

## Introduction

Grammatical gender: morphosyntactic cue to predict upcoming information during sentence processing

- Monolingual children make anticipations based on gender of the article (Lew-Williams & Fernald, 2007)
- Adult L2 speakers show less efficient processing of gender than native speakers (e.g., Lew-Williams & Fernald, 2010)

- Interaction between two gender systems?

*Gender integrated hypothesis*

versus

*Gender autonomous hypothesis*

- Transfer effects due to gender incongruency during online processing in bilingual adults (e.g., Morales et al., 2016; Klassen, 2016)

→ *What about bilingual children?*

- Cross-linguistic influence may be modulated by language dominance (see Unsworth, 2013)

## Research questions

1. Do Italian-German bilingual children make linguistic anticipations on the basis of grammatical gender?
2. Is there cross-linguistic influence when two languages have the opposite gender?
3. What is the effect of language dominance?

## Hypotheses and predictions

1. *Bilingual children process speech incrementally*
  - increase looks to target at during the article in mismatch conditions
2. *Gender incongruency leads to cross-linguistic influence*
  - less anticipation in Italian when German translation equivalents have opposite gender
3. *Language dominance influences anticipation abilities and the likelihood of transfer*
  - stronger anticipation patterns for Italian-dominant children
  - language incongruency effect more likely for German-dominant children

## References

Klassen, R. (2016). The representation of asymmetric grammatical gender systems in the bilingual mental lexicon. *Probus*, 28(1), 9-28. - Lew-Williams, C., & Fernald, A. (2007). Young children learning Spanish make rapid use of grammatical gender in spoken word recognition. *Psychological Science*, 18(3), 193-198. - Lew-Williams, C., & Fernald, A. (2010). Real-time processing of gender-marked articles by native and non-native Spanish speakers. *Journal of memory and language*, 63(4), 447-464. - Mirman, D., Dixon, J. A., & Magnuson, J. S. (2008). Statistical and computational models of the visual world paradigm: Growth curves and individual differences. *Journal of memory and language*, 59(4), 475-494. - Mani, N., & Huettig, F. (2014). Word reading skill predicts anticipation of upcoming spoken language input: A study of children developing proficiency in reading. *Journal of experimental child psychology*, 126, 264-279. - Morales, L., Paolieri, D., Dussias, P. E., Kroff, J. R. V., Gerfen, C., & Bajo, M. T. (2016). The gender congruency effect during bilingual spoken-word recognition. *Bilingualism: Language and Cognition*, 19(2), 294-310. - Unsworth, S. (2013). Current issues in multilingual first language acquisition. *Annual Review of Applied Linguistics*, 33, 21-50.

## Methods

### Participants

- 44 Italian-German bilingual children
- 4 excluded due to technical problems/trilingualism
- Age range 7;4 – 9;3 ( $M = 8;5$ )
- Resident in Italy, attending a 50/50 bilingual school

### Visual world eye-tracking experiment

Intro	Determiner	Noun
Dov'è	la	fragola?
'Where is	the	strawberry?'

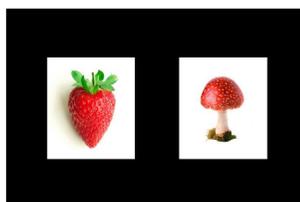


Figure 1.

#### Mismatch/Congruent

la<sub>[+Fem]</sub> fragola  
il<sub>[+Masc]</sub> fungo  
die<sub>[+Fem]</sub> Erdbeere  
der<sub>[+Masc]</sub> Pilz



Figure 2.

#### Mismatch/Incongruent

il<sub>[+Masc]</sub> topo  
la<sub>[+Fem]</sub> farfalla  
die<sub>[+Fem]</sub> Maus  
der<sub>[+Masc]</sub> Schmetterling

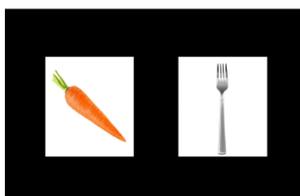


Figure 3.

#### Match/Congruent

la<sub>[+Fem]</sub> carota  
la<sub>[+Fem]</sub> candela  
die<sub>[+Fem]</sub> Möhre  
die<sub>[+Fem]</sub> Kerze

- 42 test items (14 per condition) + 3 practice items
- 2 lists with reversed targets/competitors

### Other measures:

#### Vocabulary test (PPVT) in German and Italian

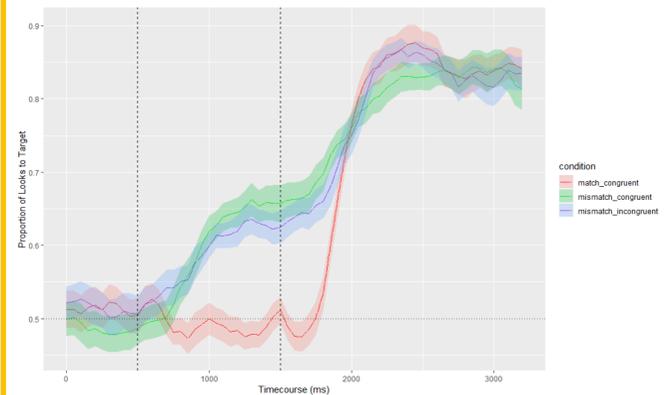
- *Italian-dominant*
  - $M$  standard score Italian PPVT: 109 ( $SD = 11$ )
  - $M$  standard score German PPVT: 83 ( $SD = 12$ )
  - Balance score = Italian PPVT – German PPVT

### Statistical analysis

GLMM: Looks to target ~ time region (intro vs determiner vs noun) \* condition \* balance vocabulary + (item\_order | subject) + (1 | item)

Work in progress: growth curve analysis without time regions (Mirman, Dixon & Magnuson, 2008)

## Results



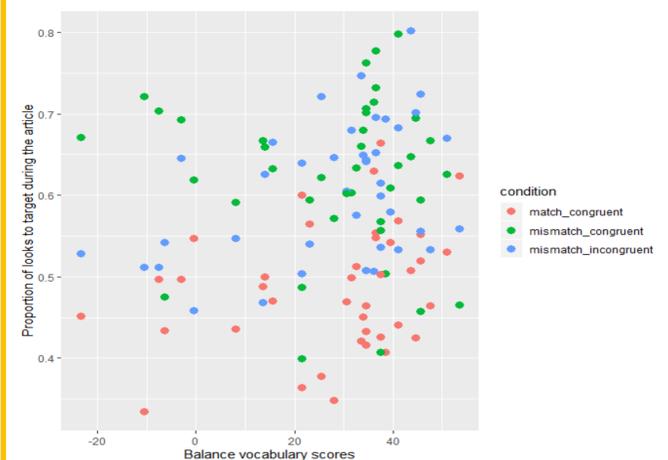
Significant interaction between time region (intro vs determiner) and condition (match vs mismatch) (Est. odds ratio = 1.86, 95% CI = 1.78..1.95,  $p < .0001$ )  
→ *anticipation on the basis of gender*

Significant interaction between time region (intro vs determiner) and condition (congruent vs incongruent) (Est. odds ratio = 1.16, 95% CI interval = 1.10..1.23,  $p < .0001$ ) → *interference from German*

→ Both effects significantly modulated by language dominance

Italian-dominant =

- more anticipation ( $p < .001$ )
- less interference ( $p = .016$ )



## Discussion

- Like monolingual children and adults, bilingual children process speech rapidly and incrementally  
→ but anticipation on the basis of gender is stronger when proficiency is greater
- Activation of 2 gender systems may cause interference when anticipating the noun; supports *gender integrated hypothesis*
- Cross-linguistic influence seems to be most likely from dominant language to weaker language
- Results should be confirmed using growth curve analysis

### Future studies

- German-Italian bilingual children resident in Germany → confirm dominance effect
- Relation between reading skills and anticipation (see Mani & Huettig, 2014)
  - Anticipation in L1 predicts reading in L2 and vice versa?