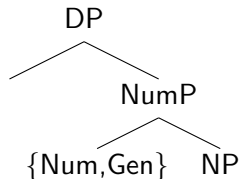
The heritage grammar bundles number and gender, so it has restructured the baseline grammar.

(12) **Split (baseline):**



→

(13) **Bundled (heritage):**



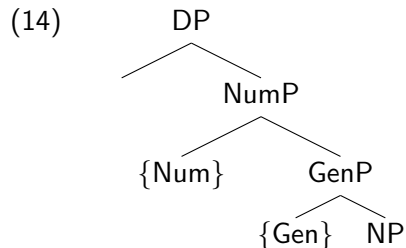
Key question

How did we get from (12) to (13)?

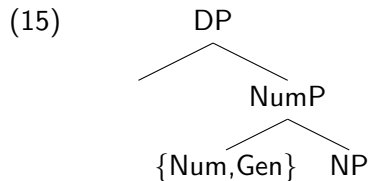
The results suggest a possible trajectory for attrition of agreement in heritage grammar as the result of systematic pressures from the syntax.

- Bundling of two features is possible because they are on adjacent projections in the syntactic representation.

## Step 1: Baseline grammar



## Step 2: Restructuring/bundling



**Step 3:** Feature bundle is **opaque**, which may lead to interpretive instability.

... If there is no consistent interpretation of a feature (bundle), it loses its utility...

**Step 4:** Feature specification of the bundle may be **lost altogether**, resulting in an empty feature projection → This results in a more **general decline in morphological richness**, leading eventually to the attrition of agreement.

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## Broader Question

Are differences in performance the result of...

- 1 ...overwhelming processing load of speaking non-dominant language?
- 2 ...deeper structural differences in the heritage grammar?

# Conclusions

In the case of **restructuring of agreement** in heritage Spanish, the difference is due to **structural difference** in how number and gender features are projected.

In fact, the **trajectory** we put forth suggests that the gradual impoverishment of morphological richness is driven by **systematic pressures** which can be predicted on the basis of **syntactic structures**.

## **Future directions:**

Heritage grammars are the outcome of language contact between L1 and L2. We can extend our paradigm to cases of agreement attrition in other instances of language contact, such as creoles.



# Acknowledgments

Thank you!

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## Appendix: Demographics

Age distribution of 71 participants whose data was analyzed and presented in the study:

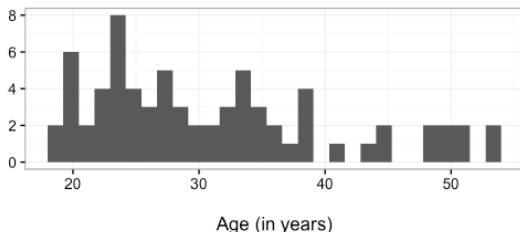


Fig. B.1: Age. *¿Cuántos años tiene? (por favor ponga el número)*

## Appendix: Demographics

Self-reported proficiency levels of 71 participants whose data was analyzed and presented in the study:

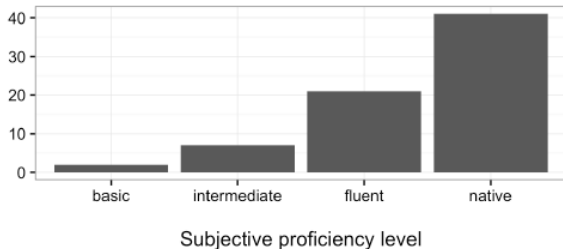


Fig. B.2: Proficiency. *¿Cómo evaluaría su nivel de proficiencia en español?*<sup>12</sup>

Note: self-assessment by heritage speakers is sometimes inversely correlated with their proficiency (cf. Beaudrie & Ducar, 2005; Thompson, 2015, for Spanish heritage speakers, Davidson & Lekic, 2013; Titus, 2012, for Russian heritage speakers) or reflects the degree of their ethnic and cultural identification rather than proficiency (Kang & Kim, 2012).

## Appendix: Demographics

Language spoken at home, as reported by the 71 participants whose data was analyzed and presented in the study:

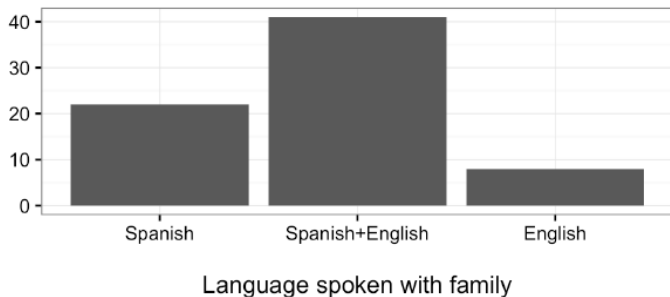


Fig. B.3: Home language. *¿Qué idioma habla con su familia?*

## Appendix: Demographics

Years of second-language education in Spanish at the elementary school level for the 71 participants whose data was analyzed and presented in the study:

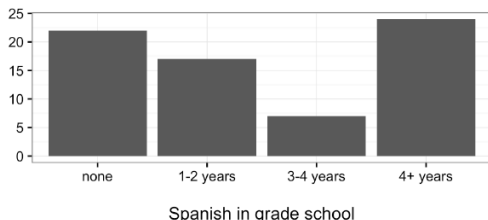


Fig. B.4: Grade-school Spanish. *Si tomó usted clases de español en la escuela, ¿cuántos años de español tomó?*

## Appendix: Demographics

Amount of college-level coursework in second-language education in Spanish of the 71 participants whose data was analyzed and presented in the study:

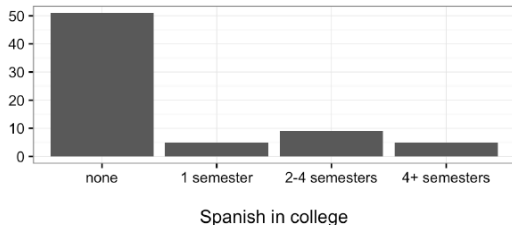


Fig. B.5: College Spanish. *Si tomó clases de español en la universidad, ¿cuántos semestres ha tomado?*