# 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.**

▶
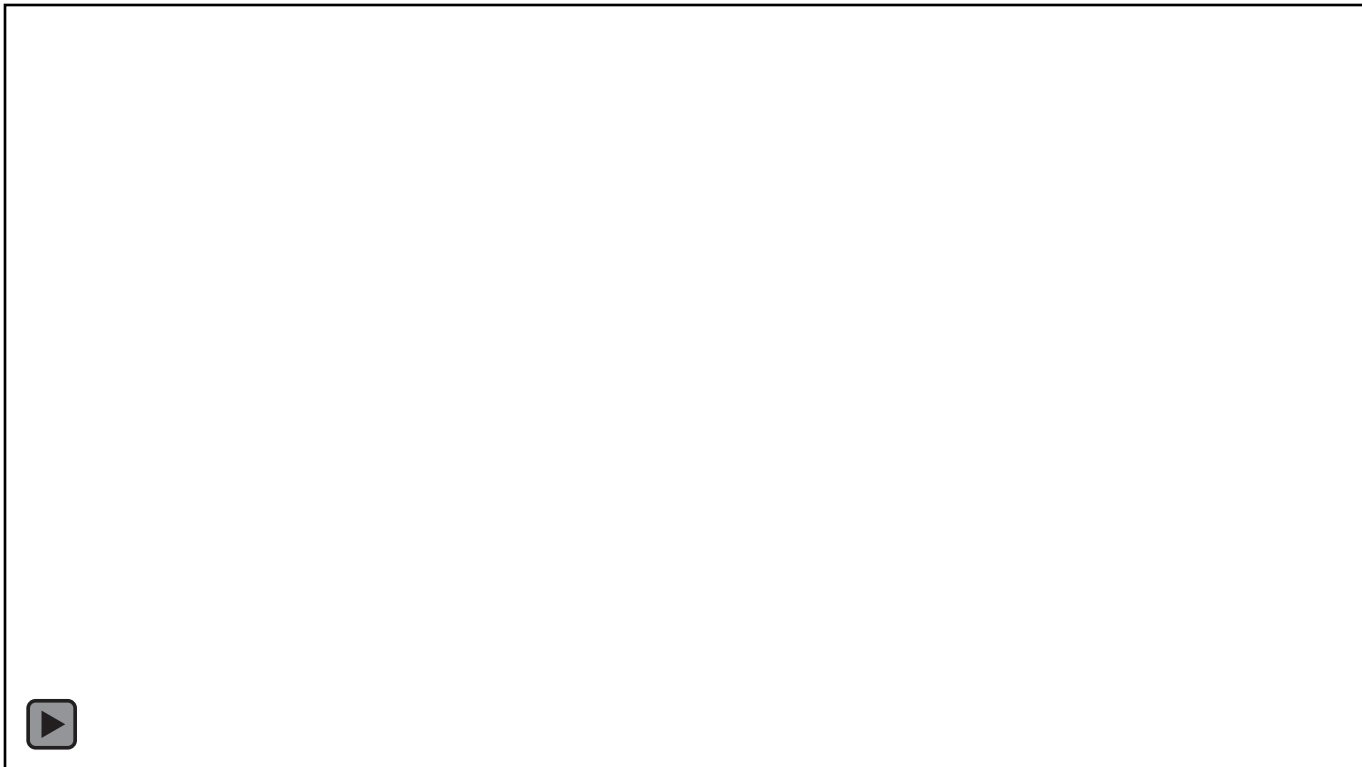
# GROUP RESULTS

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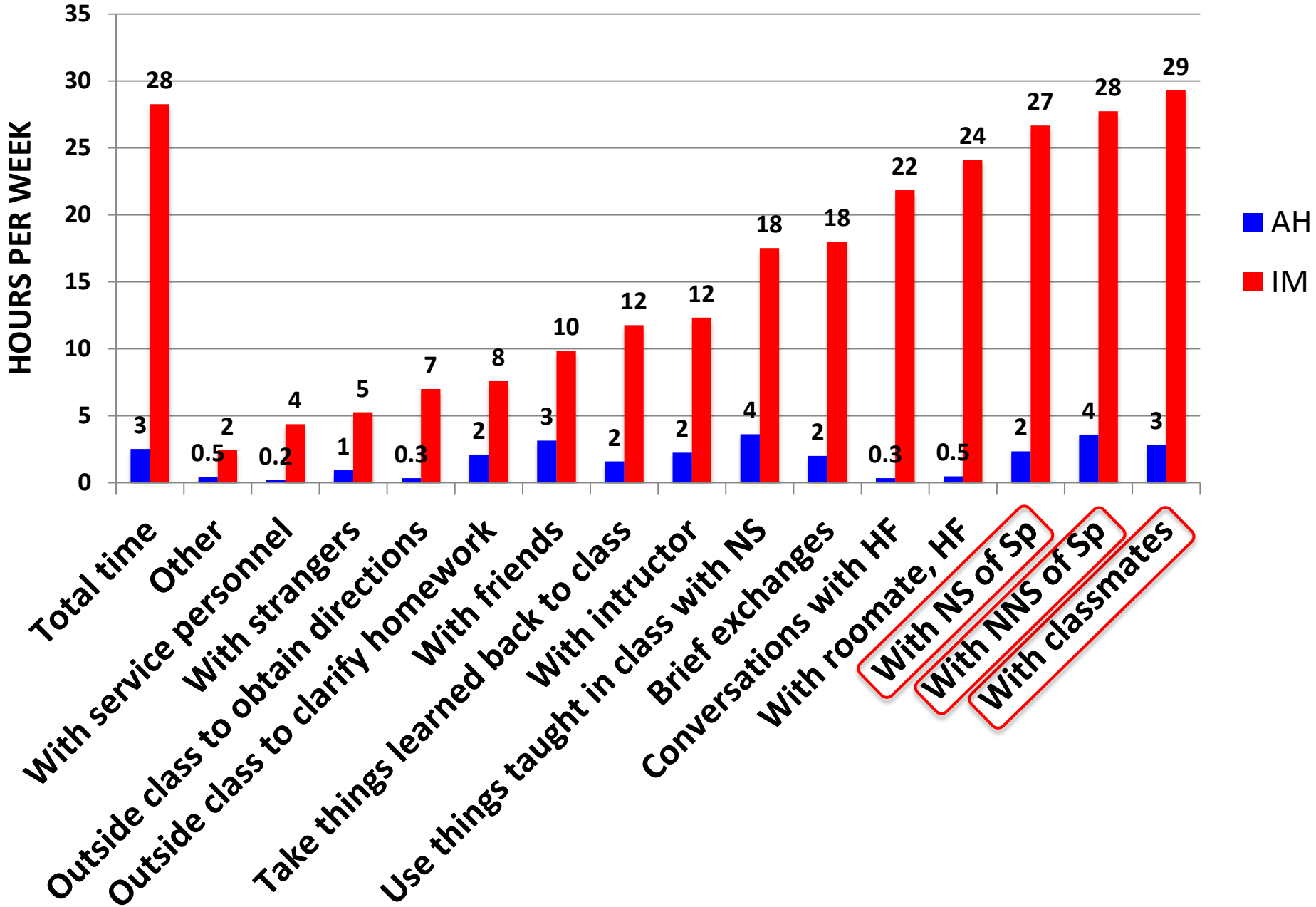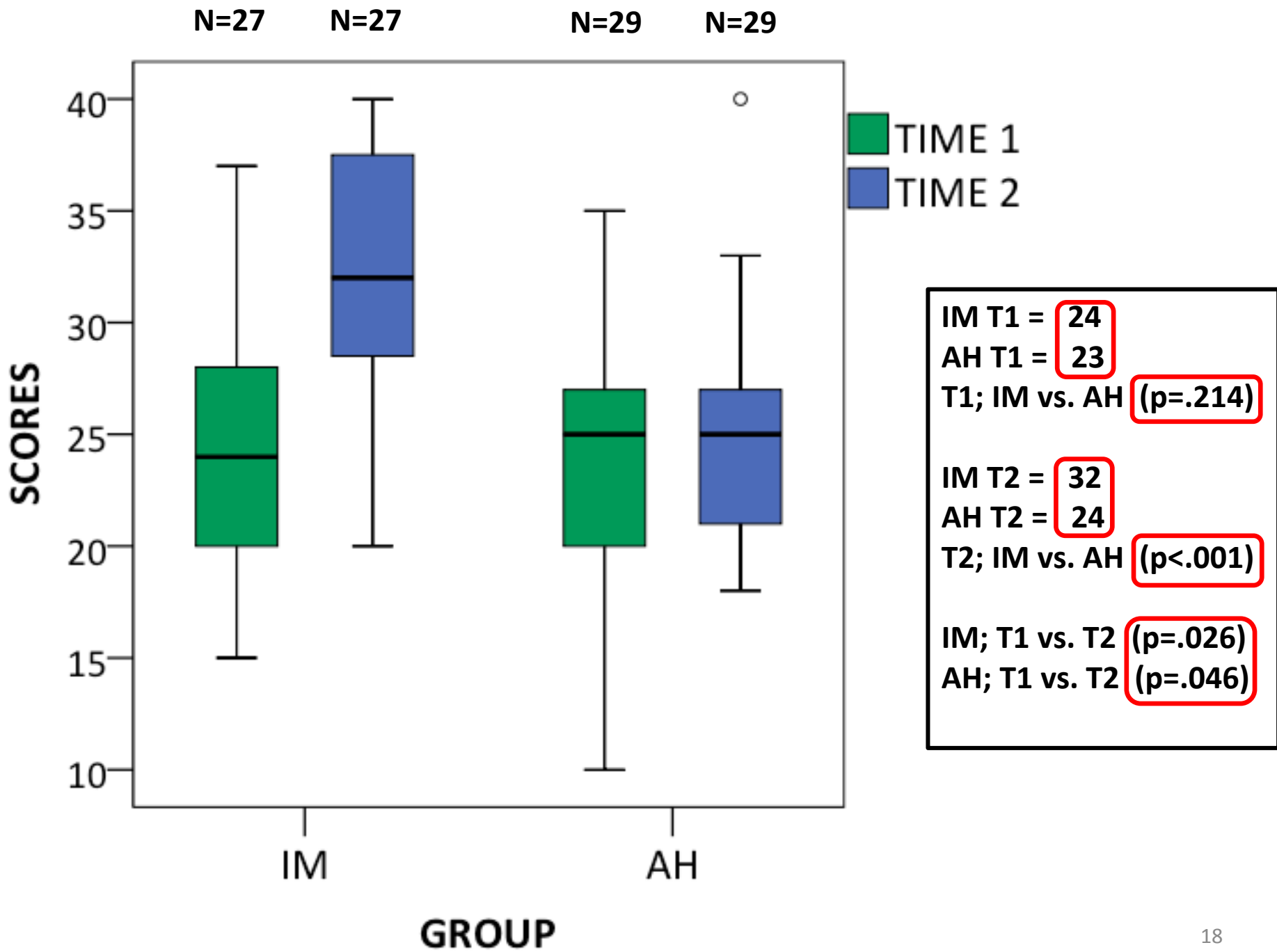      **c**. NUMBER OF SECONDS BETWEEN SILENT PAUSES

**IV.** **ATTENTION CONTROL TASK**

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# LANGUAGE CONTACT PROFILE

SELF-REPORTED TIME SPEAKING SPANISH

**SELF-REPORTED TIME SPEAKING SPANISH**

HOURS PER WEEK

Legend: AH (blue), IM (red)

| Category | AH | IM |
|---|---|---|
| Total time | 3 | 28 |
| Other | 0.5 | 2 |
| With service personnel | 0.2 | 4 |
| With strangers | 1 | 5 |
| Outside class to obtain directions | 0.3 | 7 |
| Outside class to clarify homework | 2 | 8 |
| With friends | 3 | 10 |
| Take things learned back to class | 2 | 12 |
| With intructor | 2 | 12 |
| Use things taught in class with NS | 4 | 18 |
| Brief exchanges | 2 | 18 |
| Conversations with HF | 0.3 | 22 |
| With roomate, HF | 0.5 | 24 |
| With NS of Sp | 2 | 27 |
| With NNS of Sp | 4 | 28 |
| With classmates | 3 | 29 |

# PROFICIENCY TEST

# FLUENCY
# (OIM ONLY)

Development over 6 weeks in Spain

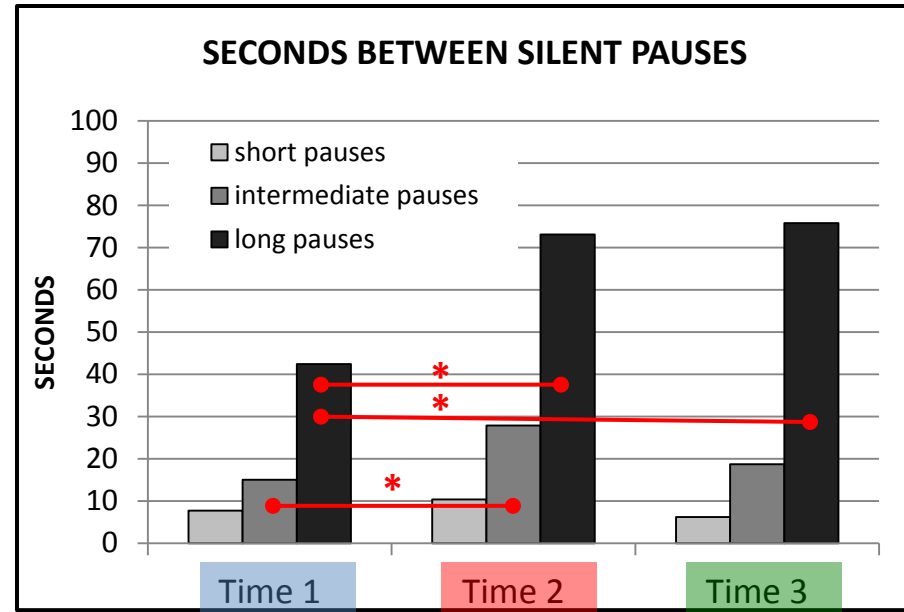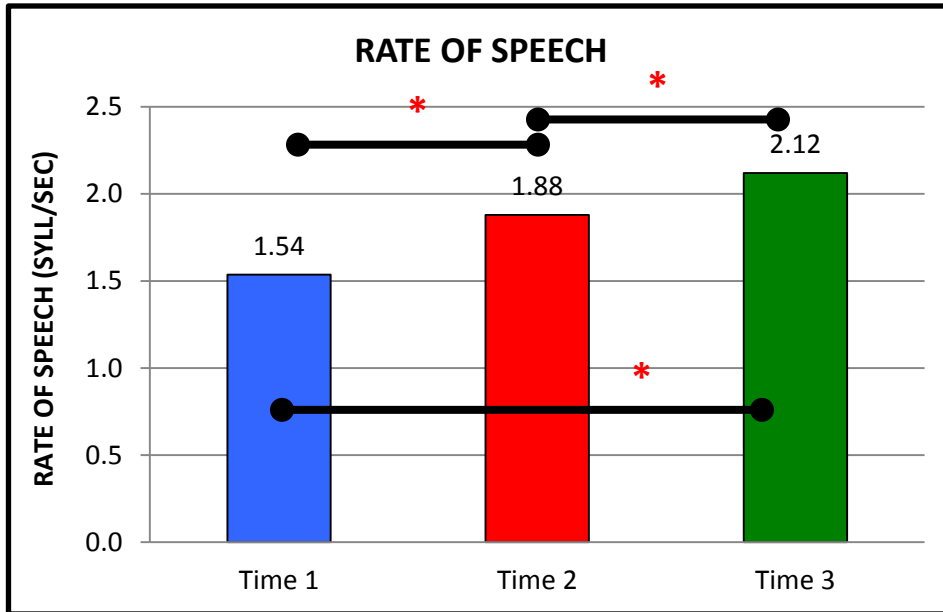# TOTAL SPOKEN TIME

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
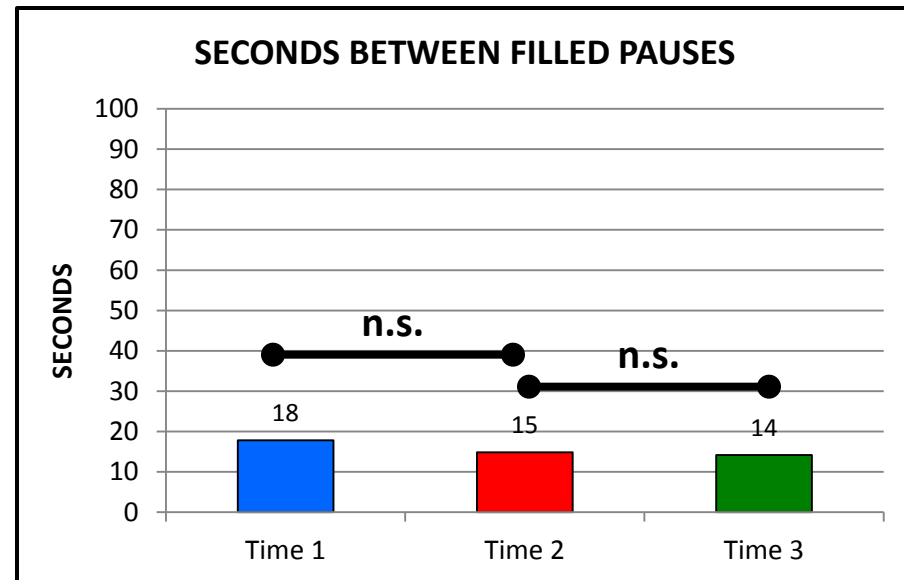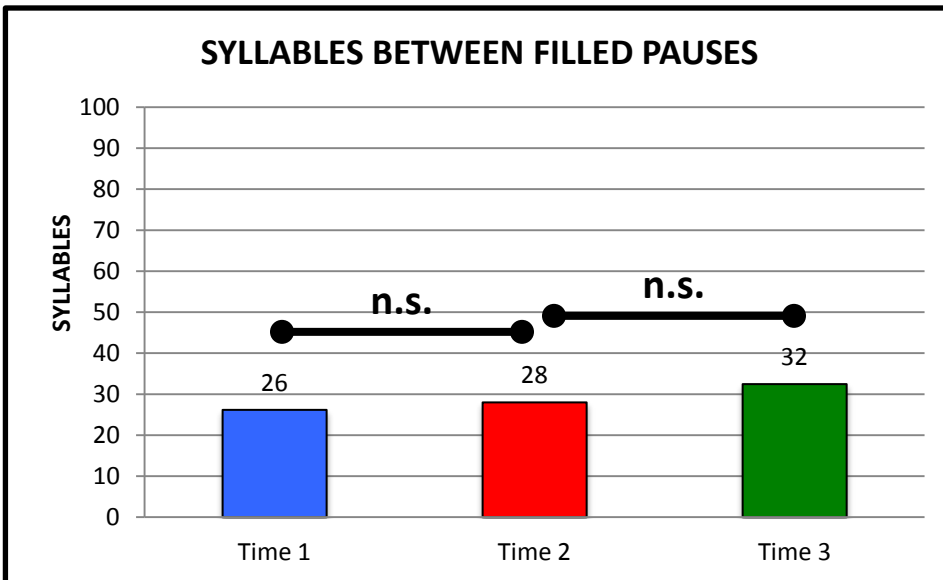
# ATTENTION CONTROL

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)
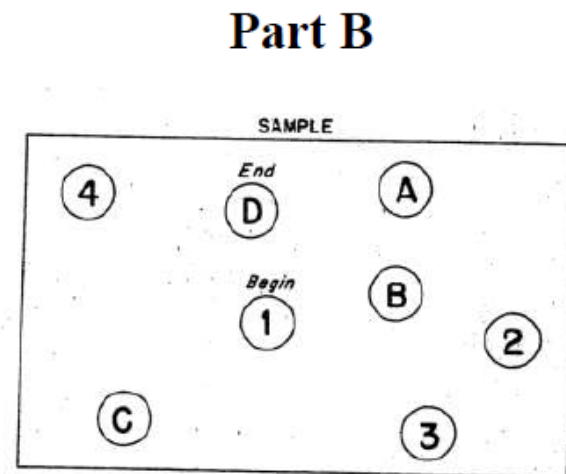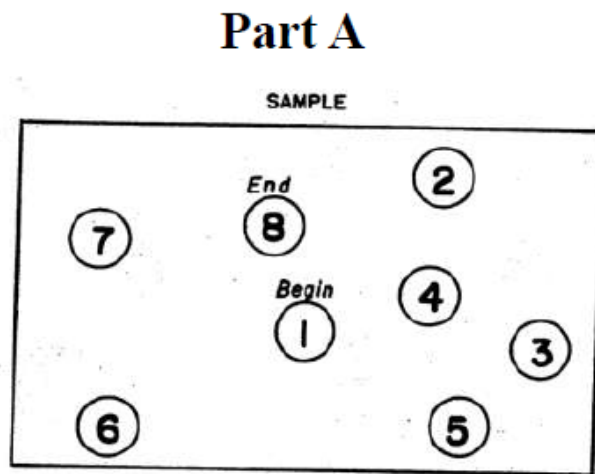


  - Switching paradigms (e.g. Rogers & Monsell, 1995)
  - Dimensional Change Card Sort Task (Frye, Zelazo & Palfai, 1995; Bialystok & Martin 2004)
  - Wisconsin Card Sorting Task (Heaton 1981)
  - Metalinguistic categorization task (Segalowitz & Freed, 2004)

# 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?

Word?

**no**                                                          **yes**

Word?

**no**                                                                                          **yes**
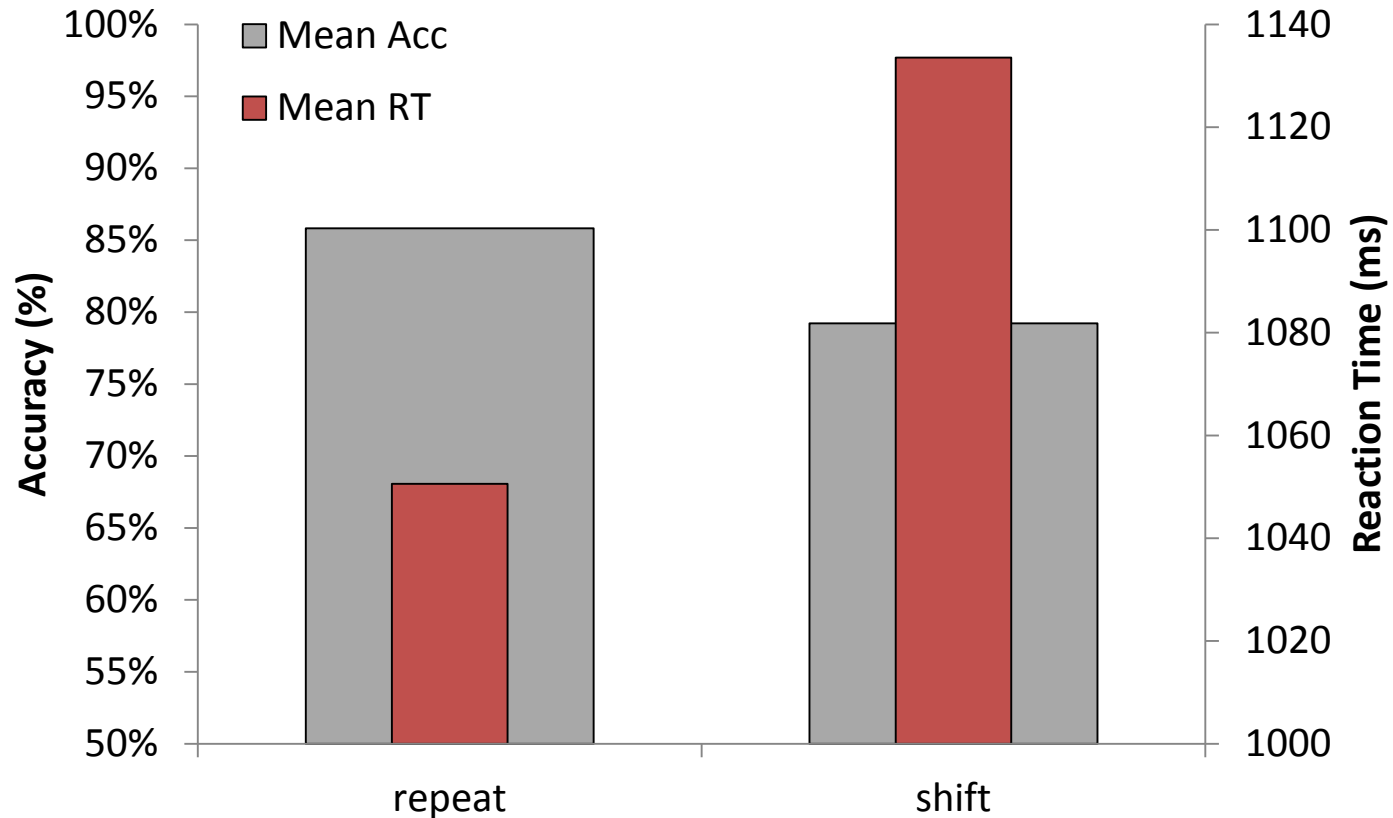
Male voice?

**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
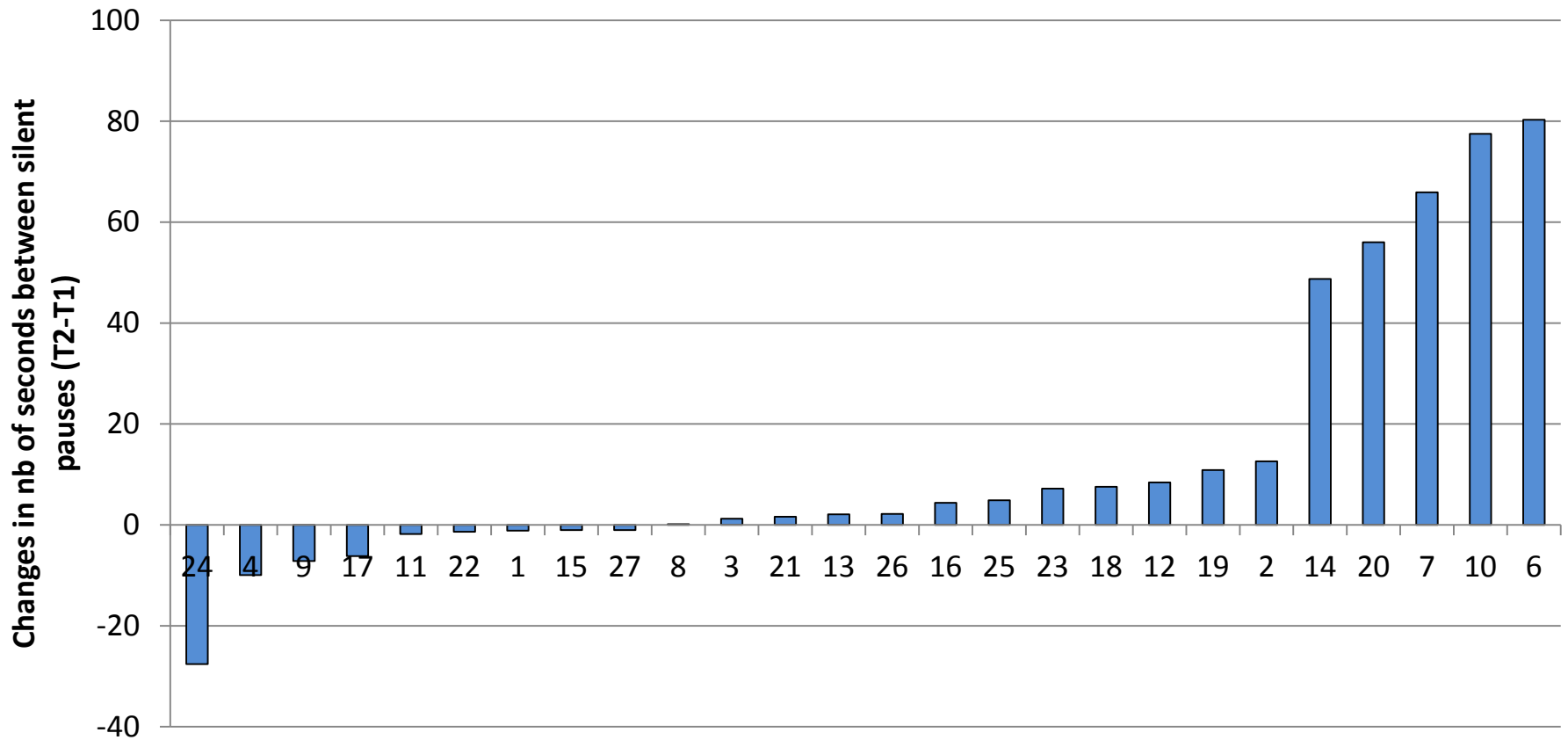
„repeat" (baseline) vs. „shift" condition



t(26) = 5.8, p < .001

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

# INDIVIDUAL VARIATION
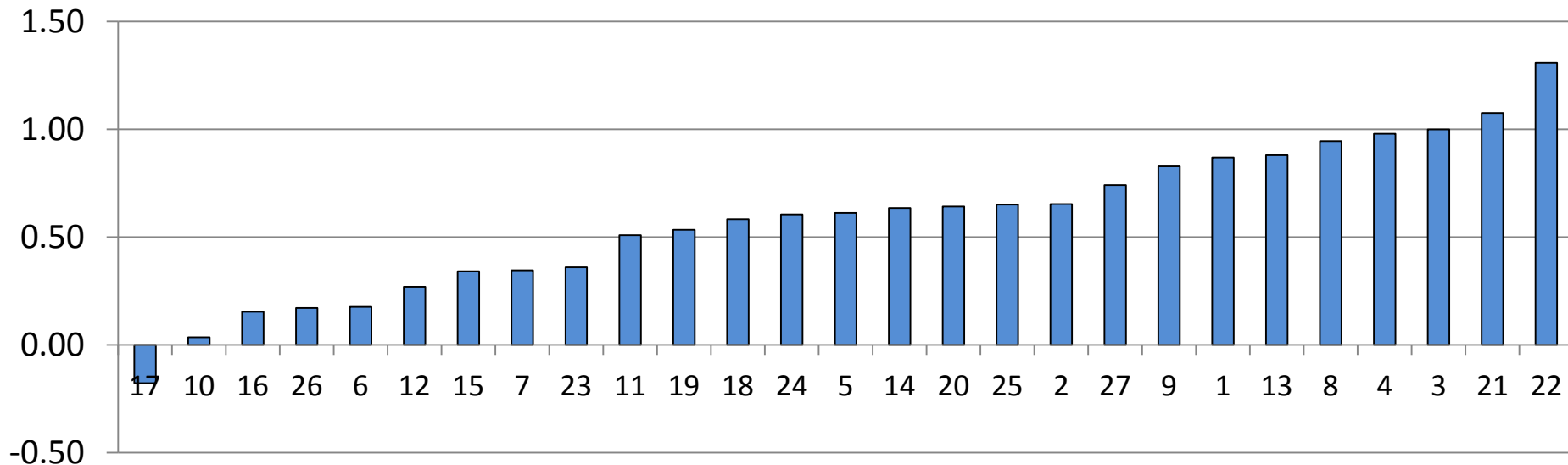
Fluency and Attention Control
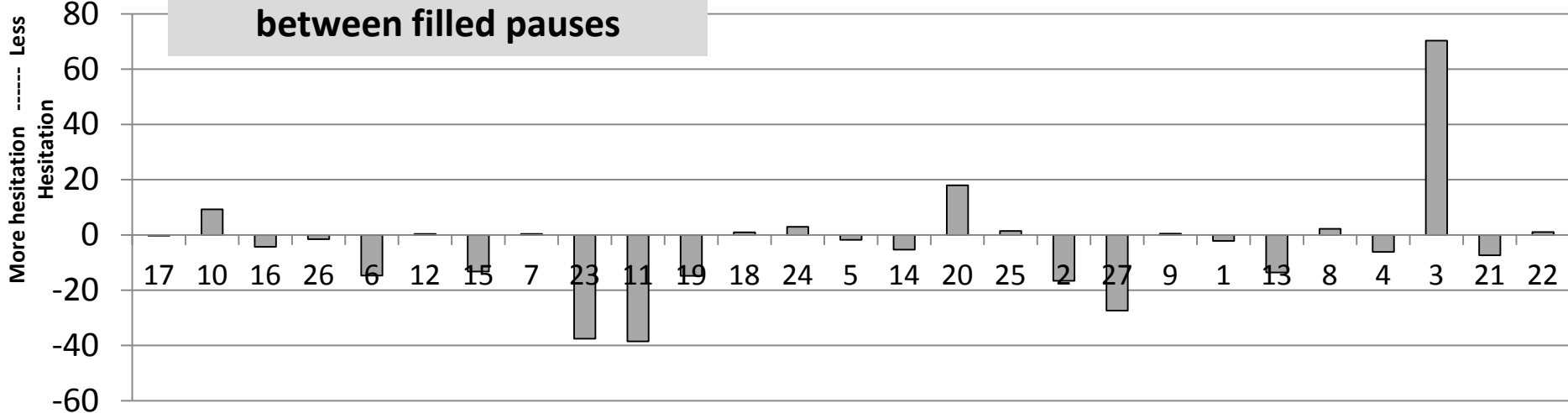
# LARGE VARIATION IN REDUCTION OF SILENT PAUSES



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
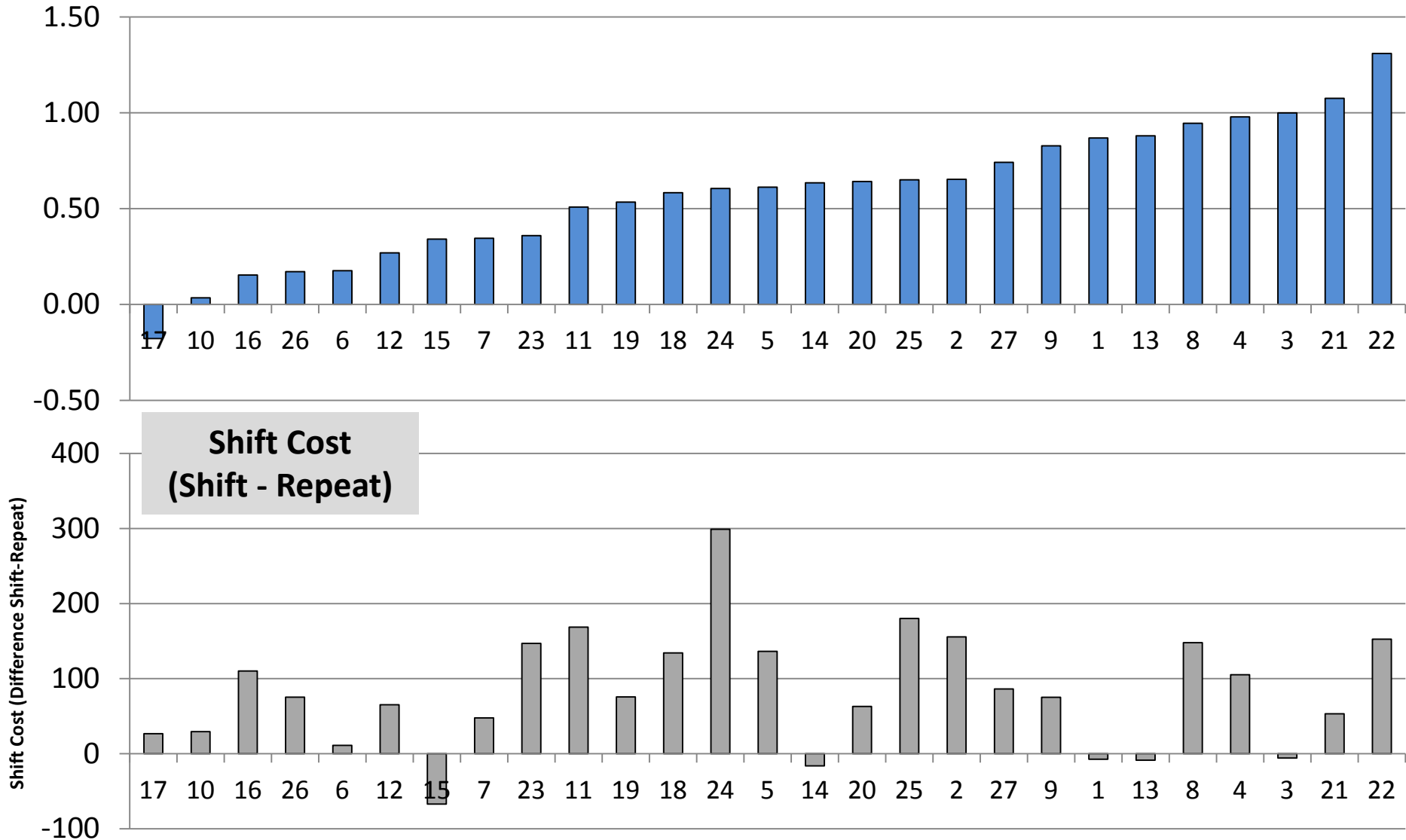


GAIN IN RATE OF SPEECH (DIFFERENCE SCORE T3-T1)

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



**Difference in [seconds between silent pauses]** (y-axis, ranging from -40 to 100)

**Shift Cost (lower = better attentional control)** (x-axis, ranging from -100 to 400)
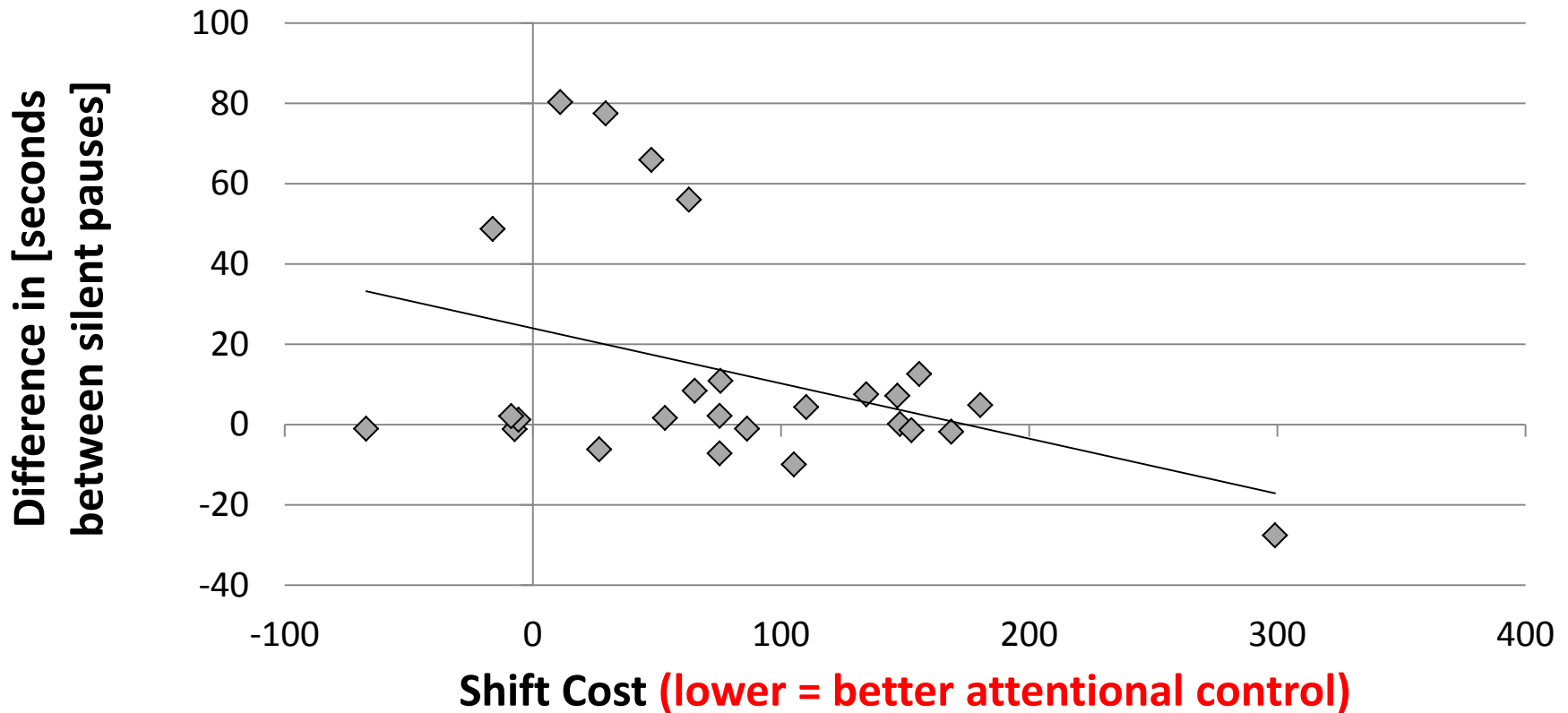
[T2 nb of seconds between silent pause - T1 nb of seconds between silent pauses]
**Positive** = fewer silent pauses; **Negative** = more silent pauses

# CORRELATIONS

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

| | | 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 | -.351 | -.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 | -.385* | -.085 | -.247 | -.223 | .073 |
| | Sig. (1-tailed) | .169 | .029 | .343 | .117 | .143 | .364 |
| | N | 25 | 25 | 25 | 25 | 25 | 25 |
| Mean RT Repeat | Pearson Correlation | .002 | -.188 | .098 | -.190 | -.147 | .435* |
| | Sig. (1-tailed) | .497 | .184 | .321 | .181 | .241 | .015 |
| | N | 25 | 25 | 25 | 25 | 25 | 25 |
| Mean RT Shift | Pearson Correlation | .110 | -.365* | .039 | -.305 | -.249 | .479** |
| | 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!**