Exploring the Effects of Bilingualism on Filled Pauses: An Acoustic-Phonetic Perspective

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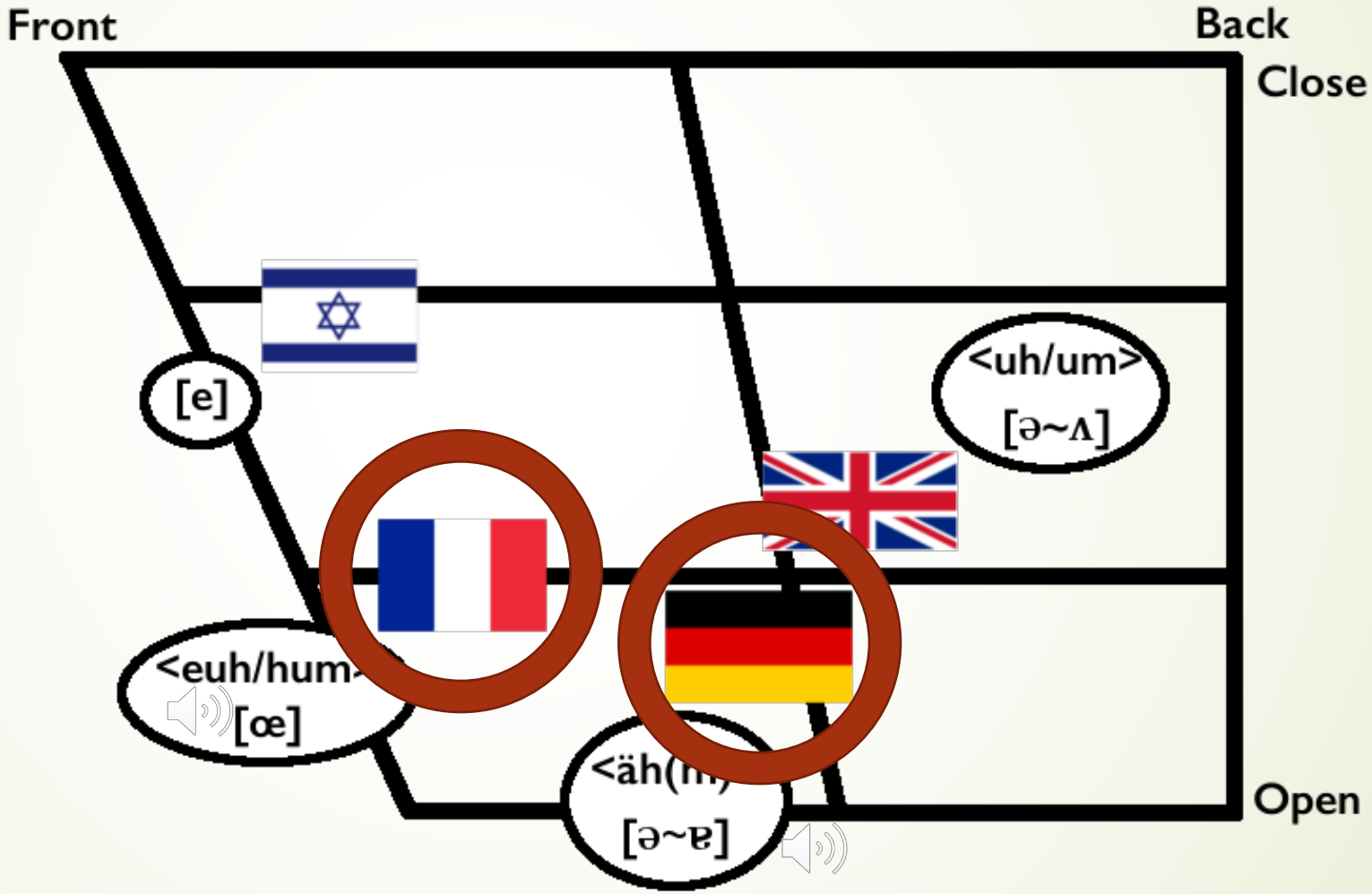
Background

- Filled pauses: "uh", "um" in hesitation
- Why bilingual FPs?
  - Forensic phonetics
    - Excellent speaker-discriminatory power (Hughes, Wood & Foulkes, 2016)
    - Speakers "consistent in *their* respective personal variant" (Künzel, 1997)
    - Dominant focus on monolingual speakers
  - What *are* FPs?
    - Words, planned (Clark & Fox Tree, 2002)?
    - Unconscious, automatic (Jessen, 2008)?

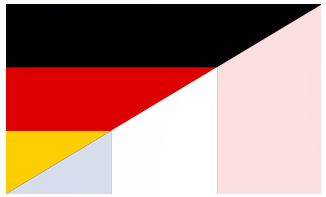
Background



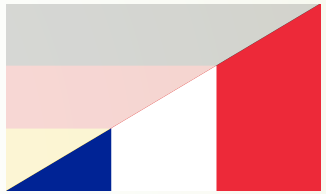
Candea, Vasilescu & Adda-Decker, 2005; Pätzold & Simpson, 1995; Silber-Varod, Weiss & Amir, 2015

Research Questions

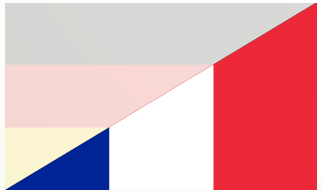
1. How do German-French bilinguals differentiate FPs in German and French?



vs



2. How do FPs of bilinguals and monolinguals speaking French differ?



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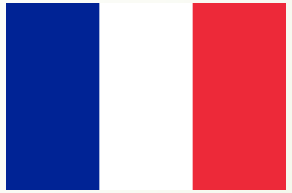


Data & Methods

Materials

German-French bilinguals

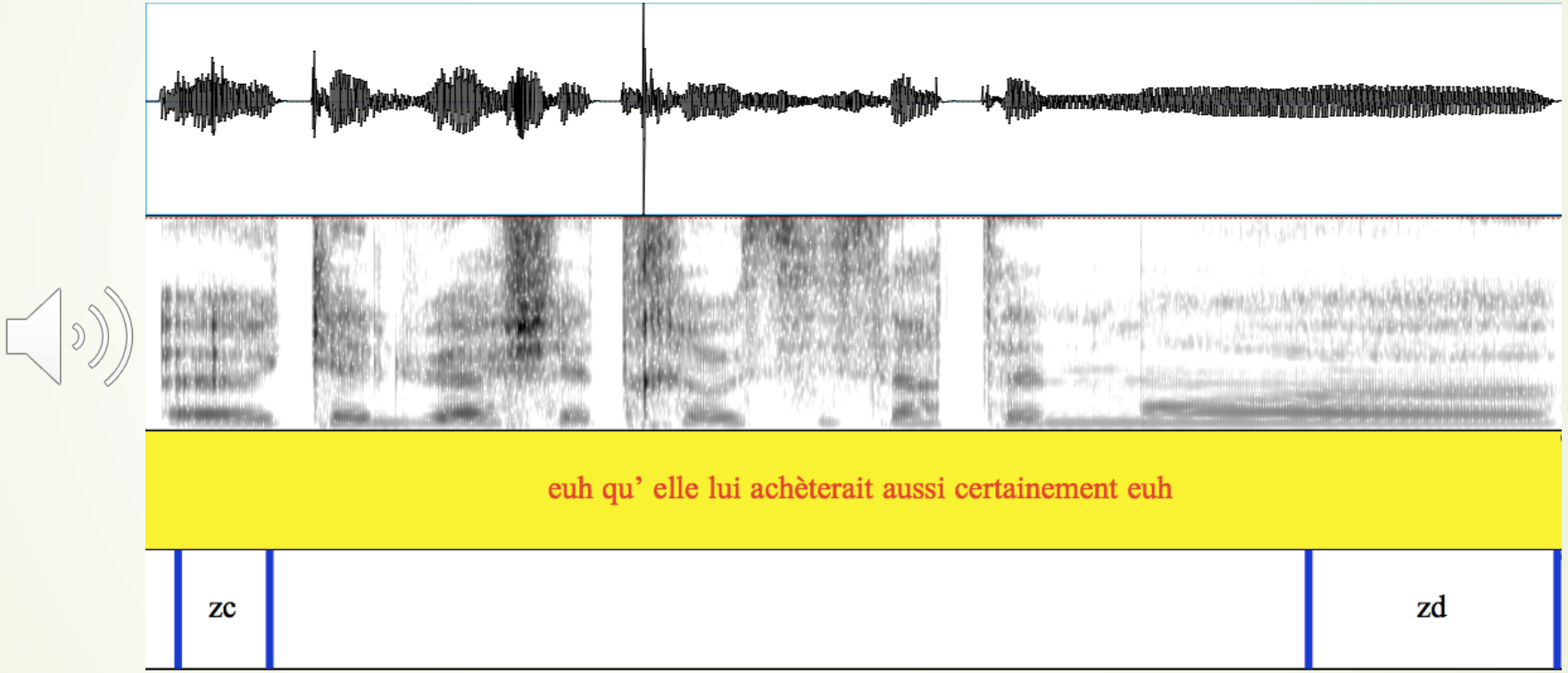
- Hamburg Adult Bilingual LAnguage
  - Kupisch, 2011; Kupisch et al, 2012
- 16 female
  - Simultaneous bilingual
- Semi-structured interviews
  - Separate German/French sessions

French monolinguals

- Nijmegen Corpus of Casual French
  - Torreira, Adda-Decker & Ernestus, 2010
- 20 female
- Conversation between friends

Procedure: Segmentation

- Based on transcripts accompanying the corpora



- Very few monolingual UM's → UH only

Procedure: Extraction

- Formant dynamics: F1–F3 at +10% time-steps
- Discarded if formant, at any time-step, beyond threshold:

(in Hz)	F1	F2	F3
Upper limit	1000	2500	–
Lower limit	300	1000	2000

- Number of tokens:

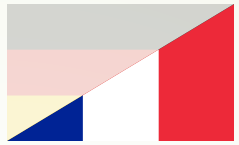
	Bi. German	Bi. French	M. French
Total	331	631	920
Min	3	8	23
Max	60	79	67
Mean	23.6	39.4	46

Procedure: Modelling

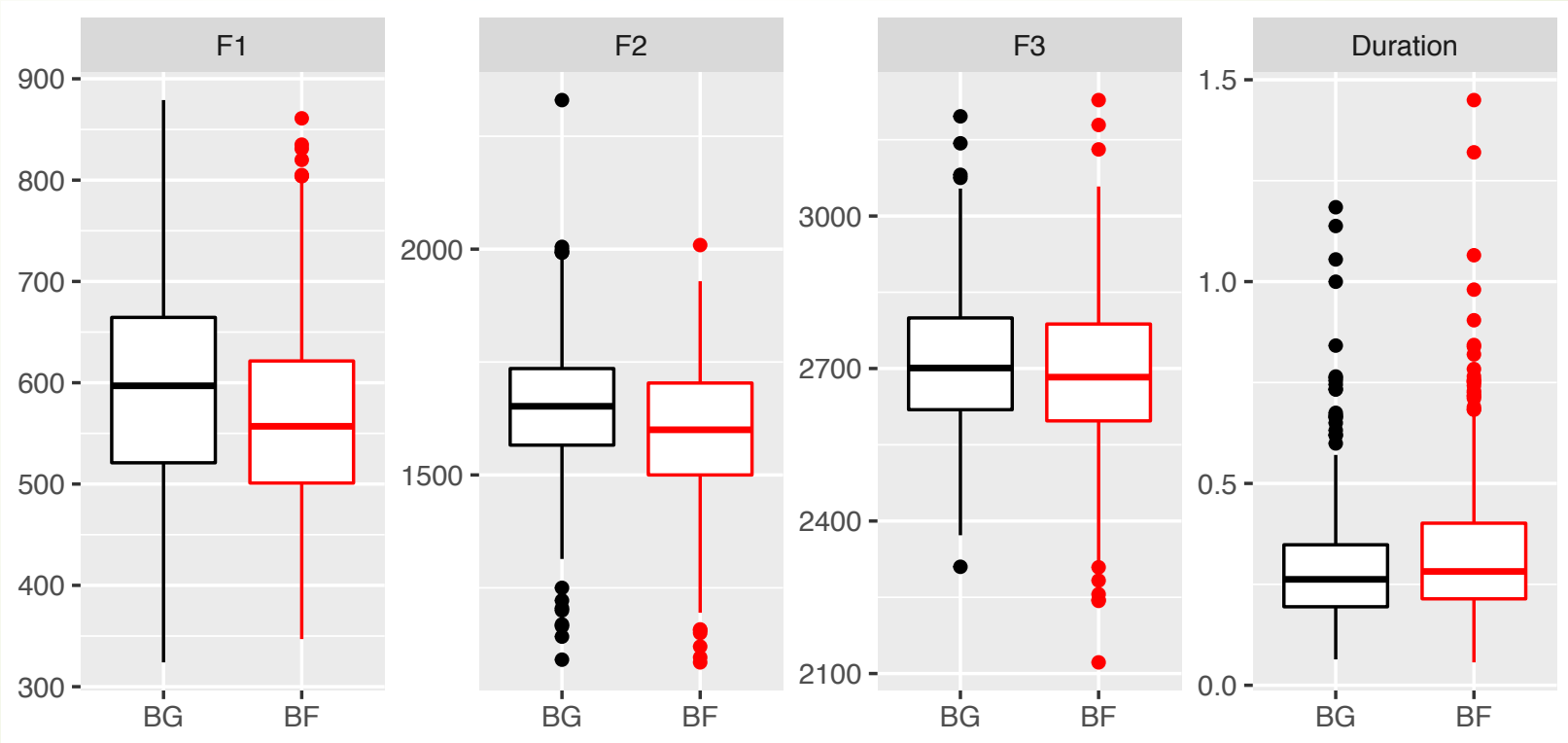
- To compare midpoint formants & duration: linear mixed effects models
  - R: *lme4* package (Bates et al, 2015)
  - Significance of effects tested with Likelihood Ratio Test

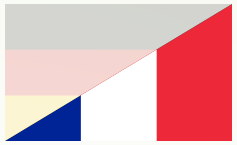
	Fixed Effect	Random intercept	Random slope
(RQ1)  vs	Language	Speaker	Speaker
(RQ2)  vs	Linguistic background	Speaker	–

Results & Discussions

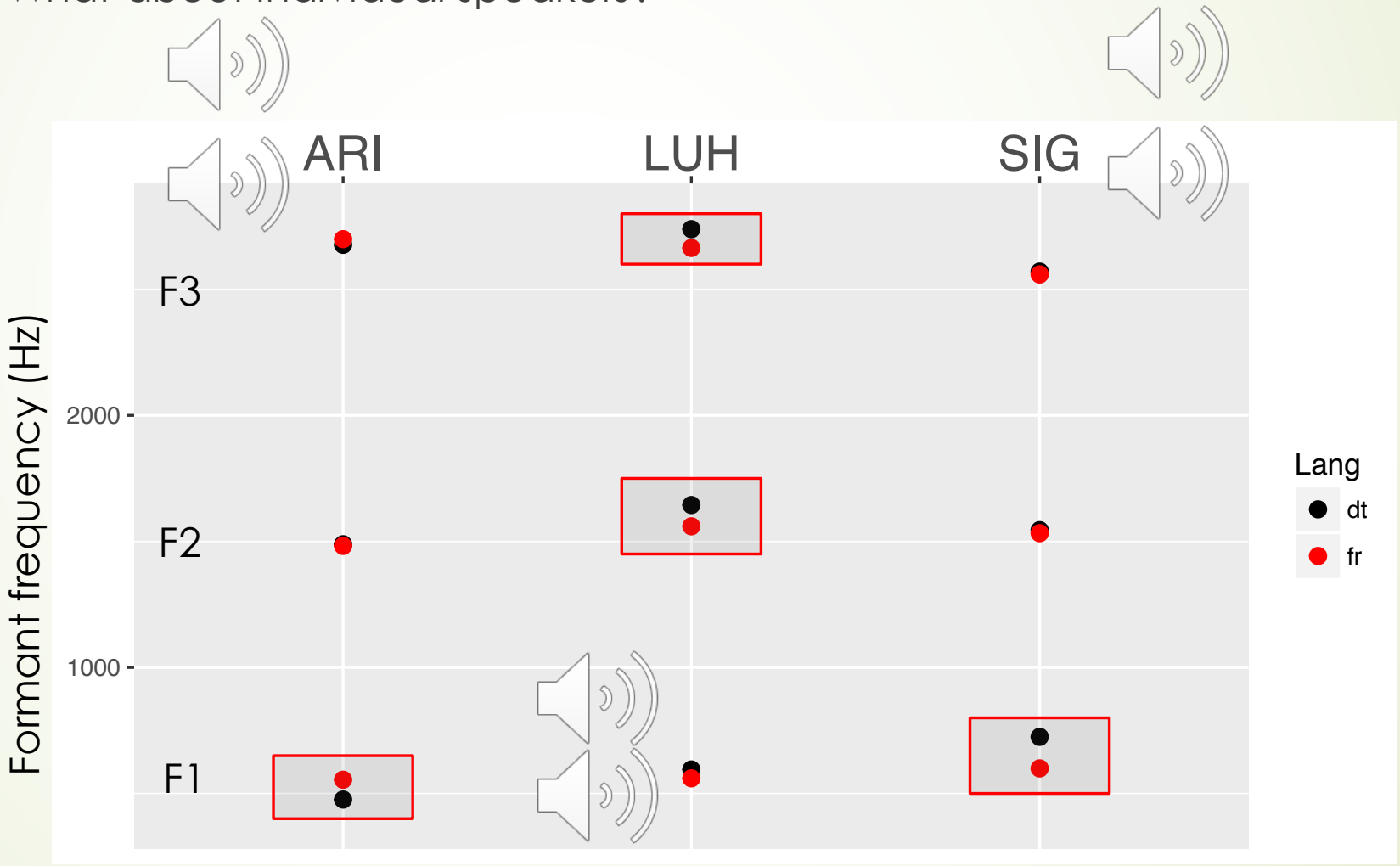
RQ1:  vs 

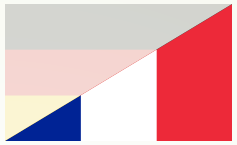
	F1 (p = 0.061)	***F2** (p = 0.0083)	**F3** (p = 0.085)	***Dur** (p = 0.017)
German	593 Hz	1646 Hz	2710 Hz	299 ms
French	566 Hz	1597 Hz	2688 Hz	326 ms
Difference	-27 Hz	-49 Hz	-22 Hz	+27 ms



RQ1:  vs 

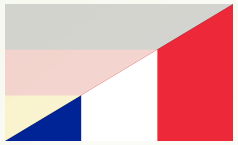
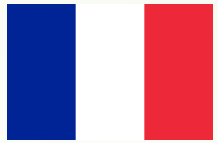
- What about individual speakers?



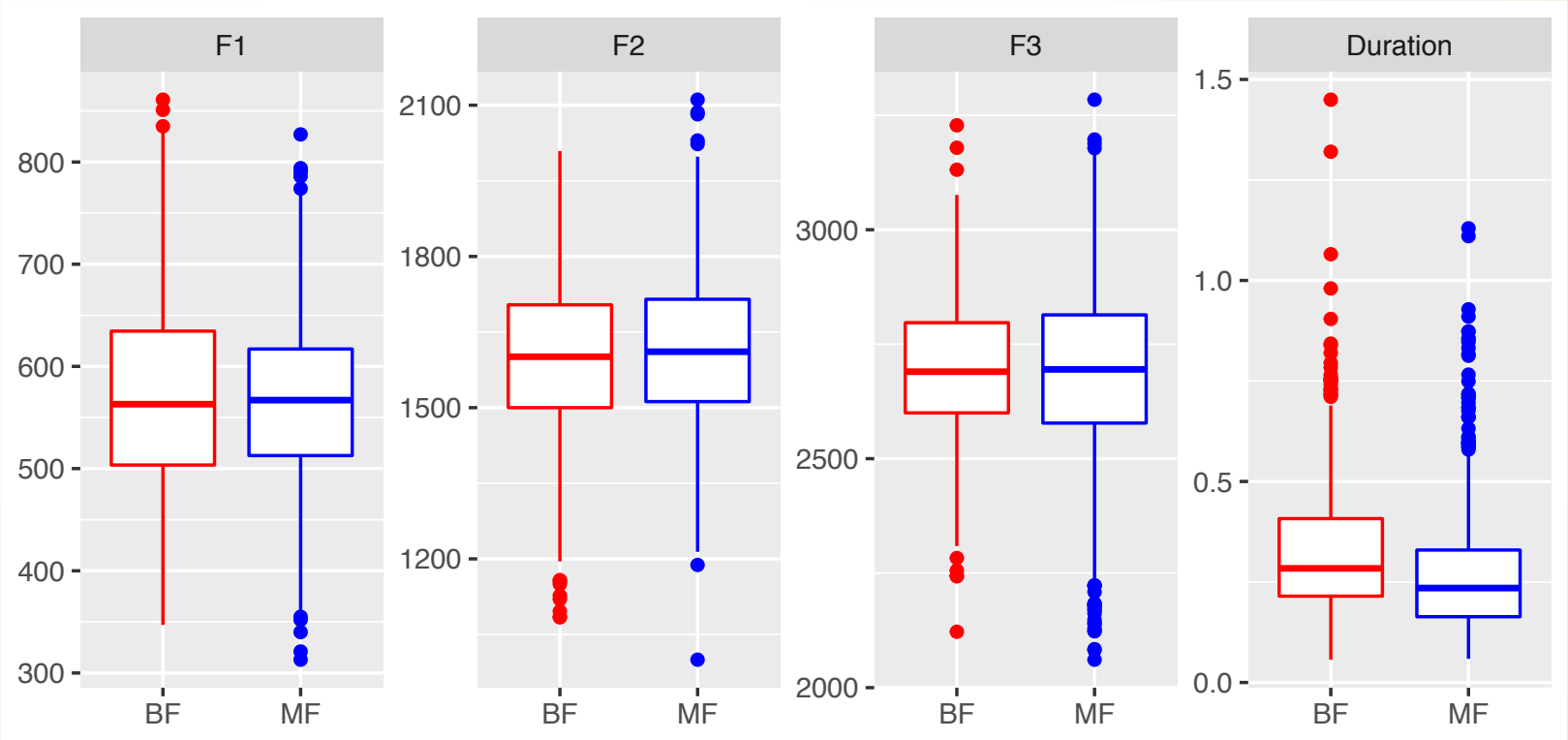
RQ1:  vs 

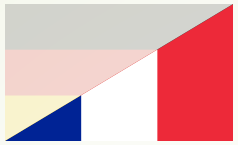
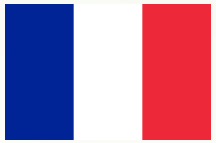
Summary

- Bilinguals tend to distinguish their FPs by vowel quality
  - Individuals make use of different mechanisms(e.g. height, rounding)
- Bilinguals also distinguish their FPs by duration
  - French > German

RQ2:  vs 

	F1 (*p* = 0.26)	**F2** (*p* = 0.33)	**F3** (*p* = 0.95)	***Dur** (*p* = 0.0011)
Bilingual	572 Hz	1597 Hz	2694 Hz	329ms
Monolingual	567 Hz	1610 Hz	2687 Hz	268ms
Difference	-5 Hz	+13 Hz	-7 Hz	-61 ms



RQ2:  vs 

Summary

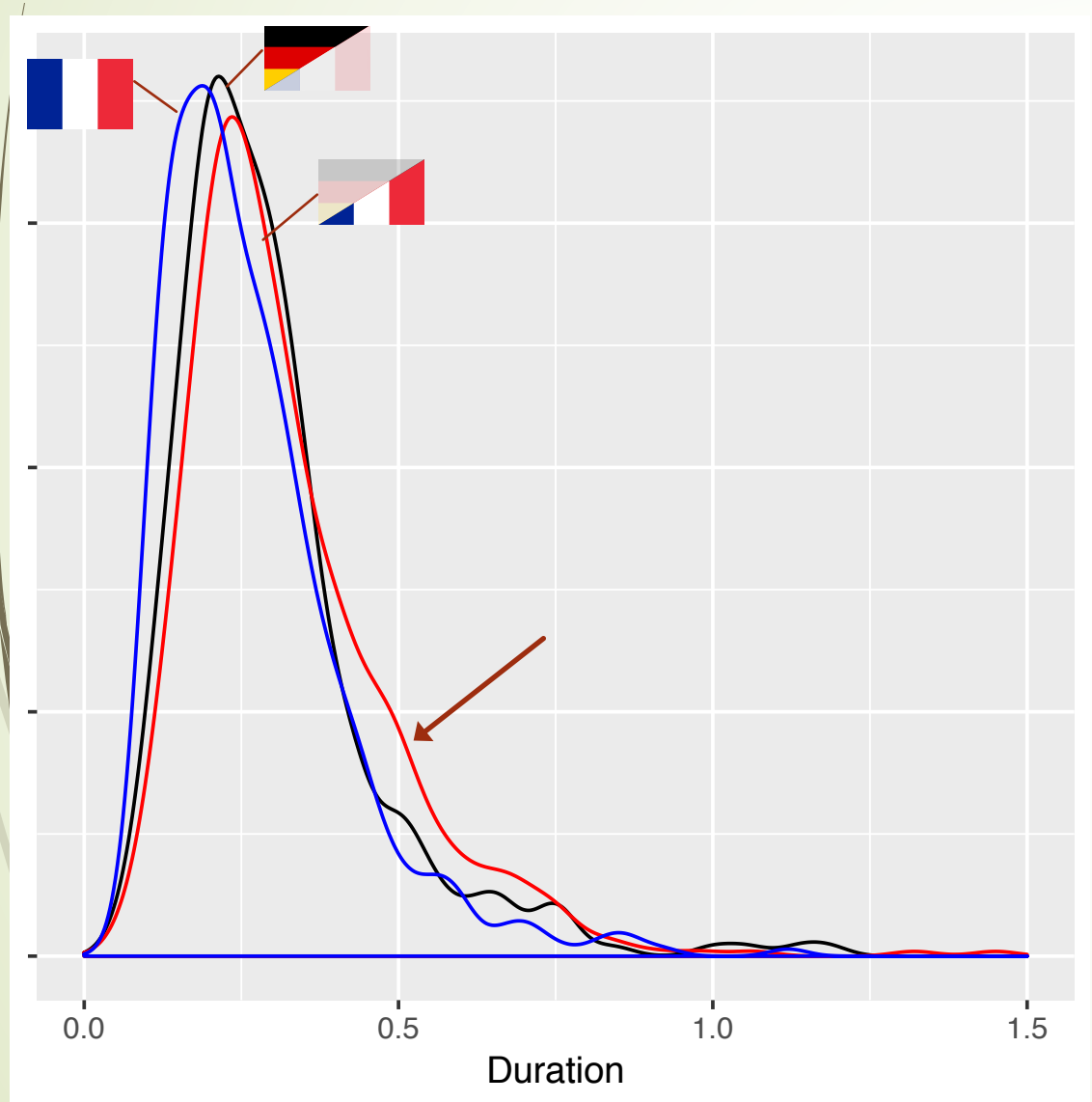
- Bilinguals and monolinguals have similar vowel quality for UH
- Bilinguals hesitate longer than monolinguals (in French)

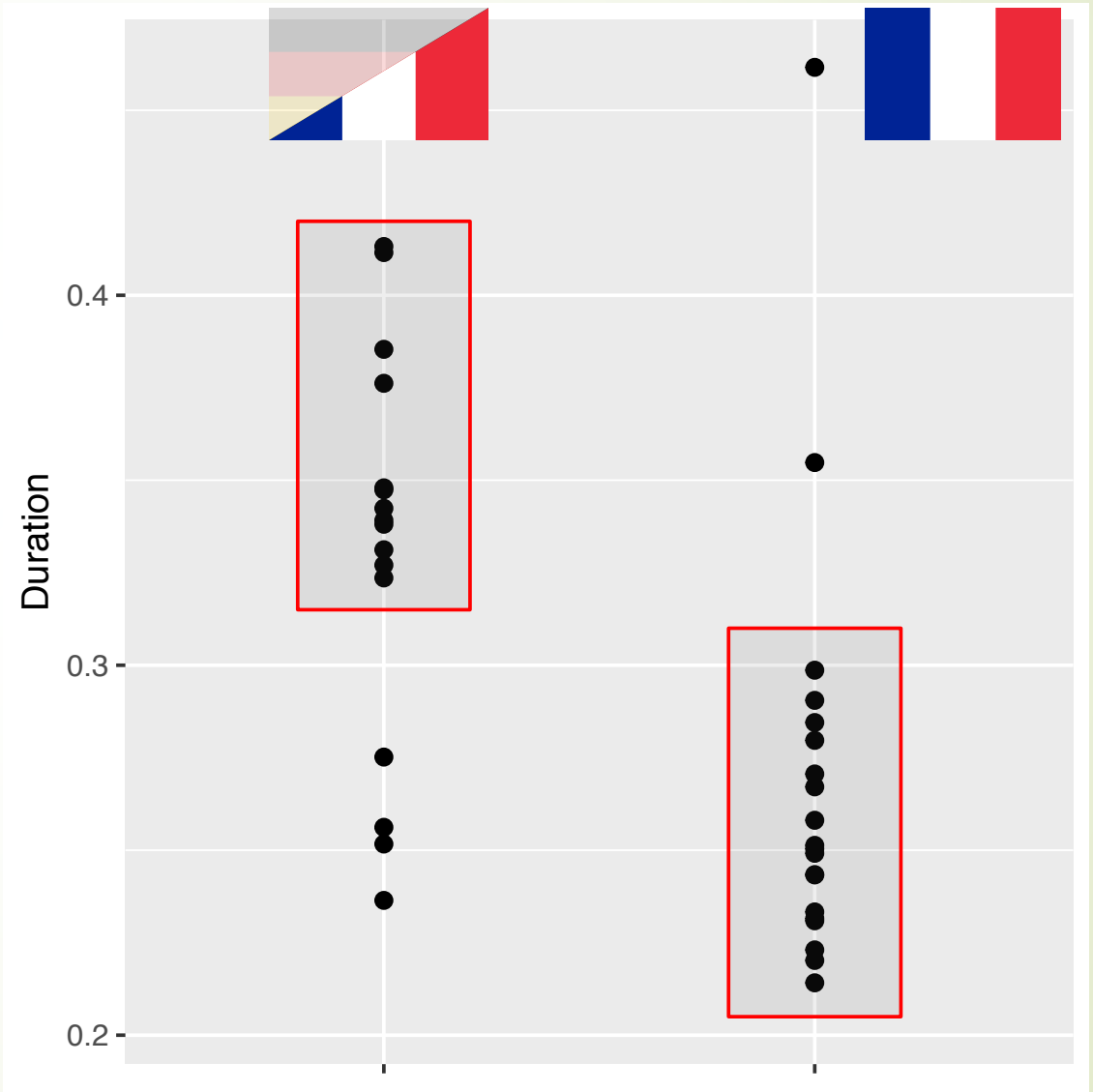
General Discussion: Vowel Quality

- Support for language specificity
  - Bilinguals tend to distinguish their UHs by language
  - Bilinguals can produce monolingual-like UHs
- Speaker specificity
  - Within language: contributes to within-language variation
  - Across language: different dimensions of contrast

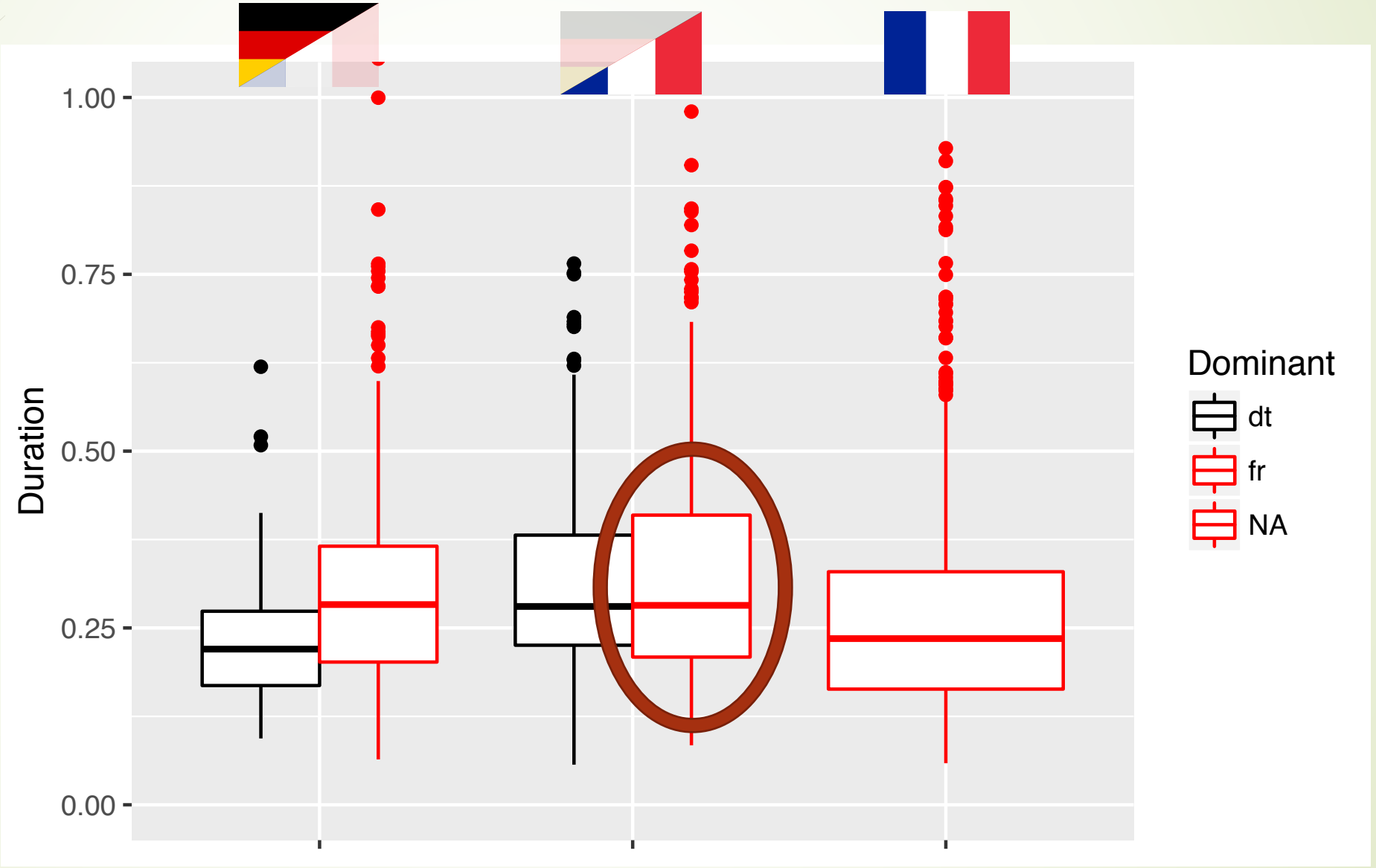
General Discussion: Duration

Recap: BG (-27ms) < BF > MF (-61ms)





General Discussion: Duration



Summary

1. Bilinguals tend to distinguish the vowel quality of UHs in different languages
   - Duration too – but it's more complicated
2. Bilinguals produce UHs similar to monolinguals in terms of vowel quality
3. Bilinguals produce longer UHs than monolinguals in the same language

Thank you!

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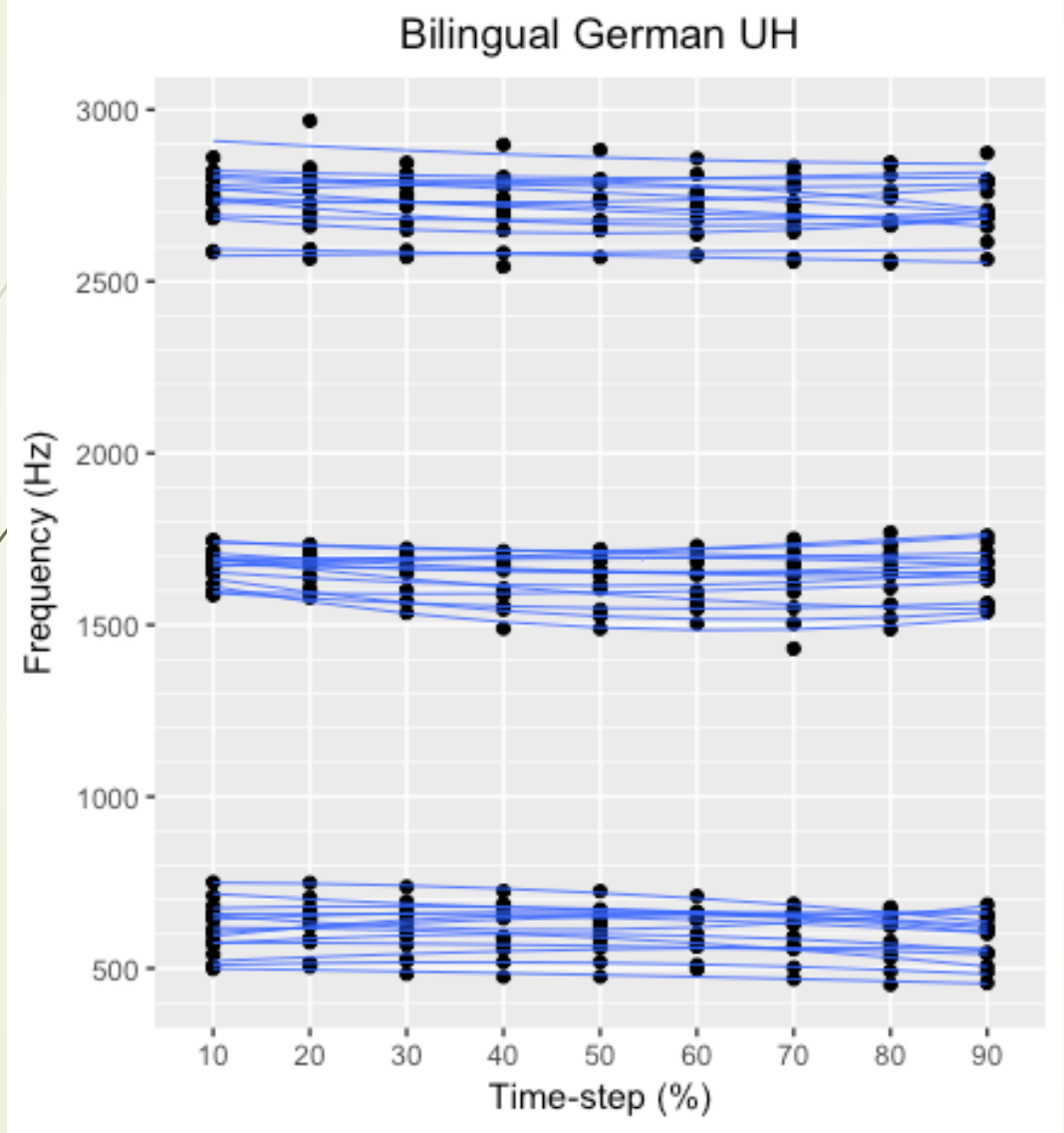
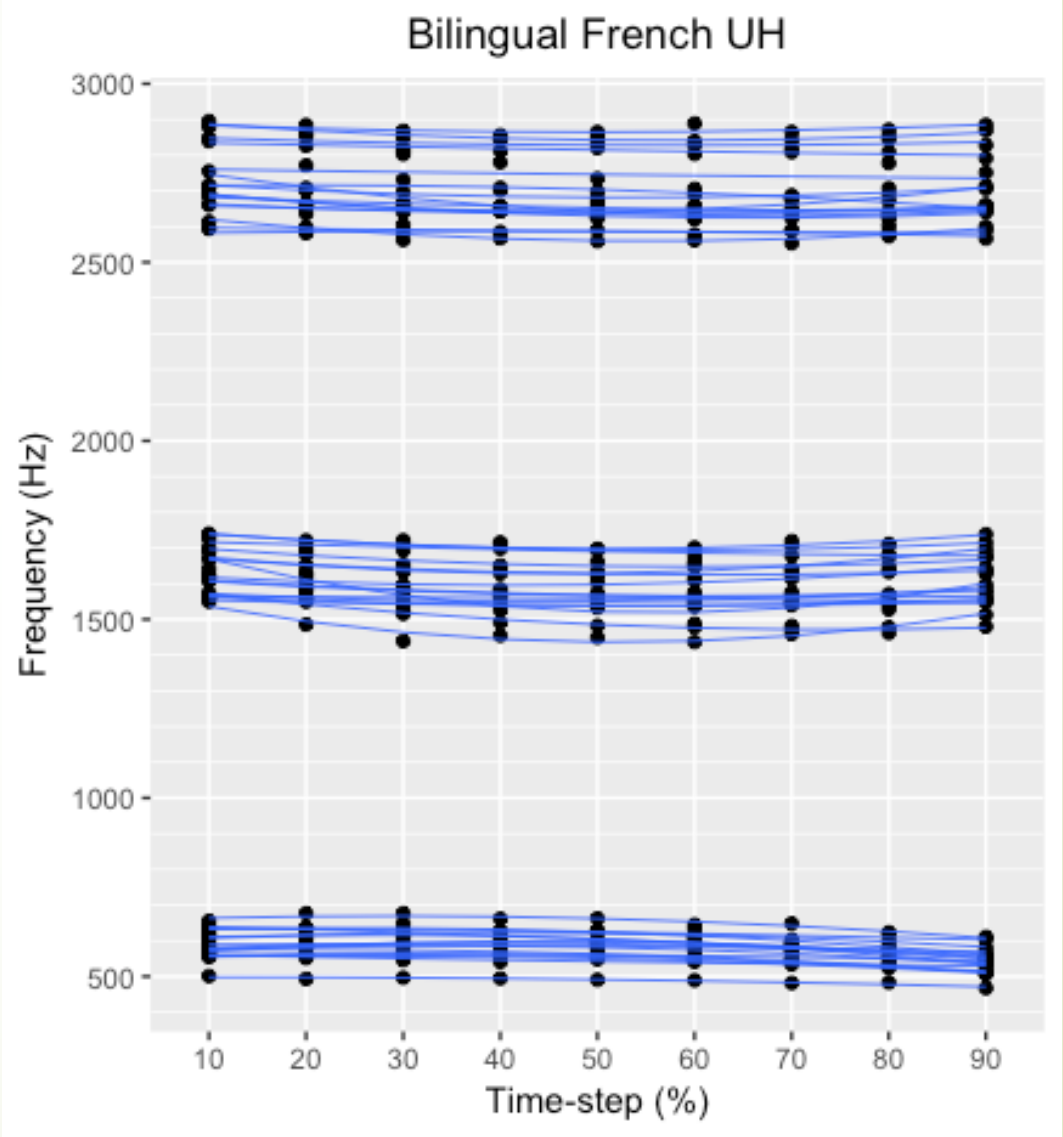
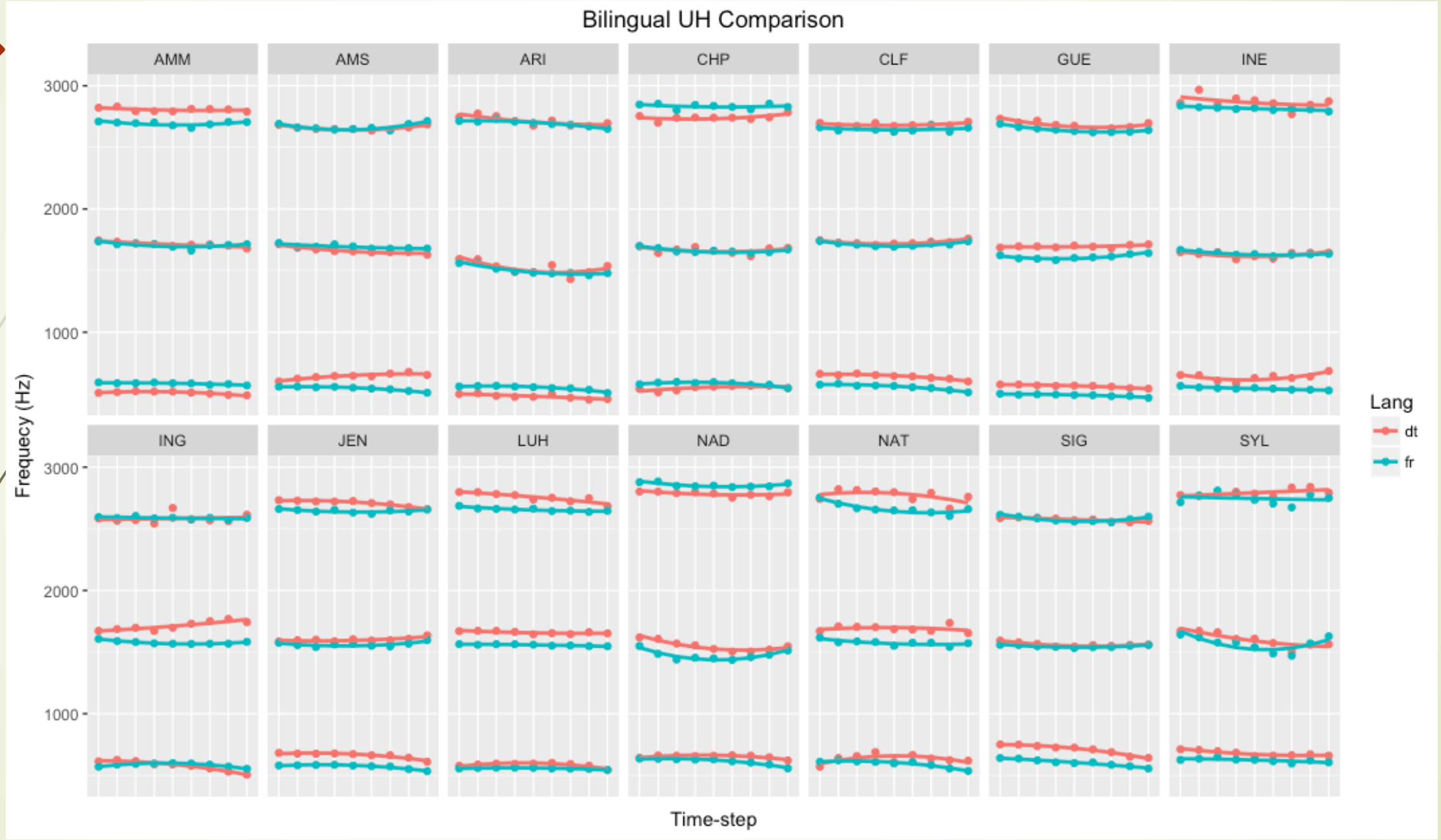
Formant dynamics: German vs French





Formant dynamics: German vs French (Individual)



Formant dynamics: Bilingual vs Monolingual