

How Gender, Handedness, and L1 Processing Strategy Influence L2 Grammatical Processing

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Introduction

- Second language models:
 - Learners progress from lexical processing of grammatical errors to grammaticalizing the rule and relying on automatic syntactical processing
- New research suggests that native-like performance in an L2 as well as native performance in L1 is **not as uniform as previously believed** (Tanner and van Hell 2014).
- New way to categorize individual differences:
 - Individuals can show a more **N400 dominant response**, indicating a reliance on lexical information
 - or a **P600-type response**, indicating a reliance on syntactic information (Tanner, Inoue, and Osterhout 2014).
- Which is more dominant?
 - **Response dominance index**, or RDI, which identifies on a continuous scale how the subject responds to grammatical errors (Tanner et al., 2013, 2014)
- What individual differences affect an individual's RDI?

Hypotheses

- **Women will have larger RDI values** (Chavez 2001, Gu 2002, Kissau 2006).
- **People with left-handed family members (FS+) will produce more N400-like responses** to grammatical errors, resulting in a lower RDI value (Bever et al. 1989).
- **Positive correlation of RDI values in L1 English and L2 French**

Method

Participants

- 20 L1 English speakers in their second year of French (L2) instruction

ERP Task

- Participants read grammatically well-formed and ungrammatical sentences in their L1 and L2

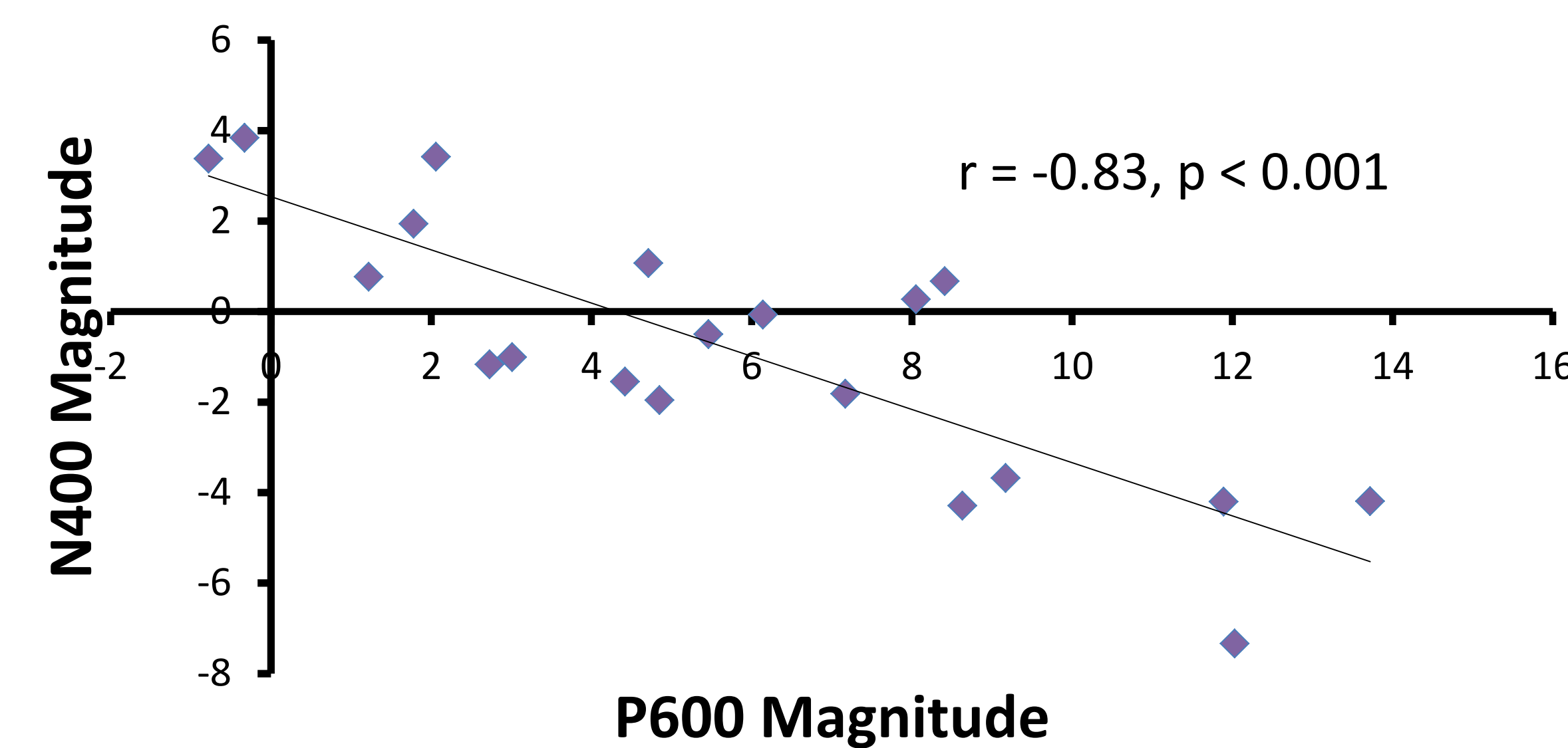
Stimuli

- Every man **has** two eyes. (grammatical)
- Every man **have*** two eyes. (ungrammatical)

Response dominance index (RDI; Tanner et al., 2013, 2014)

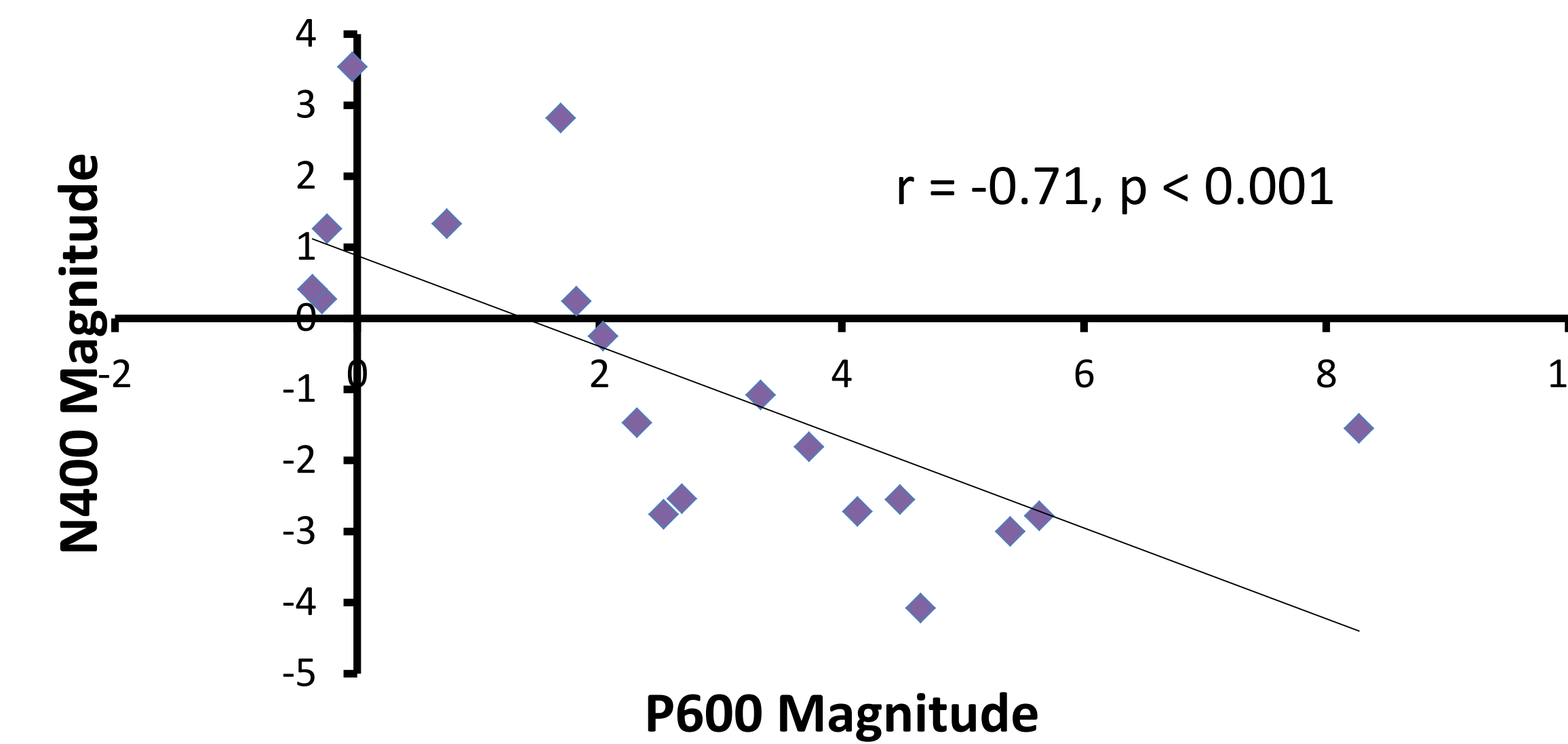
- N400 effect size and P600 effect size was calculated by the mean amplitude difference between grammatical and ungrammatical conditions in the 300-500ms and 500-900ms post-stimulus waveform, respectively
- **RDI = P600 effect size – N400 effect size**
- RDI was calculated for English and French grammatical errors

N400 and P600 Effect Magnitudes – English (L1) Syntax Errors



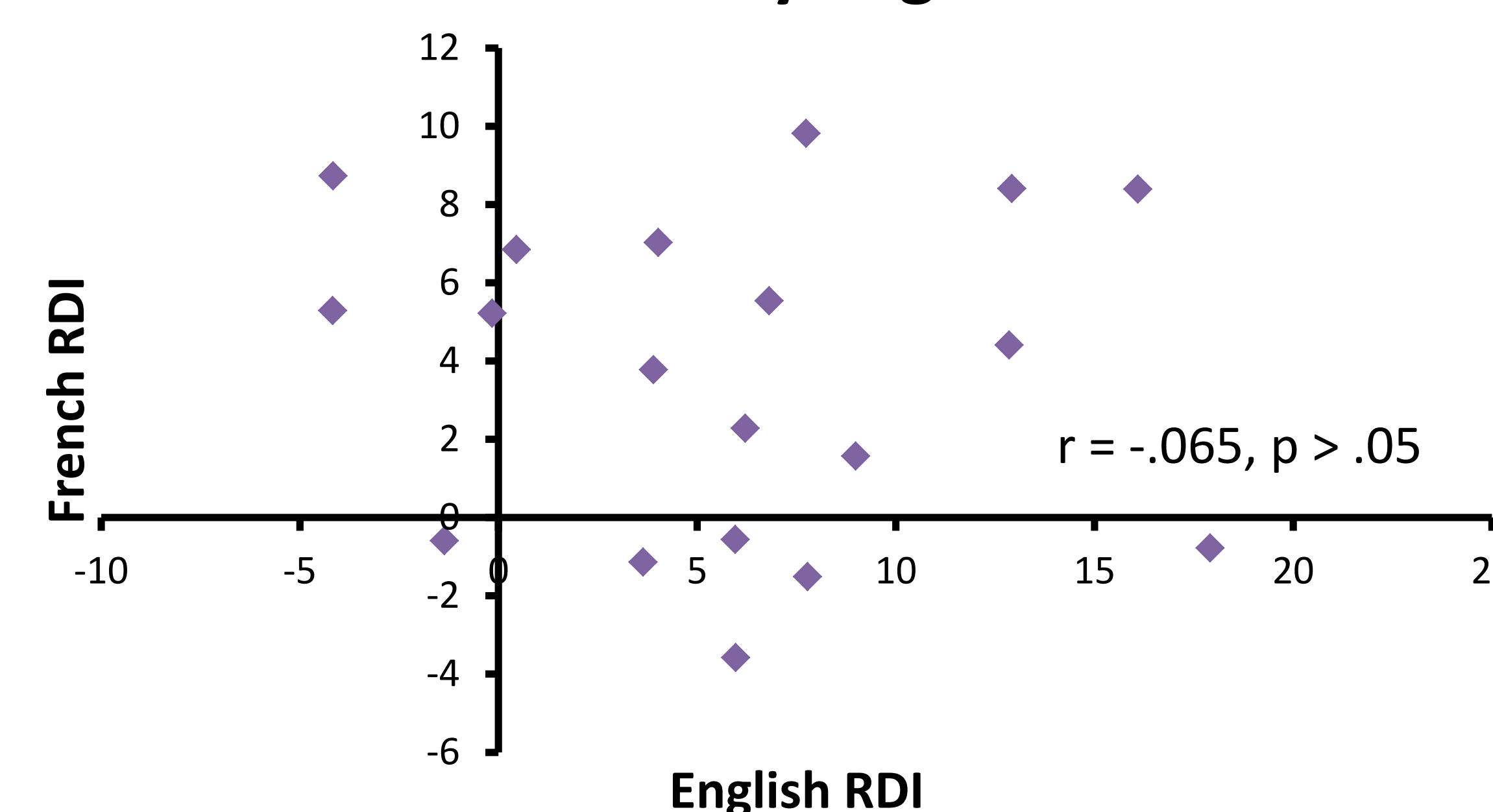
The N400 and P600 effect magnitudes to syntax errors in English are **negatively correlated**

N400 and P600 Effect Magnitudes – French (L2) Syntax Errors



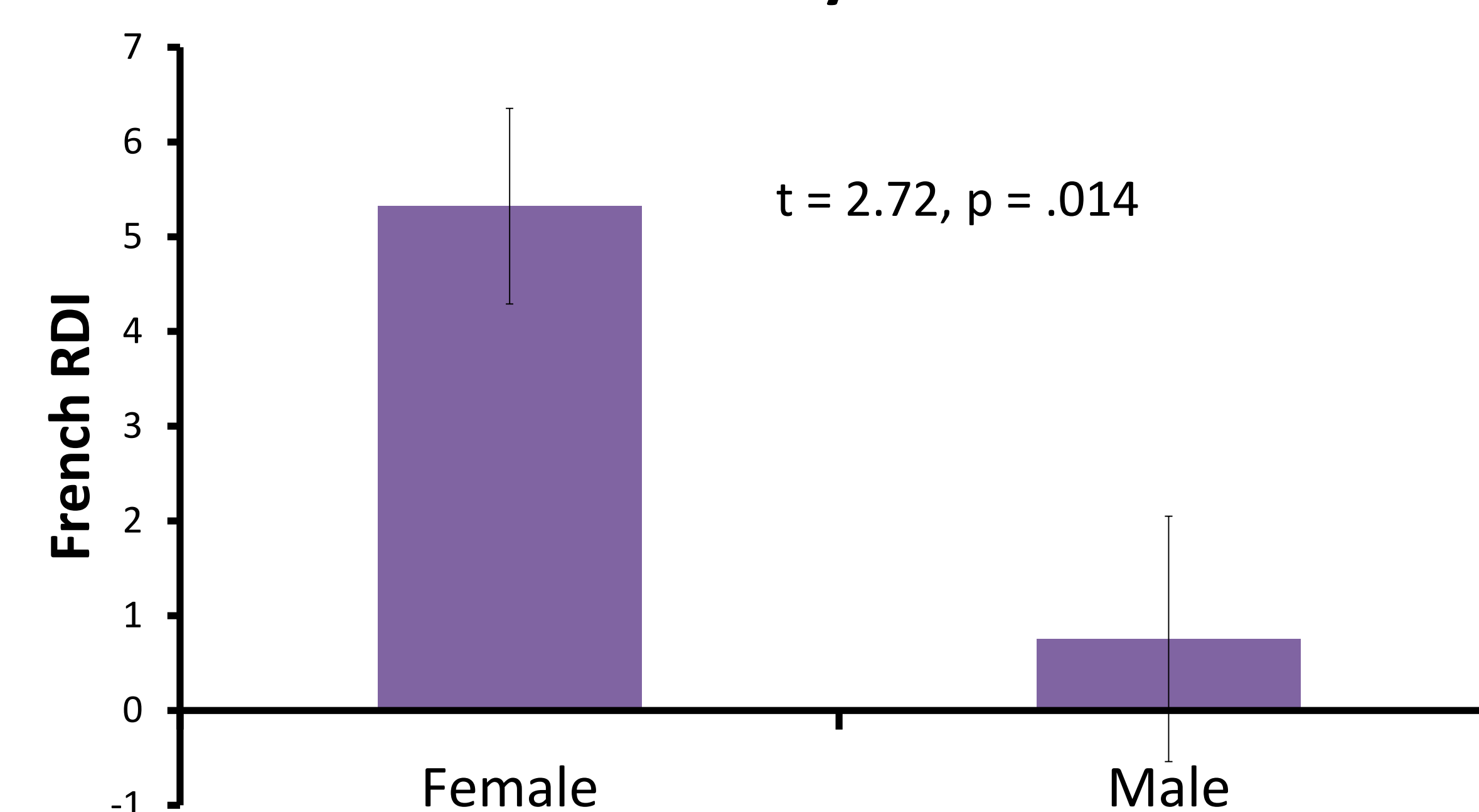
The N400 and P600 effect magnitudes to syntax errors in French are also **negatively correlated**

French RDI by English RDI



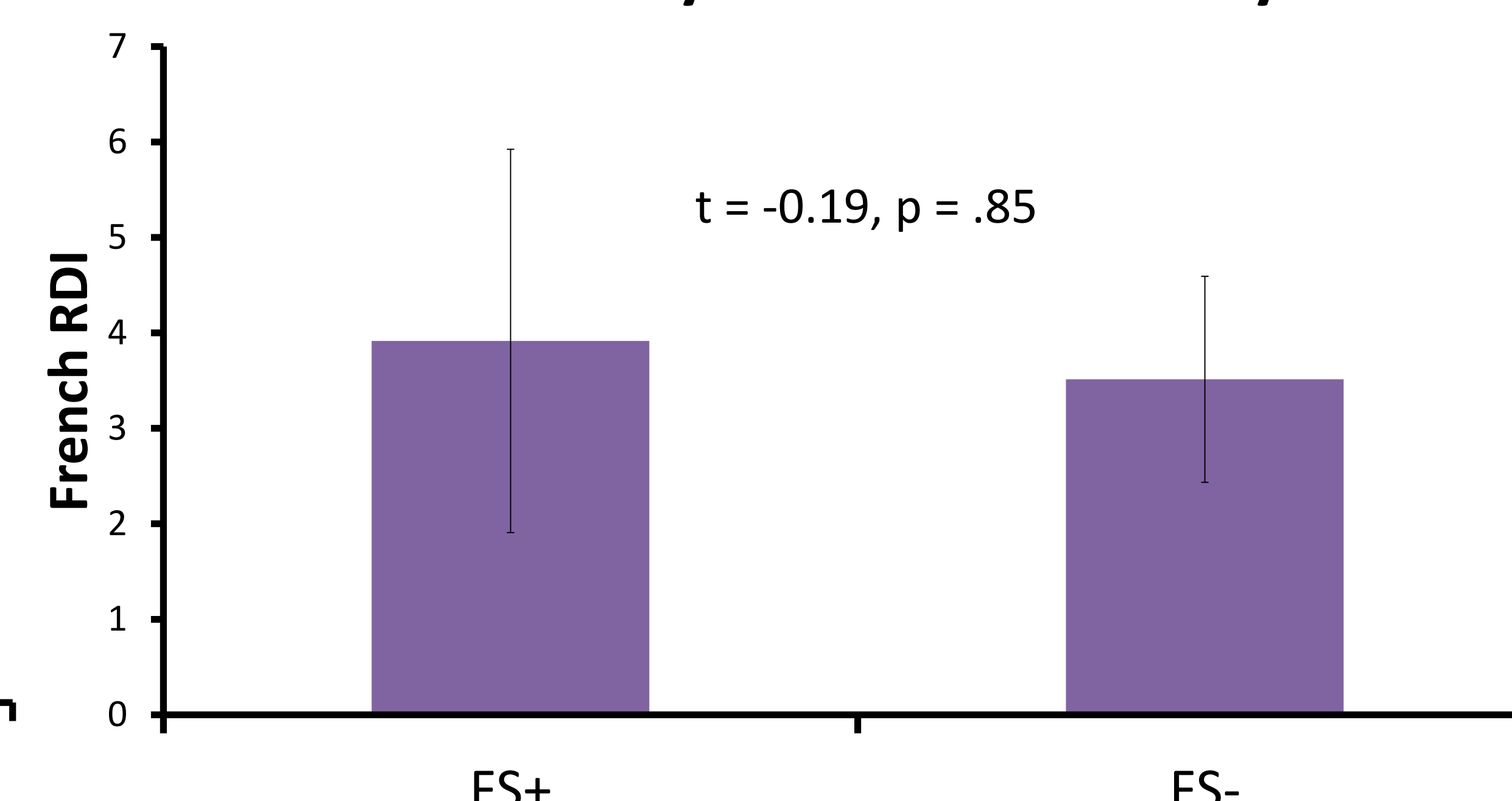
English and French RDI values were **not correlated**

French RDI by Gender



Women show **more P600-dominant responses** to syntax errors in French than men

French RDI By Familial Sinistrality



Familial sinistrality has **no effect** on French RDI to syntax errors

Discussion

- Some participants showed primarily an N400 effect and others showed primarily a P600 effect (cf. Tanner & Van Hell, 2014).
- **Women showed greater P600 dominance** than men to L2 errors - consistent with prior evidence that females learn a second language more quickly and achieve higher proficiency than male learners (Chavez 2001, Gu 2002, Kissau 2006).
- **No relationship between FS and RDI was found** – inconsistent with prior research (Tanner & Van Hell 2014)
- English RDI was unrelated to their French
 - Early in the learning process, an individual's ERP response dominance in their native language **does not predict** the dominance for their second language
 - Would this change with learning?
 - Native-like L2 RDI more like L1 RDI?
- However L2s are learned under different environments than a native language
 - Preclude the RDIs from being related?
 - Always becomes more P600-like in L2?
 - L2 instruction typically emphasizes grammar explicitly, whereas native language learning is a more implicit process.

Future Directions

- Does the relationship between L1 and L2 RDI change over time as individuals become more proficient in their L2?
- What factors go into a person's RDI in their L1?
- What, if any, is the relationship between FS and RDI?

References

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