

# **ATTENTION CONTROL IN STUDY ABROAD CONTEXT: LONGITUDINAL DATA FROM L2 LEARNERS OF SPANISH**

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# RESEARCH GOALS

1. Discuss **fluency gains** in an overseas immersion context (OIM) in Spain:
  - Temporal variables
  - Hesitation phenomena
2. Advance our knowledge of correlations of fluency and **attention control**
  - **Individual differences** in second language acquisition

# PREVIOUS RESEARCH

# SECOND LANGUAGE & COGNITIVE ABILITIES

- **Cognitive abilities:**

- Working memory (Atkins & Baddeley, 1998; Papagno & Vallar, 1995)
- Processing speed (Salthouse, 1996)
- Lexical retrieval (Segalowitz, 1997)
- Attention control (Guion & Pedersen, 2007; Segalowitz, 1997)

→ Not sufficiently understood: how these factors relate to **L2 *fluency*** development

# OUR L2 FLUENCY MEASURES

- **What is fluency?**
  - ‘Fluency’ is understood as a **primarily temporal phenomenon**: not a vague notion of proficiency, but the way speech is processed and articulated in real time (Schmidt, 1992)
- **Speed**
  - **Rate of speech (Syllables per second)**
    - Variety of measures (Lennon, 1990, Towel et al., 1997, Freed, 1995, Freed et al., 2004, Segalowitz & Freed, 2004, Mora & Vals-Ferrer, 2012, García-Amaya, 2008, 2009, 2010, 2012)
- **Hesitations**
  - **Filled pauses (Seconds between filled pauses)**
    - Watanabe et al., 2004, 2005, 2008, Segalowitz & Freed, 2004; García-Amaya, 2010, 2012
  - **Silent pauses (Seconds between silent pauses)**
    - Kang, 2010, D’Amico, 2012

# INDIVIDUAL DIFFERENCES AND L2 FLUENCY

- **L2 cognitive fluency** is related to utterance fluency ([de Jong et al. 2012](#))
  - Vocabulary knowledge, retrieval processing speed
- **Phonological memory** is related to L2 oral fluency gains in L2 Spanish ([O'Brien et al., 2007](#))
  - Serial nonword recognition
- **More efficient attention control** is also correlated with greater L2 fluency ([Mora & Gilabert, 2012](#))
  - Trail Making Task
  - But weak correlations
- **Cognitive processing abilities** are related to fluency gains in SA (study abroad) & AH (at home) contexts ([Segalowitz & Freed, 2004](#))
  - Lexical access, attention control

# RESEARCH DESIGN

# PARTICIPANTS

- **27 learners** of Spanish that participated in an **overseas immersion program (OIM)** in León, Spain through a large Midwestern institution
  - **Highly motivated learners** (between junior and senior year of high school)
  - **Previous Spanish coursework** at the high school level
  - While participating in the current study they did the following:
    - **6 weeks abroad** in Spain and **daily contact** with **native speakers**
    - **Daily classes** of **Spanish** pronunciation, culture, grammar, literature and conversation
    - **Pledge to a language commitment** (also known as the “**No-English Rule**”)
- **29 learners** of Spanish that participated in a traditional **at home (AH)** context at another large Midwestern institution
  - **Grammar and composition**
  - **Previous Spanish coursework** at the high school and college levels



# DEMOGRAPHICS

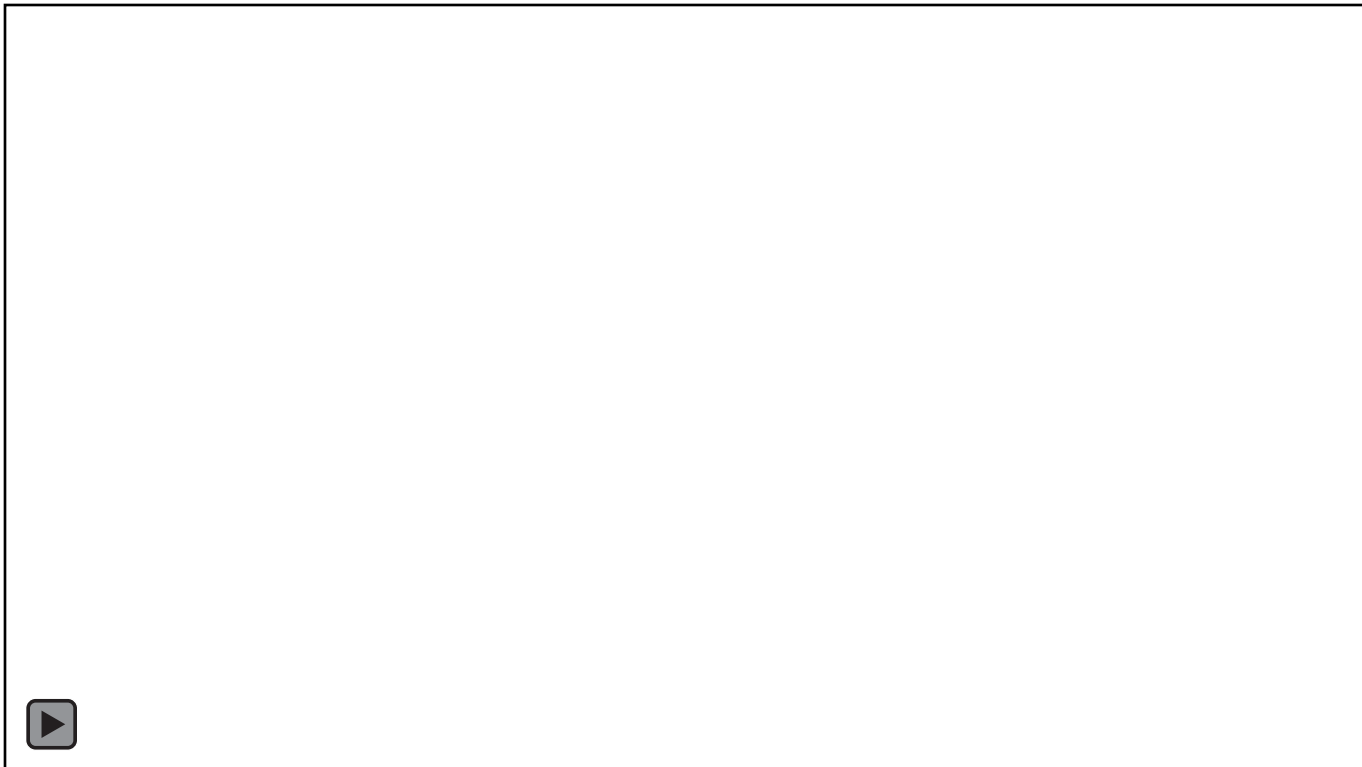
GROUP	SEX	MEAN AGE	MEAN YEARS OF SPANISH INSTRUCTION
AH	F=24 M=5	20.76	5.72
OIM	F=20 M=7	17.04	4.41

# TIME LINE

	TIME 1	TIME 2	TIME 3
AH GROUP	AUGUST 31	OCTOBER 14	NOVEMBER 30
OIM GROUP	JUNE 9	JUNE 29	JULY 19

# ORAL PRODUCTION TASK

- **At each data collection time participants watched two videos from the Simons' Cat collection (by Simon Tofield) and were asked to start retelling them as soon they finished without any pre-planning time.**



# GROUP RESULTS

# ORGANIZATION OF RESULTS

## **I. LANGUAGE CONTACT PROFILE (SPEAKING)**

## **II. PROFICIENCY TEST**

## **III. FLUENCY ANALYSIS**

**a.** RATE OF SPEECH

**b.** NUMBER OF SECONDS BETWEEN FILLED PAUSES

**c.** NUMBER OF SECONDS BETWEEN SILENT PAUSES

## **IV. ATTENTION CONTROL TASK**

# ORGANIZATION OF RESULTS

## OIM & AH

**I. LANGUAGE CONTACT PROFILE (SPEAKING)**

**II. PROFICIENCY TEST**

## OIM

**III. FLUENCY ANALYSIS**

**a. RATE OF SPEECH**

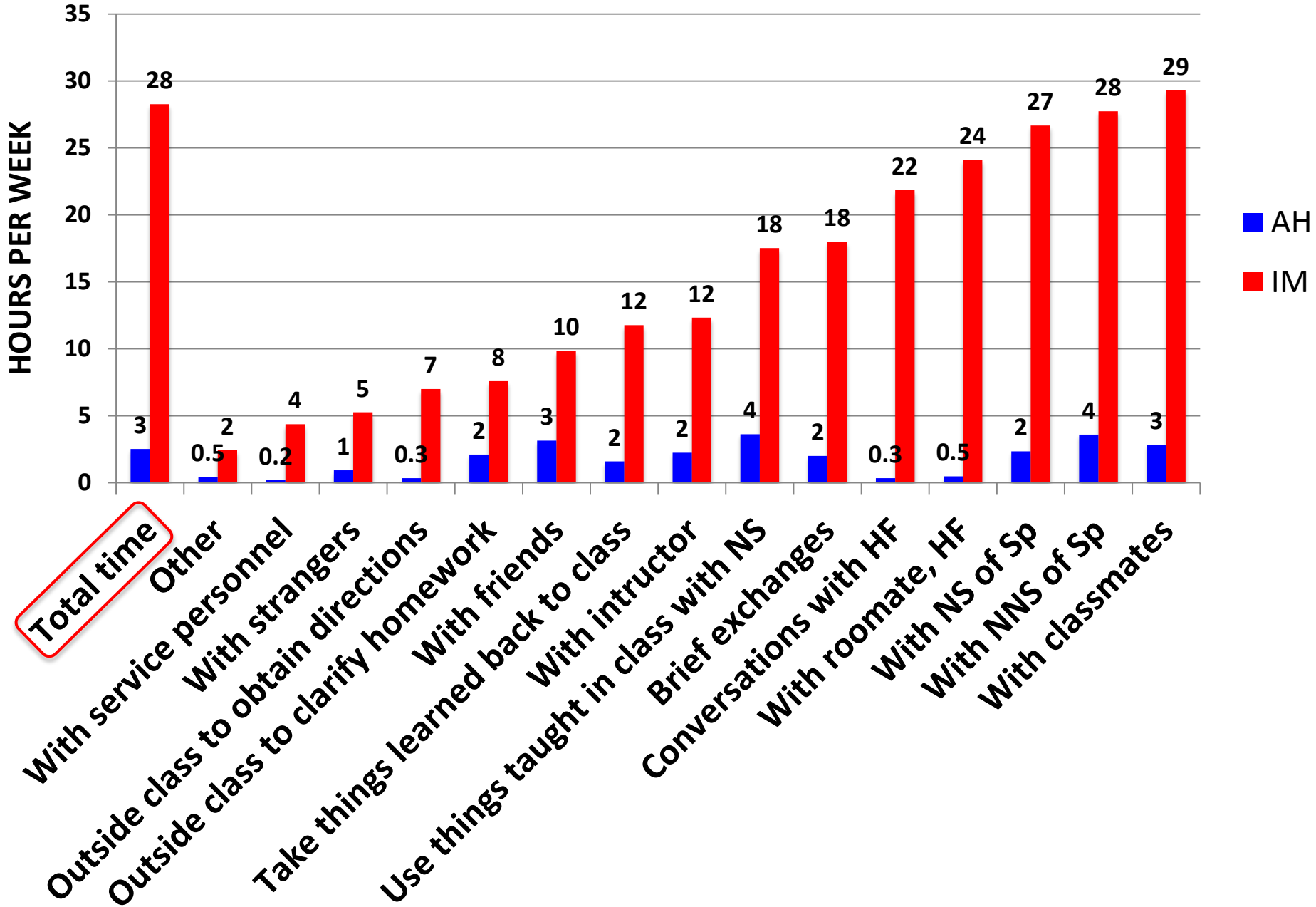
**b. NUMBER OF SECONDS BETWEEN FILLED PAUSES**

**c. NUMBER OF SECONDS BETWEEN SILENT PAUSES**

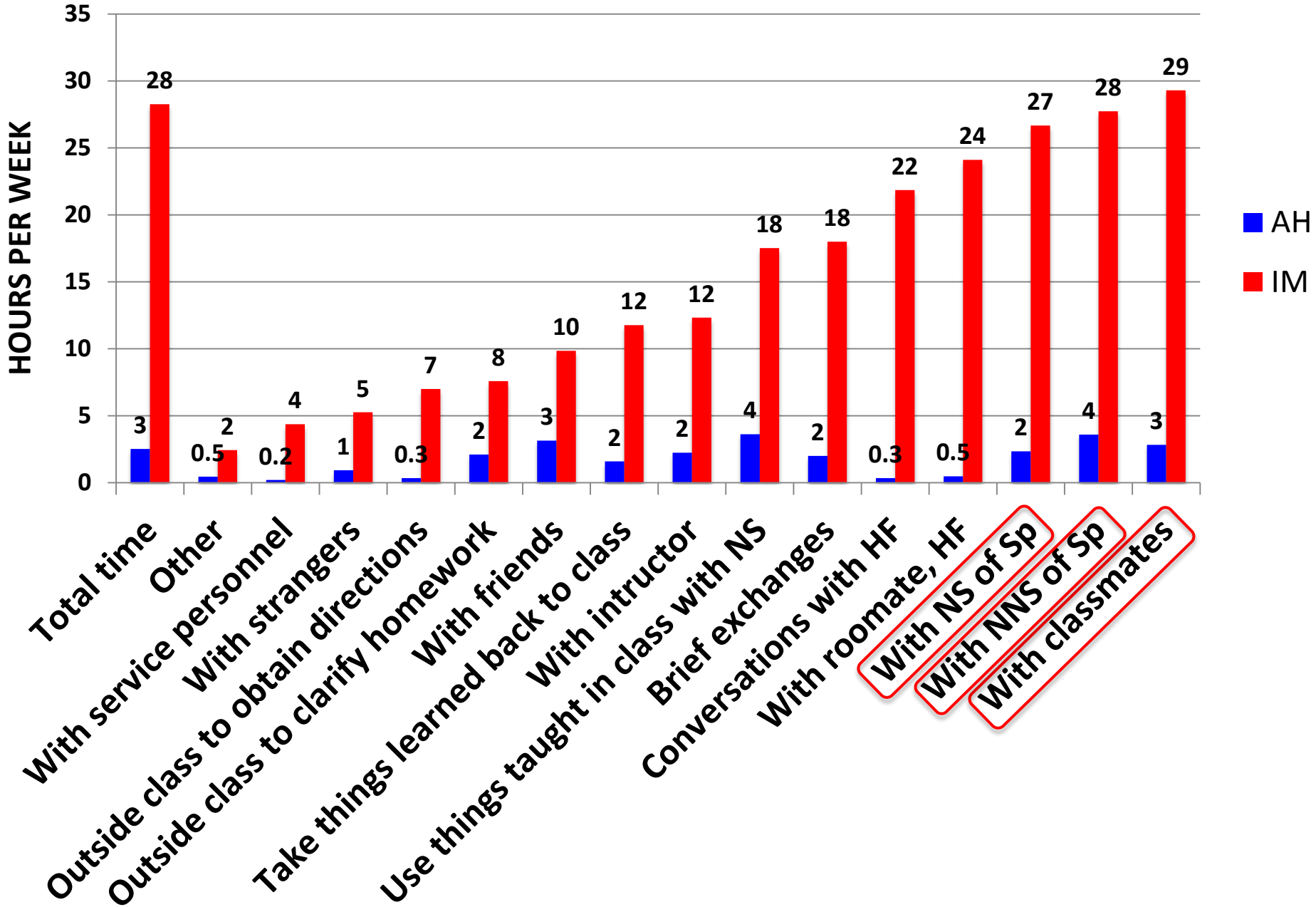
**IV. ATTENTION CONTROL TASK**

# **LANGUAGE CONTACT PROFILE**

# SELF-REPORTED TIME SPEAKING SPANISH

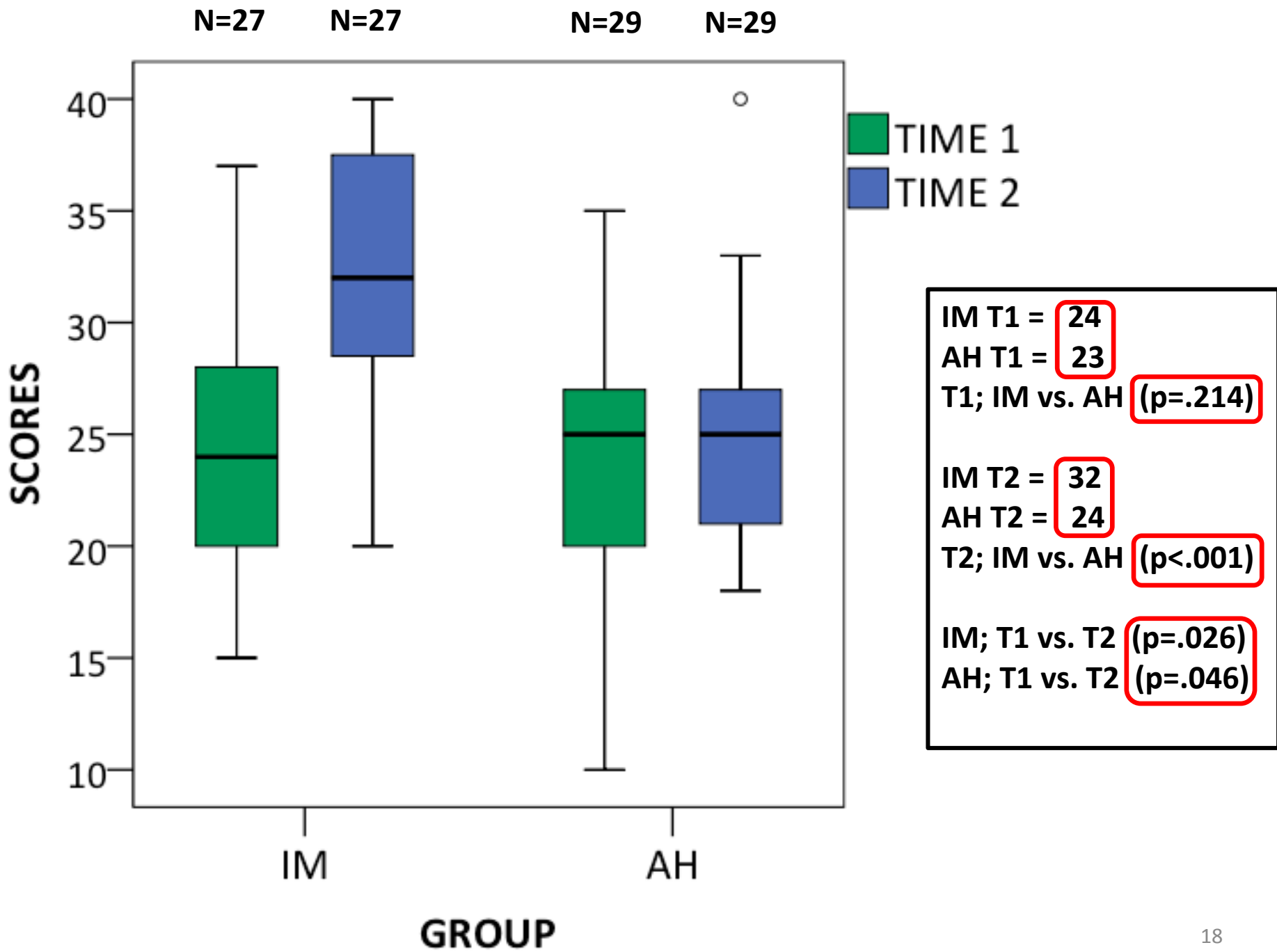


# SELF-REPORTED TIME SPEAKING SPANISH





# PROFICIENCY TEST



# **FLUENCY (OIM ONLY)**

Development over 6 weeks in Spain

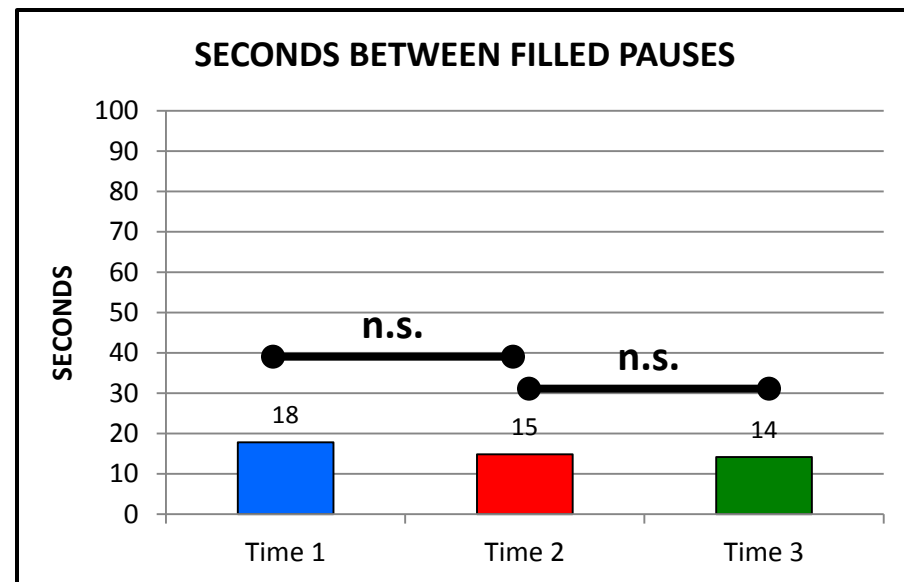
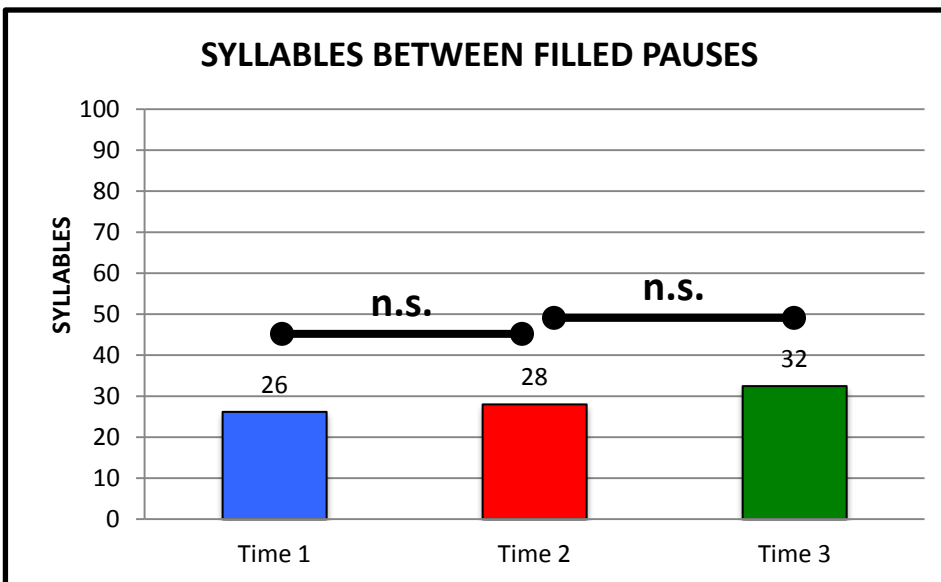
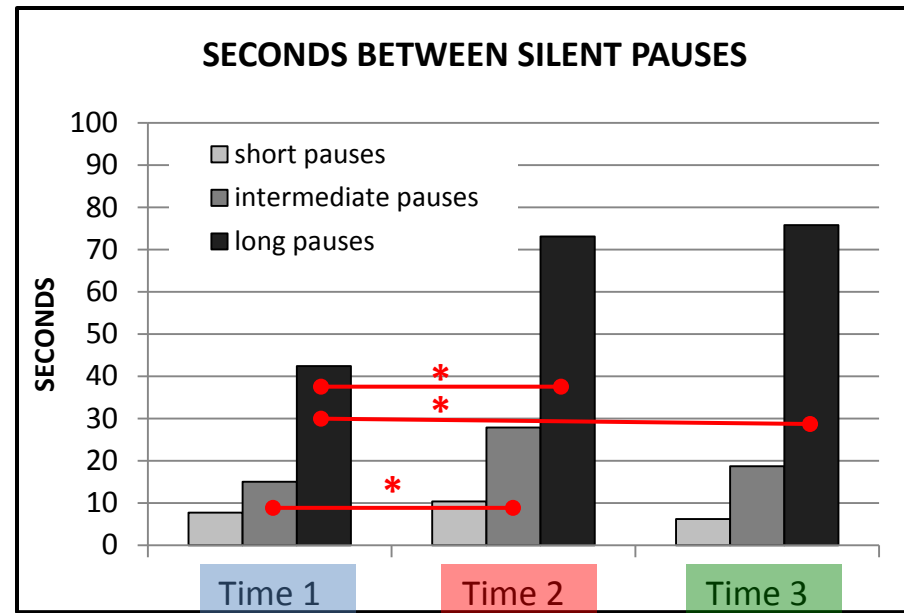
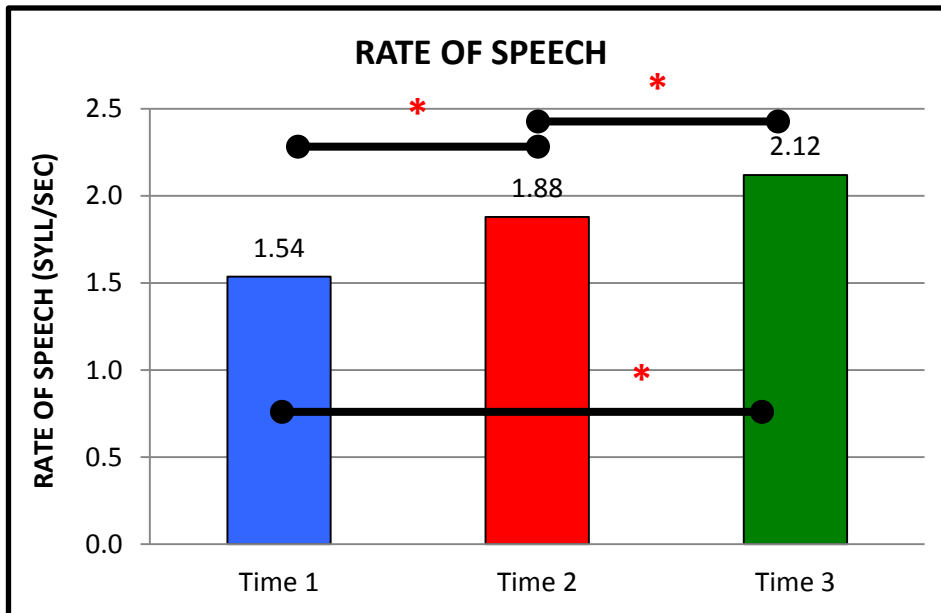
# TOTAL SPOKEN TIME

The results of the fluency analyses represent the averages obtained for a total of 6 video retells by 27 participants (162 videos)

		VIDEO		
		1	2	TOTAL
TIME	1	60 min.	35 min.	94 min.
	2	51 min.	67 min.	117 min.
	3	49 min.	82 min.	131 min.

**6 HOURS OF TRANSCRIBED RECORDINGS**

# OIM GROUP, VIDEO RETELL TASK



# **ATTENTION CONTROL**

Design of a new task to measure  
attention control

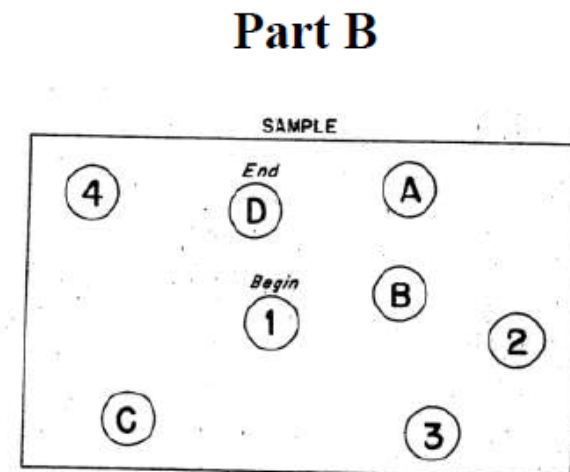
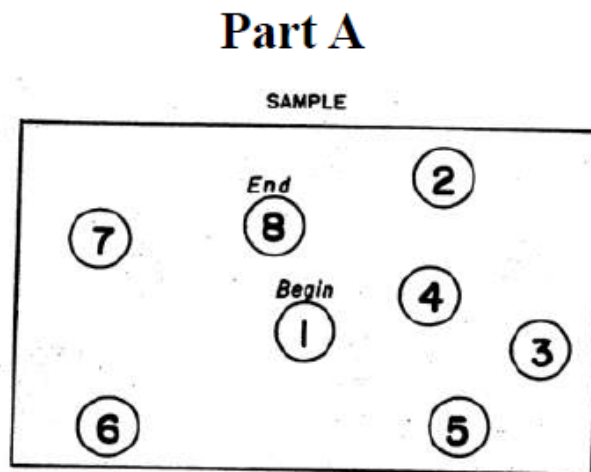
# ATTENTION CONTROL

- Inhibition of L1 and monitoring speech are component of fluent L2 speech
- Attention control is important because it is involved in monitoring speech and selecting input for subsequent processing, and hence, can be related to phonological and fluency development in L2
- Attention control is mainly operationalized as **the ability to rapidly shift attention to different levels of linguistic information**
  - This needs to be measured in a specific way

# PREVIOUS MEASURES OF ATTENTION CONTROL

- Mostly not directly language-related
  - Trail Making Task

“TMT involves visual search, visual perceptual ability, and motor speed for both Trails A and Trails B; Trail B additionally requires task shifting, planning, working memory, attention, and inhibition (Wodka et al., 2008)” (Bialystok, 2010:95)



- Switching paradigms (e.g. Rogers & Monsell, 1995)
- Dimensional Change Card Sort Task (Frye, Zelazo & Palfai, 1995; Bialystok & Martin 2004)
- Wisconsin Card Sorting Task (Heaton 1981)
- Metalinguistic categorization task (Segalowitz & Freed, 2004)







# OUR TASK: SPEEDED CATEGORY DECISION

- New method to measure attentional control in L1
  - auditory analog of the Dimensional Change Card Sort Task (Bialystok & Martin 2004).
- Participants must inhibit attention to a dimension that was previously selected, and refocus on a different aspect of the same stimulus
- Requires two different types of information to be extracted from the stimulus: lexical vs. indexical.

# ATTENTION CONTROL (IN L1)

- Shift attention to a specified dimension of the auditory stimuli (e.g. „Male Voice?“ or „Word?“) (stimuli vary in voice and lexical status)

Question	Auditory stimulus	Response
Male voice?	word (female) 	NO
Word?	word (male) 	YES
Word?	non-word (male) 	NO
Male voice?	word (female) 	NO

- Measure:  
accuracy and latency on **Repeat** (baseline) vs. **Shift** conditions

**EXAMPLE: 4 TRIALS**

+



Male voice?

**no**

**yes**

+



Word?

**no**

**yes**

+





Word?

**no**

**yes**

+



Male voice?

**no**

**yes**

# RESULTS

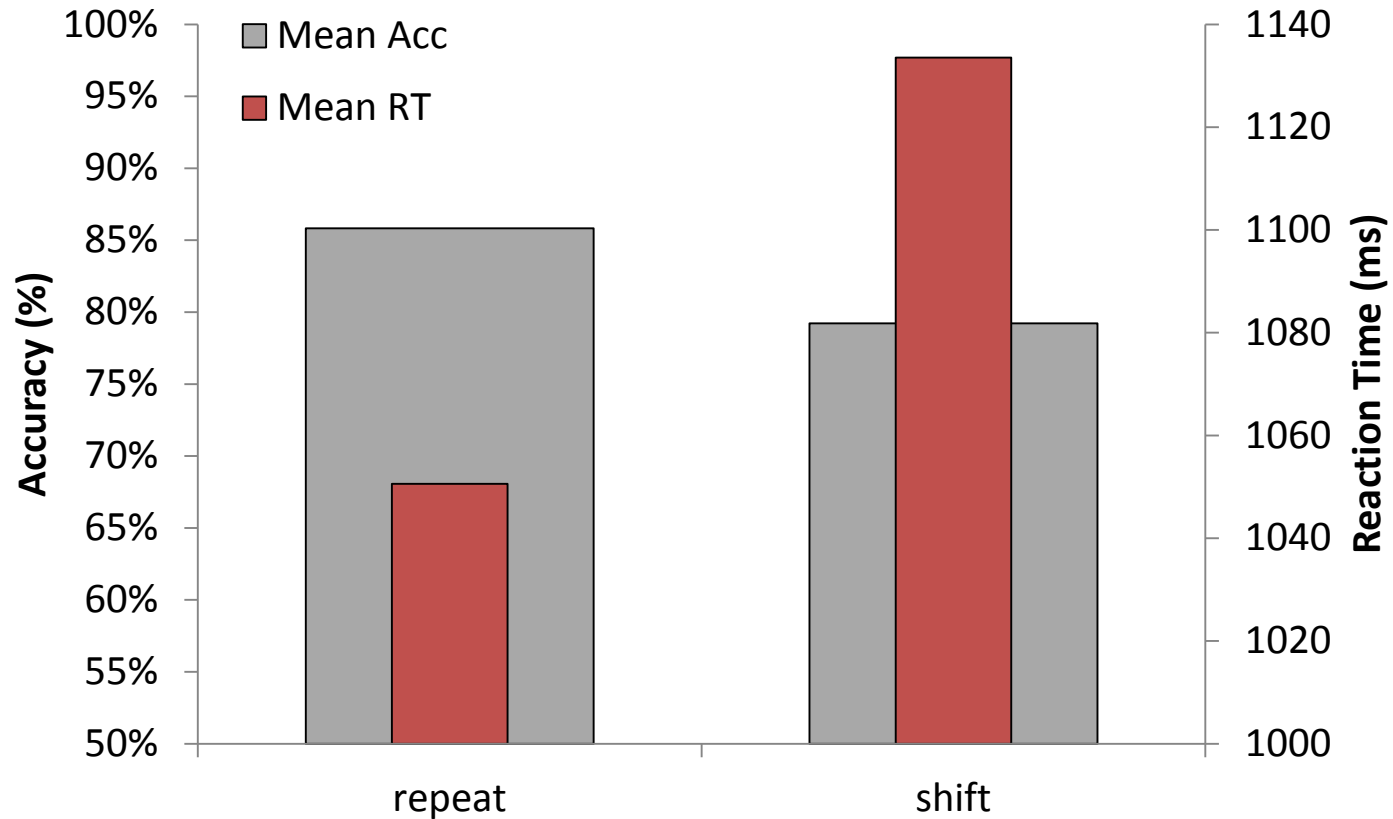
Participants did the same task at T1 and T3

No significant difference between Times

**=> Collapsed means across times**

# ATTENTION CONTROL: SHIFT COST

„repeat“ (baseline) vs. „shift“ condition



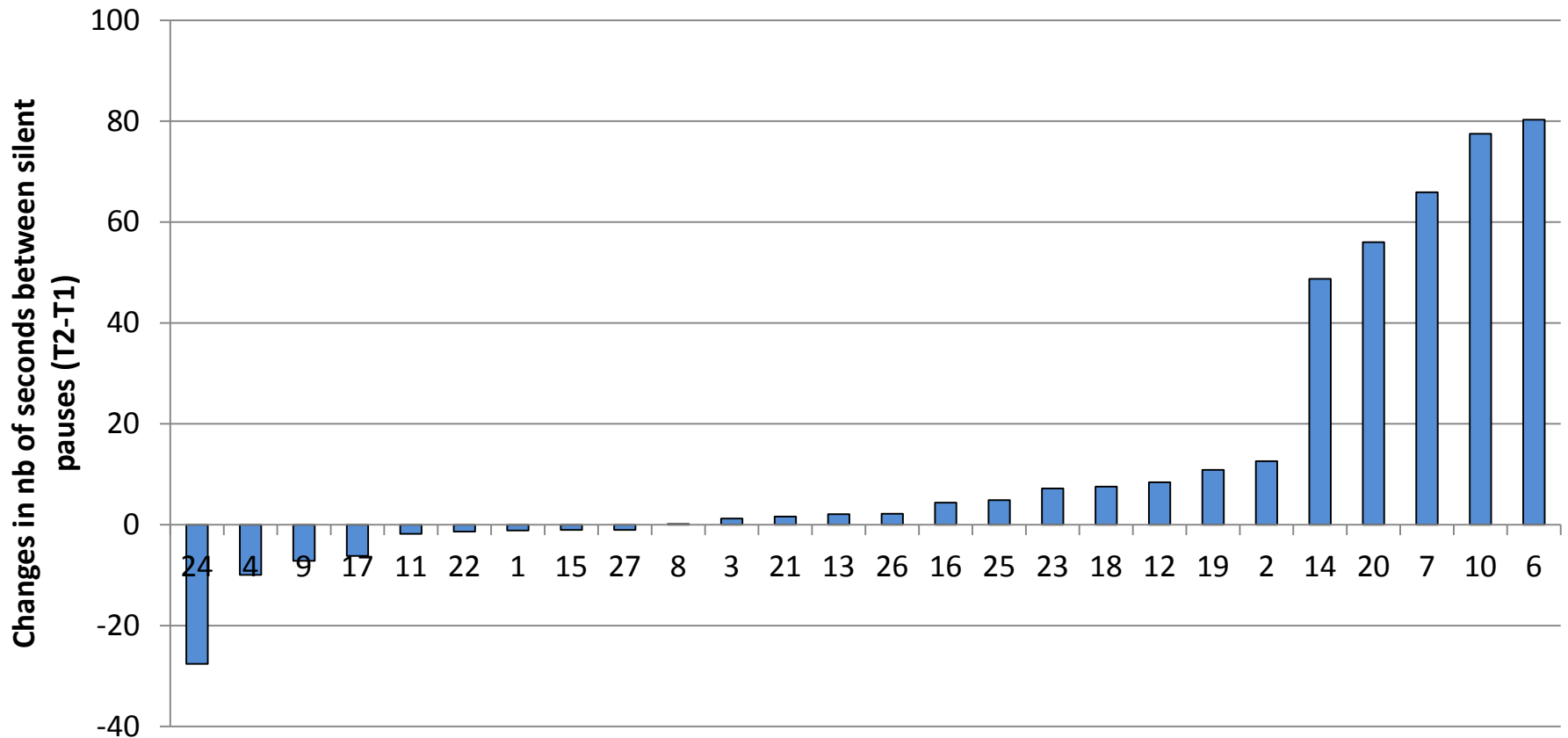
$t(26) = 5.8, p < .001$

$t(26) = -5.5, p < .001$

# INDIVIDUAL VARIATION

Fluency and Attention Control

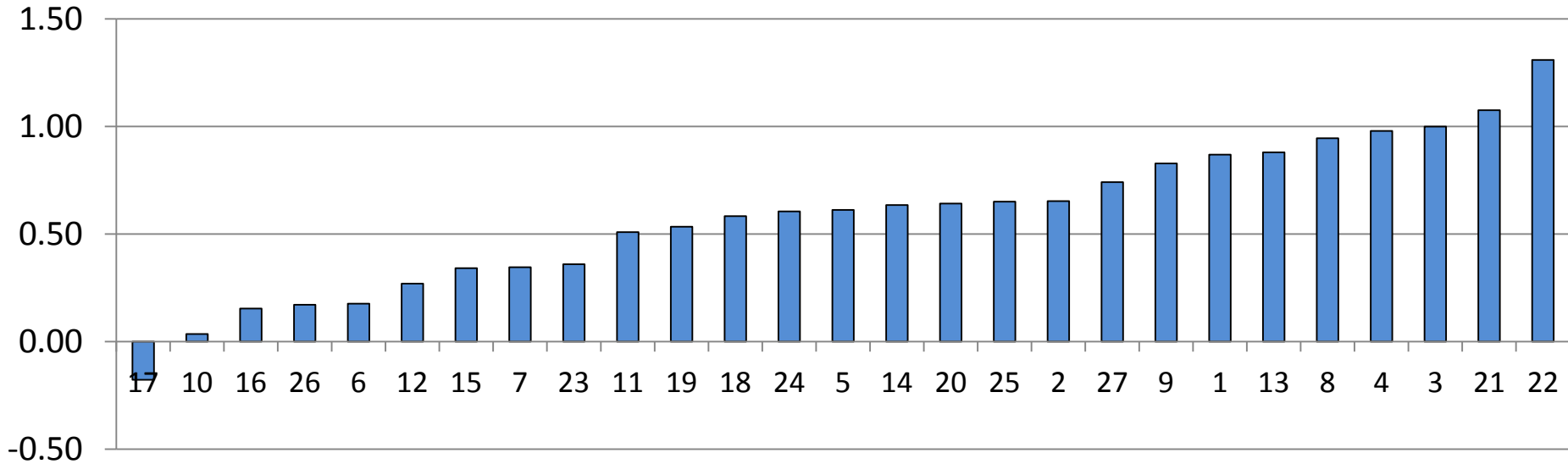
# LARGE VARIATION IN REDUCTION OF SILENT PAUSES



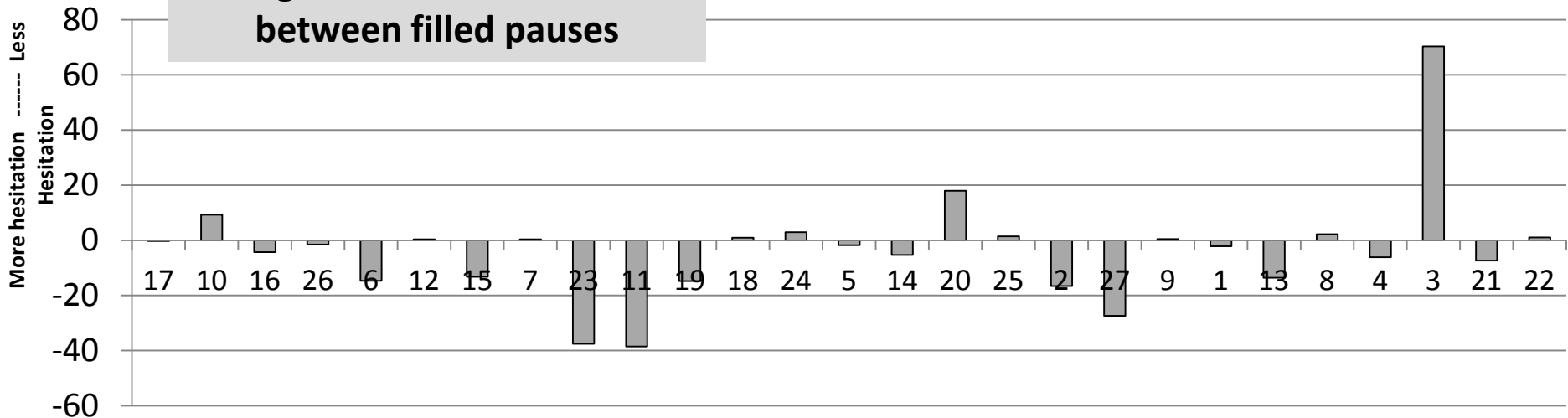
**Negative: fewer seconds, more frequent silent pauses**  
**Positive: more seconds, less frequent silent pauses**

No relation between Rate of Speech gains and reduction of filled pauses

## GAIN IN RATE OF SPEECH (DIFFERENCE SCORE T3-T1)



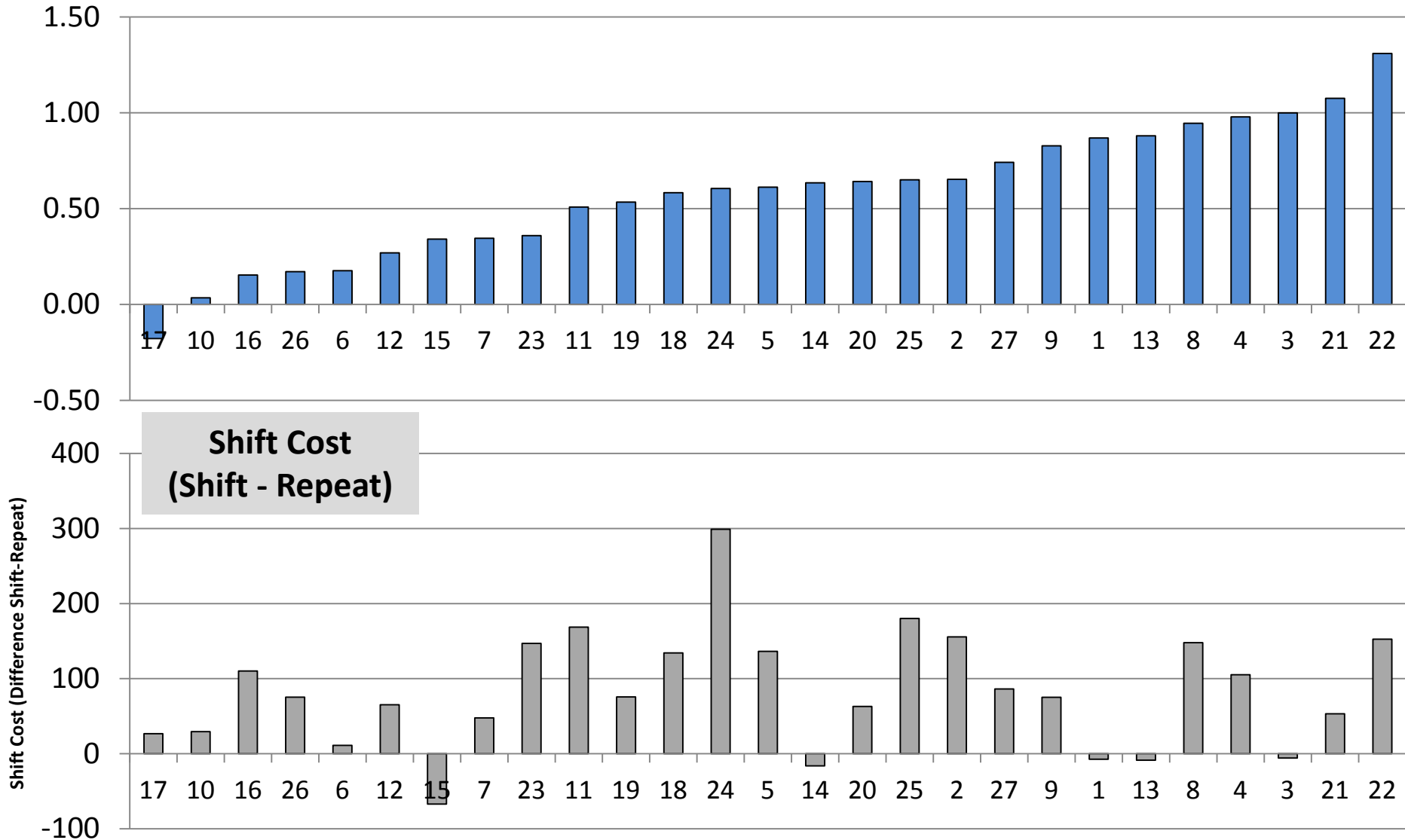
## Change in number of seconds between filled pauses



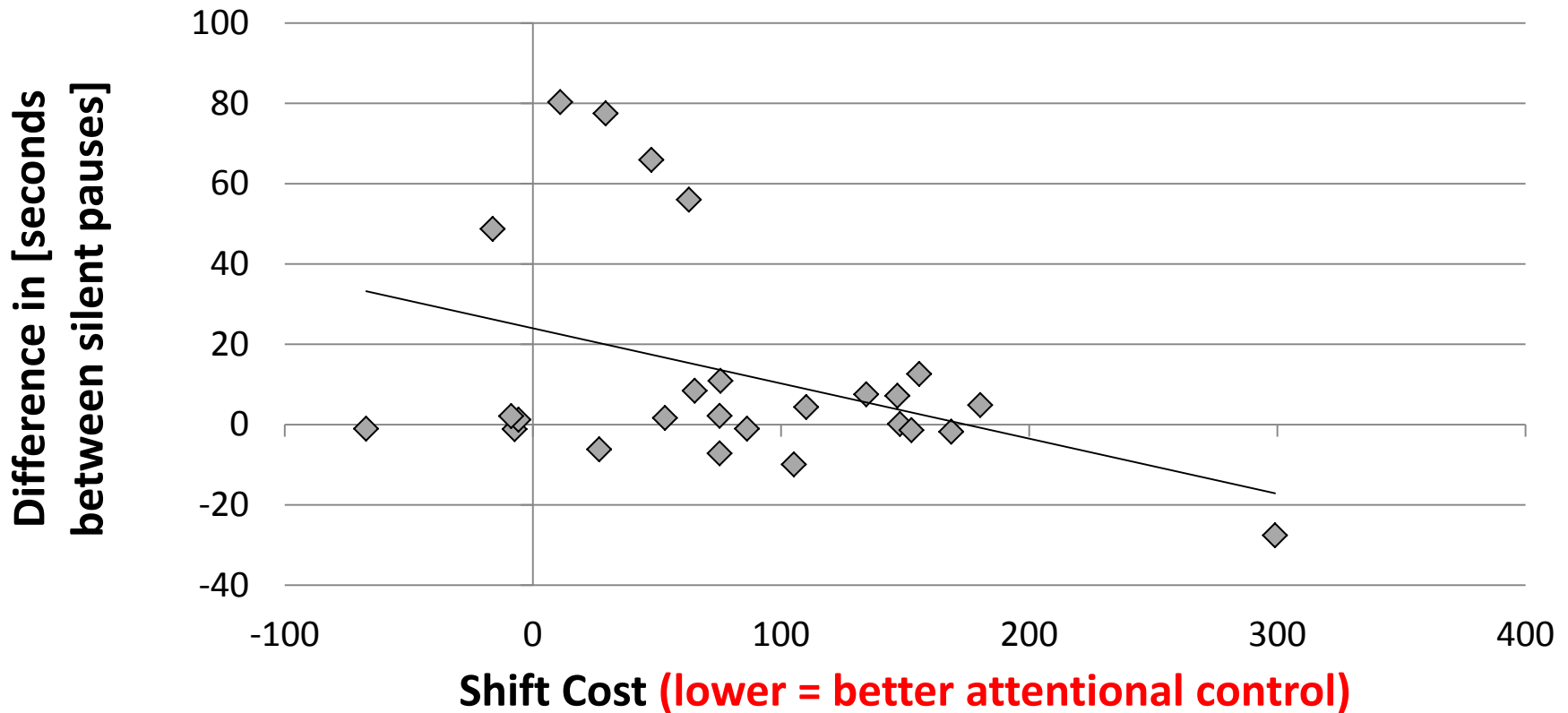


No relation between Rate of Speech gains and shift cost

## GAIN IN RATE OF SPEECH (DIFFERENCE SCORE T3-T1)



# HIGHER SHIFT COST CORRELATES WITH OVERALL MORE FREQUENT SILENT PAUSES



[T2 nb of seconds between silent pause - T1 nb of seconds between silent pauses]

**Positive** = fewer silent pauses; **Negative** = more silent pauses

Higher shift cost is related to more hesitations (shorter distance, fewer seconds between pauses)

# CORRELATIONS

		Distance between short silent pauses (T2-T1)	Distance between Intermediate silent pauses (T2-T1)	Distance between Intermediate silent pauses (T2-T1)	Distance between filled pauses (T3-T1)	Distance between filled pauses (T2-T1)	Gain in Rate of Speech (T3-T1)
Mean Shift Cost (T1T2)	Pearson Correlation	.208	<b>-.351</b>	-.104	-.234	-.205	.119
	Sig. (1-tailed)	.159	.043	.310	.130	.163	.286
	N	25	25	25	25	25	25
Mean Shift Cost ratio (T1T2)	Pearson Correlation	.200	<b>-.385*</b>	-.085	-.247	-.223	.073
	Sig. (1-tailed)	.169	.029	.343	.117	.143	.364
	N	25	25	25	25	25	25
Mean RT	Pearson Correlation	.002	<b>-.188</b>	.098	-.190	-.147	<b>.435*</b>
Repeat	Sig. (1-tailed)	.497	.184	.321	.181	.241	.015
	N	25	25	25	25	25	25
Mean RT	Pearson Correlation	.110	<b>-.365*</b>	.039	<b>-.305</b>	-.249	<b>.479**</b>
Shift	Sig. (1-tailed)	.300	.036	.426	.069	.115	.008
	N	25	25	25	25	25	25

Higher RT is related to more hesitations (shorter distance, fewer seconds between pauses)

# **DISCUSSION & CONCLUSION**

# MAJOR FINDINGS

- **PROFICIENCY**

- IM learners improved more than AH learners

- **FLUENCY**

- Fluency gains were visible for all IM learners

- Rate of Speech and Hesitations

- **ATTENTION**

- Our task is successful at measuring attention control

- Stable over time

- But correlations with fluency measures were not the strongest

# CONCLUSION

- **Correlations**
  - Our findings expand previous findings about the relationship of attention control and L2 fluency (Mora and Gilabert, 2012)
- **Attention control tasks** must be understood better
  - Task effects
  - Speech-specific attention vs. general attention?
- More work to be done to understand its relationship with various aspects of L2 acquisition
  - Fluency vs. Proficiency
  - Phonology / pronunciation
  - Production vs. Perception



**THANK YOU!**