

Case and agreement morphology processing in bilinguals.

Evidence from ERPs

Adam Zawiszewski^{1,2} & Itziar Laka²



Universidad del País Vasco Euskal Herriko Unibertsitatea

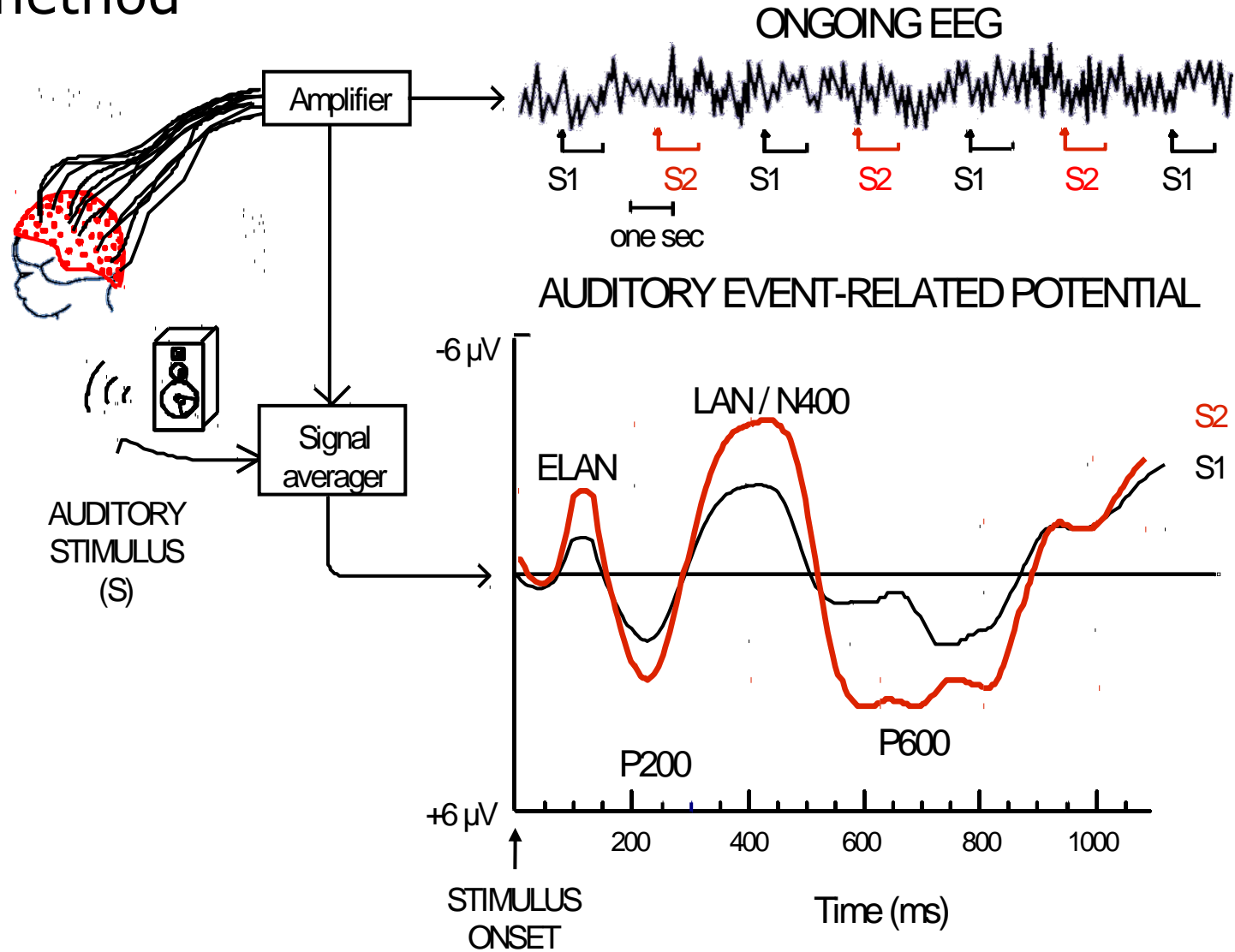
1 -MPI for Human Cognitive and Brain Sciences, Leipzig 2- University of the Basque Country, Vitoria-Gasteiz

Structure of the talk

1. Preliminaries: language processing and ERPs
2. Bilingual language processing
 - a. Age of Acquisition (AoA) effects
 - b. Proficiency effects
3. Current study
4. Results
5. Discussion
6. Conclusions

Preliminaries

ERP method



Bilingual language processing: AoA effects

- Chinese L2 speakers of English (Weber-Fox and Neville, 1996) show maturational constraints processing syntax
- Japanese L2 speakers of German (AoA = 27 yrs) (Hahne and Friederici, 2001) showed no ERP component for syntactic violations
- Russian L2 speakers of German (AoA = 27 yrs) (Hahne, 2001) showed P600 to syntactic violations, but no ((E)LAN)
- Chinese L2 learners of English (AoA = 12 yrs) showed a late frontal negativity to agreement violations (natives LAN – P600 pattern) (Chen et al., 2006)

Bilingual language processing: proficiency effects

- High proficient (HP) German learners taught an artificial language BROCANTO (AoA = 24.9 yrs) showed an (E)LAN-P600 pattern as a response to syntactic violations (Friederici et al., 2002)
- Italian L2 HP speakers of German (AoA = 18.4) and German L2 HP speakers of Italian (AoA = 20.8 yrs) responded to SV violations similarly to natives of each language (LAN-P600), low-proficient speakers showed only a delayed P600 (Rossi et al., 2006)
- Spanish L2 HP speakers of English (AoA = 5yrs) process ambiguous and ungrammatical sentences like natives (Kotz et al., 2008)

Bilingual language processing: AoA and proficiency

- German L2 HP speakers of Japanese (AoA = 23.6 yrs) showed no effect to classifier violations, whereas natives displayed a LAN-P600 pattern (Mueller et al., 2005, 2007)
- German L2 speakers of Dutch responded to gender violations similarly to natives (P600); English and Romance L2 learners of Dutch showed no effect (Sabourin, 2003)
- Japanese L2 HP speakers of English differ significantly from natives when processing SV violations (Ojima et al., 2005)

Is there any principled way to account for these results?

Bilingual language processing: hypothesis

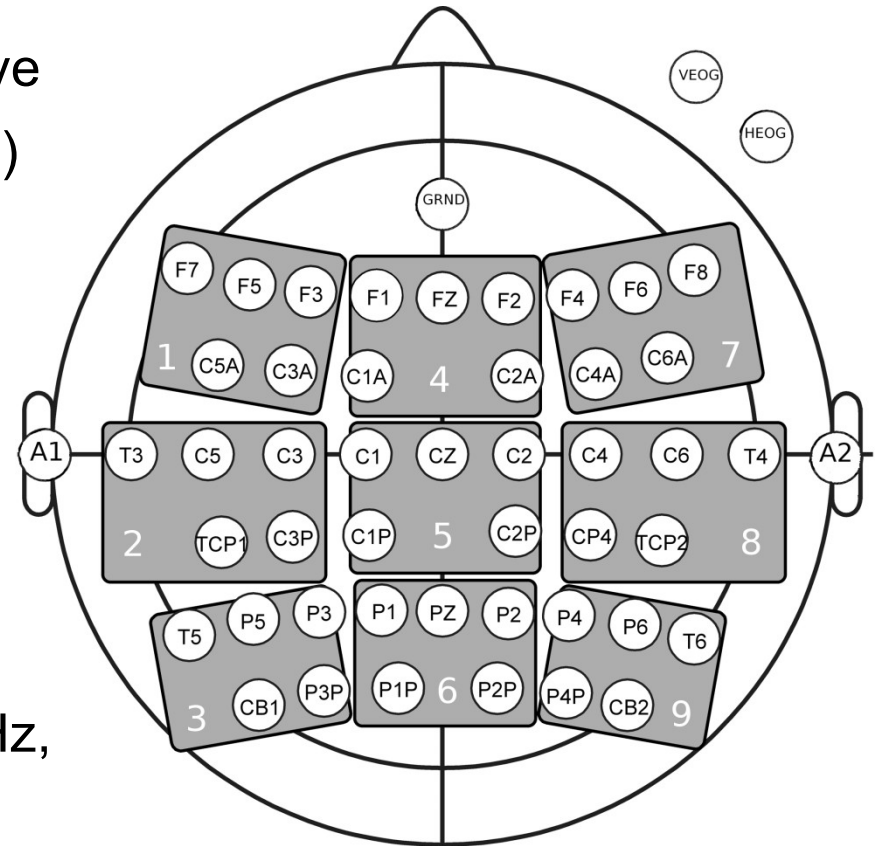
- Given HP, AoA effects in L2 processing are expected when a linguistic property tested in L2 is absent in L1 (see Weber-Fox and Neville, 1996; Sabourin, 2003; Mueller et al., 2005; Ojima et al., 2005; Chen et al., 2006)
- Given HP, no AoA effects in L2 processing are expected when a property of L2 is present in speakers' L1 (see Friederici et al., 2002; Rossi et al., 2006; Kotz et al., 2008)

Current study: general assumptions

1. Early Spanish L2 HP speakers of Basque (AoA = 3-4 yrs)
2. Investigate the properties of L2
 - absent in L1:
 - ergativity (case morphology)
 - object-verb agreement morphology
 - common for both L1 and L2 (control condition)
 - semantics (subcategorization)
3. compare the results with a native control group
4. experimental method: ERPs and grammaticality judgment task

Current study: method

- subjects: 20 native and 21 nonnative speakers of Basque (AoA = 3.1 yrs)
- EXPE6 (Pallier et al., 1997)
- presentation: visual, word-by-word, 350 ms with 235 ms of ISI, 80 experimental sentences for each experimental condition+ fillers
- BrainVision software, 64 electrode cap, digitalization at a rate of 500 Hz, electrode impedance kept below 5 KOhm



Current study: sample of materials

1. Noun morphology: ergative case

Goizean egunkaria irakurri du gizonak /*gizona tabernan.

Morning-in newspaperABS read has manERG/*ABS bar-in

‘This morning the man read a newspaper in the bar.’

2. Verb morphology: OV agreement

Zu-k ni hondartza-ra eramaten na-u-zu /*d-u-zu batzuetan.

You-Subj I-Obj beach-to take me-have-you/*it-have-you sometimes

‘Sometimes you take me to the beach’

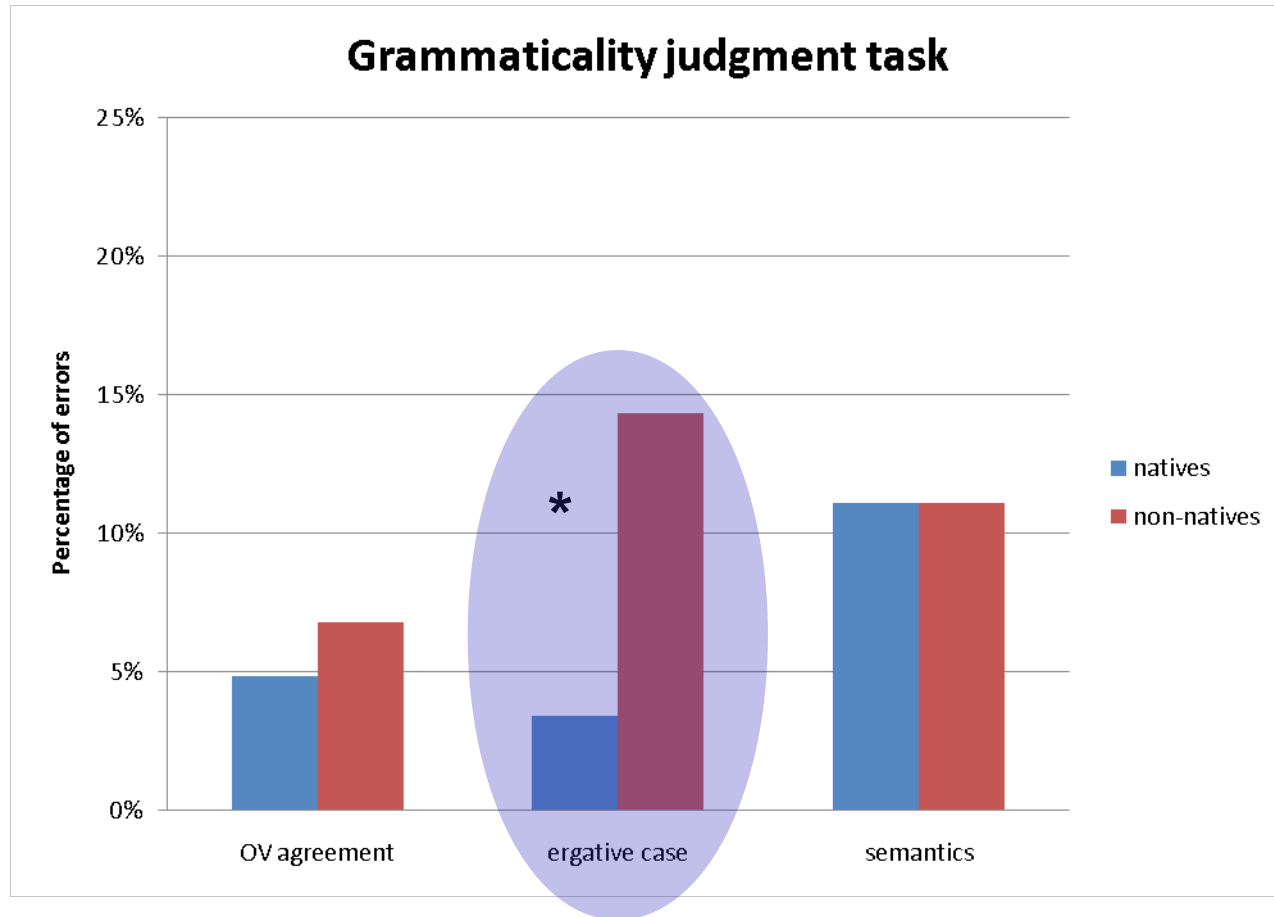
3. Semantics

Ikasleek bazkaltzera gonbidatu zuten maisua /*horma atzo.

‘Students for a dinner invited the teacher/*wall yesterday’

‘The students invited their teacher/*wall to dinner yesterday’

Current study: behavioural results



Current study: ERP results

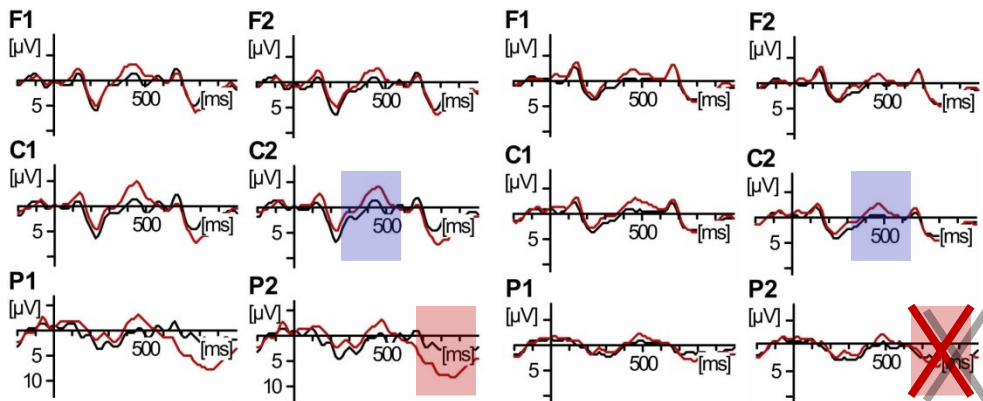
ERGATIVE CASE

SEMANTICS

NATIVES

ERG vs. *ABS

NONNATIVES

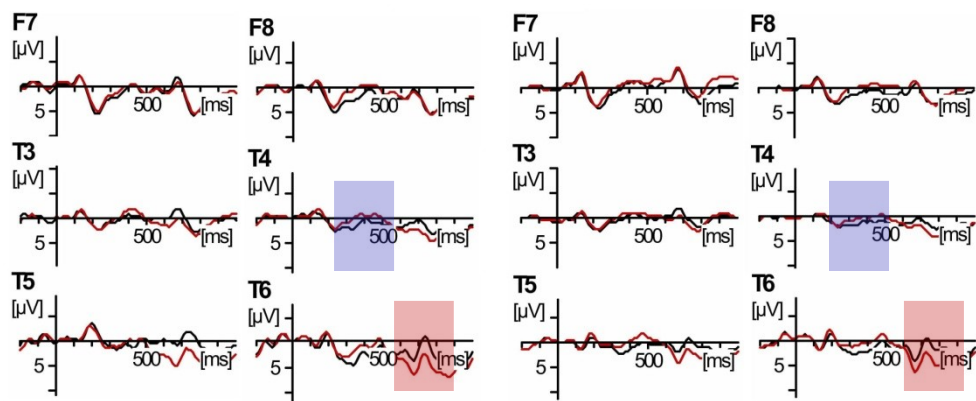


OBJECT-VERB AGREEMENT

NATIVES

OV vs. *OV

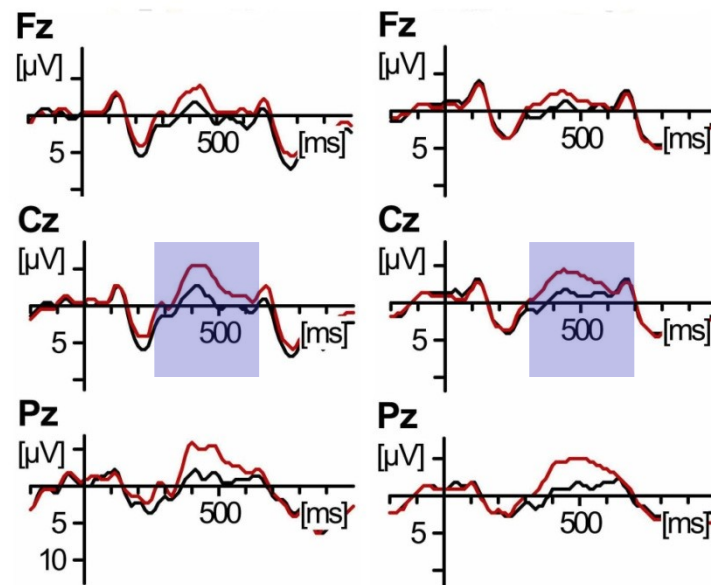
NONNATIVES



NATIVES

NONNATIVES

TEACHER vs. *WALL



= N400
 = P600

ERG: GRAM*ANT (stat. trend)
 OV: GRAM*ANT; GRAM*HEM
 SEM: GRAM*ANT

 ERG: GROUP*GRAM*ANT
 OV: GRAM*ANT
 SEM: no effect

Discussion

- L2 HP speakers of Basque differ significantly from L1 speakers when processing ergativity but not OV agreement or semantics
- lack of P600 among L2 speakers ...
 - ...reflects the goodness of the task fulfillment?
(number of errors correlated with the amplitude of the P600?)
 - ...suggests that they are not aware of the ungrammaticality ?
 - ...prove that they rely on their L1 when processing the ungrammatical structures ?

Conclusion

- there appears to be a maturational effect for case morphology / ergativity (within the first 3 years of life) but not for OV agreement morphology
- within the morphological component of grammar, age (and maybe also the mode of acquisition) may have an asymmetrical impact...
 - ...independent of proficiency
 - ...dependent on the type of grammatical process at play (nominal vs. verbal morphology)

THANK YOU