

INTRODUCTION

AIM & BACKGROUND

Aim: To examine how the neural underpinnings of **online morpho-syntactic processing** in **late second language (L2) learners of English** might be influenced by: (1) **L1-background** (i.e. language transfer); (2) **L2 proficiency**

Transfer effects:

- Structural similarities or differences between L1-L2 → **positive or negative transfer** [3]
- **Controversial** whether **absence of L2 features in L1** → **native-like L2 processing** [1] vs. [5]
- **ERP evidence** of transfer effects is still quite **scarce** [2]

Proficiency effects:

- Distinct patterns of processing in late acquired L2 vs. native speakers
 - However, reliance on **native-like mechanisms may increase with L2 proficiency** [6]
- Precise ways in which **L1-background/transfer** and **proficiency modulate brain responses** still to be understood

PRESENT STUDY

- **Native-French** (N=23) and **native-Mandarin** (N=21) **late learners of English** were compared to **native-English monolinguals** (N=17) in a **reading ERP study in English**
- **Nominal morphology:** articles and their interaction with singular/plural markers [7, 8]
- **English and French** make **use of nominal morphology** [cf. Table 1]
- **Mandarin: no singular indefinite determiner and no singular/plural morphology** [4]
- Target sentences contained NPs involving **mismatching plural morphology and singular indefinite articles**

Table 1

	English	Mandarin	French	
i)	<i>They put a book ...</i>	?	✓	<i>... un livre</i>
ii)	<i>They put a books ...</i>	?	✗	<i>... un livres</i>

MATERIALS & PROCEDURE

- Target sentences intermixed with 8 types of filler sentences
- Rapid serial visual presentation (300ms, 200ms ISI)
- ERP epochs: -100ms – 1500ms
- Proficiency measures: **Cloze-test** (overall L2 proficiency) and **behavioral acceptability judgments** (structure-specific L2 proficiency)
- Age of acquisition (French-L1 mean = 14 years; Mandarin-L1 mean = 10 years)

PREDICTIONS

- English native-speakers:**
 - Morphological violation expected to elicit morphosyntactic response (LAN/P600)
- French and Mandarin late L2 learners of English:**
 - LAN/P600?
 - Possible variations in brain responses related to differences in L1-background, age of acquisition and L2-proficiency measures (cloze-test and error rates in behavioral tasks)

RESULTS

L1-BACKGROUND

Fig 1: Acceptance rates

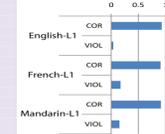


Fig 2: English-L1

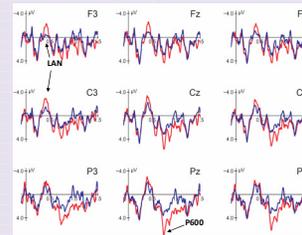


Fig 4: French-L1

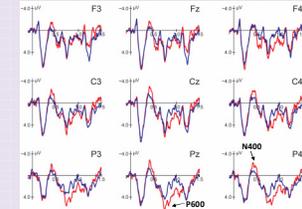


Fig 5: Mandarin-L1

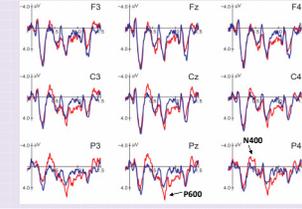
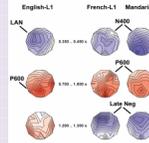


Fig 3: Voltage maps



As predicted for the **native-English**, the mismatch violation condition (*a books) elicited a **left anterior negativity (LAN, 350-450ms) + P600** (cf. Fig.2)

In contrast, an **N400+P600 pattern + a subsequent anterior negativity** was found in the **French-L1 and Mandarin-L1 groups** (cf. Fig 4 and 5)

PROFICIENCY LEVEL

Fig 6a. High proficiency L2 groups

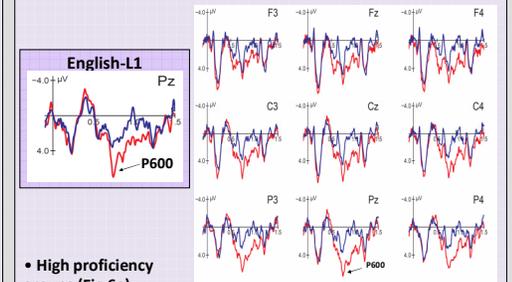
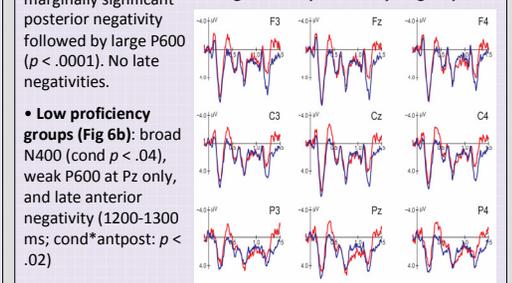


Fig 6b. Low proficiency L2 groups



• **High proficiency groups (Fig 6a):** marginally significant posterior negativity followed by large P600 ($p < .0001$). No late negativities.

• **Low proficiency groups (Fig 6b):** broad N400 (cond $p < .04$), weak P600 at Pz only, and late anterior negativity (1200-1300 ms; cond*antpost: $p < .02$)

- **Irrespective of L1-background, the P600 amplitude significantly correlated with L2 proficiency**, and more so in terms of **structure-specific proficiency** (behavioral error rates, $r = -0.51$, $p < 0.05$) than **overall proficiency** (cloze test, $r = 0.32$, $p = 0.05$) or age of acquisition ($r = -0.45$, $p < 0.05$).
- In a **stepwise regression**, only the behavioral error rates (acceptability for incorrect sentences) survives as a significant predictor of size of P600 effect

DISCUSSION

- **Native-speakers vs. L2 groups:** N400/L2 vs. LAN/L1 difference is consistent with lexical/declarative vs. grammatical/procedural basis for morphosyntax in L2 vs. L1
- Late negativity in L2 groups was an unexpected finding (and not easily explainable)
- **French vs. Mandarin groups:** Similar patterns regardless of L1-background → no clear support of transfer effects

- **L2 proficiency level** significantly modulated P600 amplitude
- In line with models predicting that **neural underpinnings of L2 processing** are better described in terms of **proficiency-dependent continuum** than categorical L1 vs. L2 distinction (or AOA dependent)
- **Structure-specific proficiency** more important than cloze test (overall L2 proficiency) in **predicting native-like L2 processing**