

L3 Norwegian /ɤ:/ and /u:/ in L1 Polish/L2 English learners: Different patterns of cross-linguistic interactions



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Background

- Studies of L3 vowels somewhat limited [1, 2, 3].
- An L2 advantage demonstrated in some [1].
- Combined **cross-linguistic influence (CLI)** demonstrated by [5] for the similar set of L1 Polish, L2 Danish, L3 English.

Aim

- **Explore** the patterns of CLI in vowels with conflicting possible sources of interference.
- **Explore** longitudinal development of L3 vowels in terms of overlap with L1 and L2 vowels.
- **Explore** inter-speaker variability.

Introduction

- **Norwegian GUD /u:/** is high central rounded, thus phonetically similar to **English GOOSE /u:/** but not Polish **BUTY /u/**. **Norwegian BOK /u:/** is phonetically similar to BUTY /u/ but not GOOSE /u/. Spelling varies as shown below.

	Phonetics	Spelling
GUD _{no} – BUTY _{pl}	✗	✓
GUD _{no} – GOOSE _{en}	✓	✗
GOOSE _{en} – BUTY _{pl}	✗	?
BOK _{no} – BUTY _{pl}	✓	✗

Tentative hypotheses

- H1: New categories in L3 Norwegian could form if they are sufficiently dissimilar from L1 Polish and L2 English (cf. Flege [4]).
- H2: We hypothesise considerable L1→L3 CLI due to automatized neuro-motor articulatory routines of the native language.
- H3: We also expect L2–L3 interactions based on the intrinsic phonetic similarities between English and Norwegian high vowel systems as well as a frequently attested ‘foreign-language effect’ [1, 5].
- H4: We predict developmental changes in spectral overlap as a function of time and learning experience.

Methods

- **Participants/speakers:** 10 female speakers of L1 Polish, L2 English, L3 Norwegian. Mean age 20. Enrolled in the first year of ‘**Norwegian Philology**’ at two Polish tertiary institutions.
- **Recording sessions:** Three data collection rounds (T1, T2, T3) in November, March and June of the first year of the course.
- **Material:** Read speech in the three languages. Target words of the form *dVd* or *dVt* embedded in carrier sentences read from a computer screen in a randomized order. This study is part of a larger project where all the vowels were collected, along with large amounts of other material.
- **Recordings:** Quiet office surroundings. Head-worn condenser microphone (Shure SM-35) into a portable recorder (Marantz PMD661).
- **Measures:** Spectral overlap on the F1–F2 plane measured using Pillai scores and Mahalanobis distances (as recommended by [17]).

Results

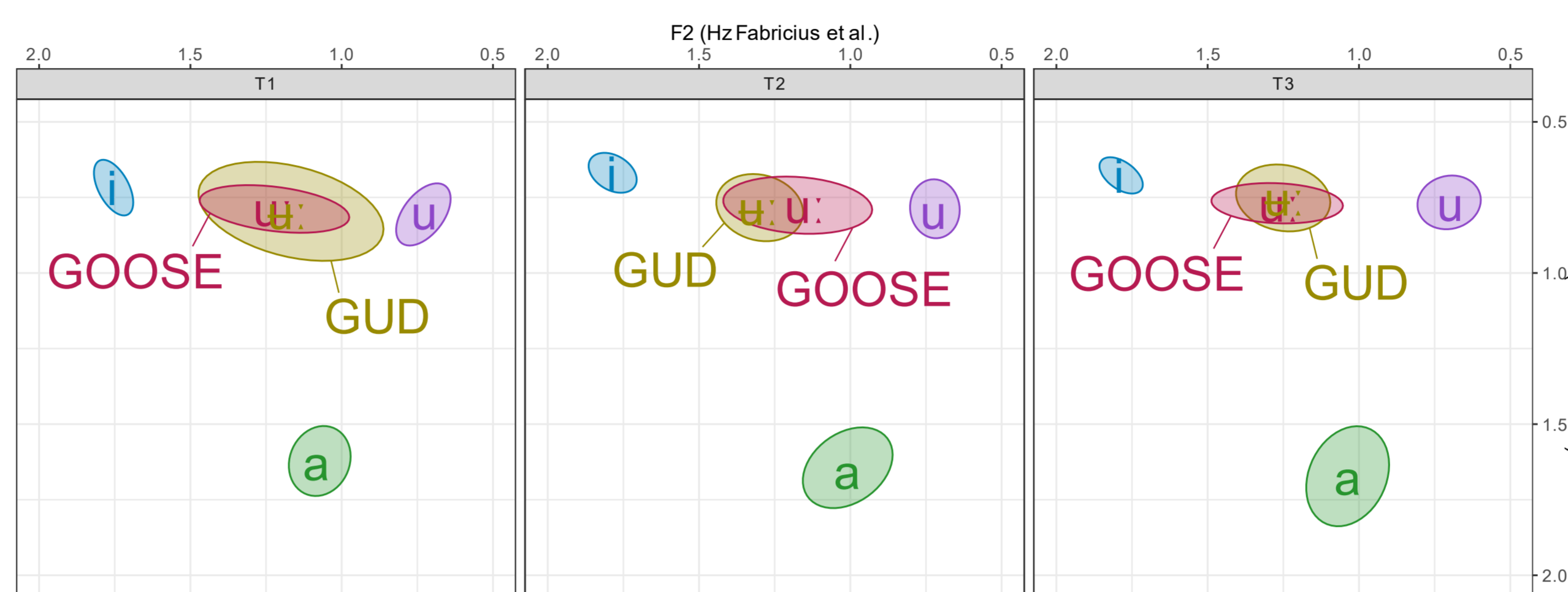


Figure 1. Aggregate results (all speakers) at T1, T2 and T3. Polish /i/, /ɤ:/, /u/ and /a/ included as anchors. Ellipses at a 0.5 confidence level.

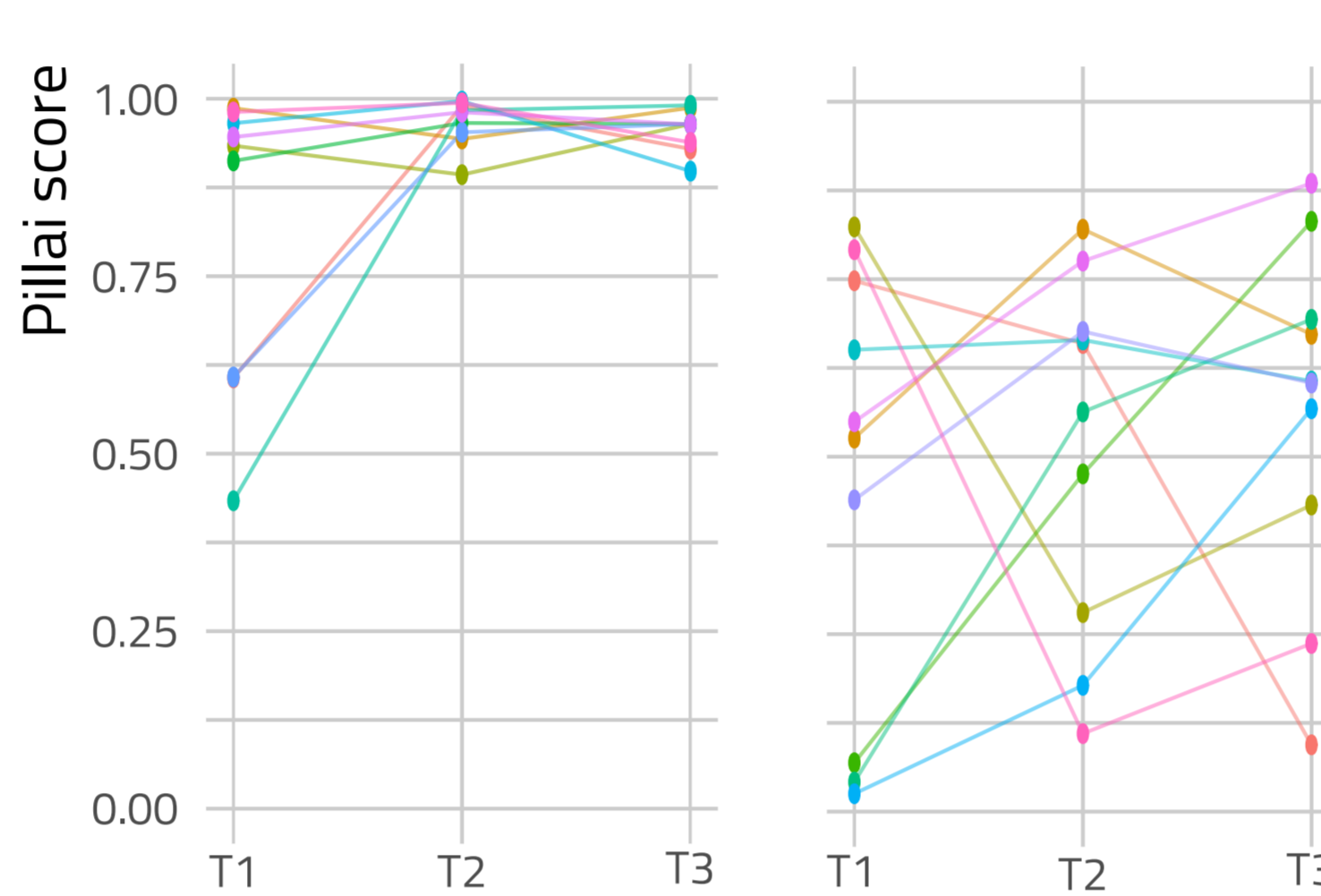


Figure 2. Pillai scores for GUD–BUTY (left) and GUD–GOOSE (right) at T1, T2 and T3. 0 = total overlap; 1 = total separation. Each line is one speaker.

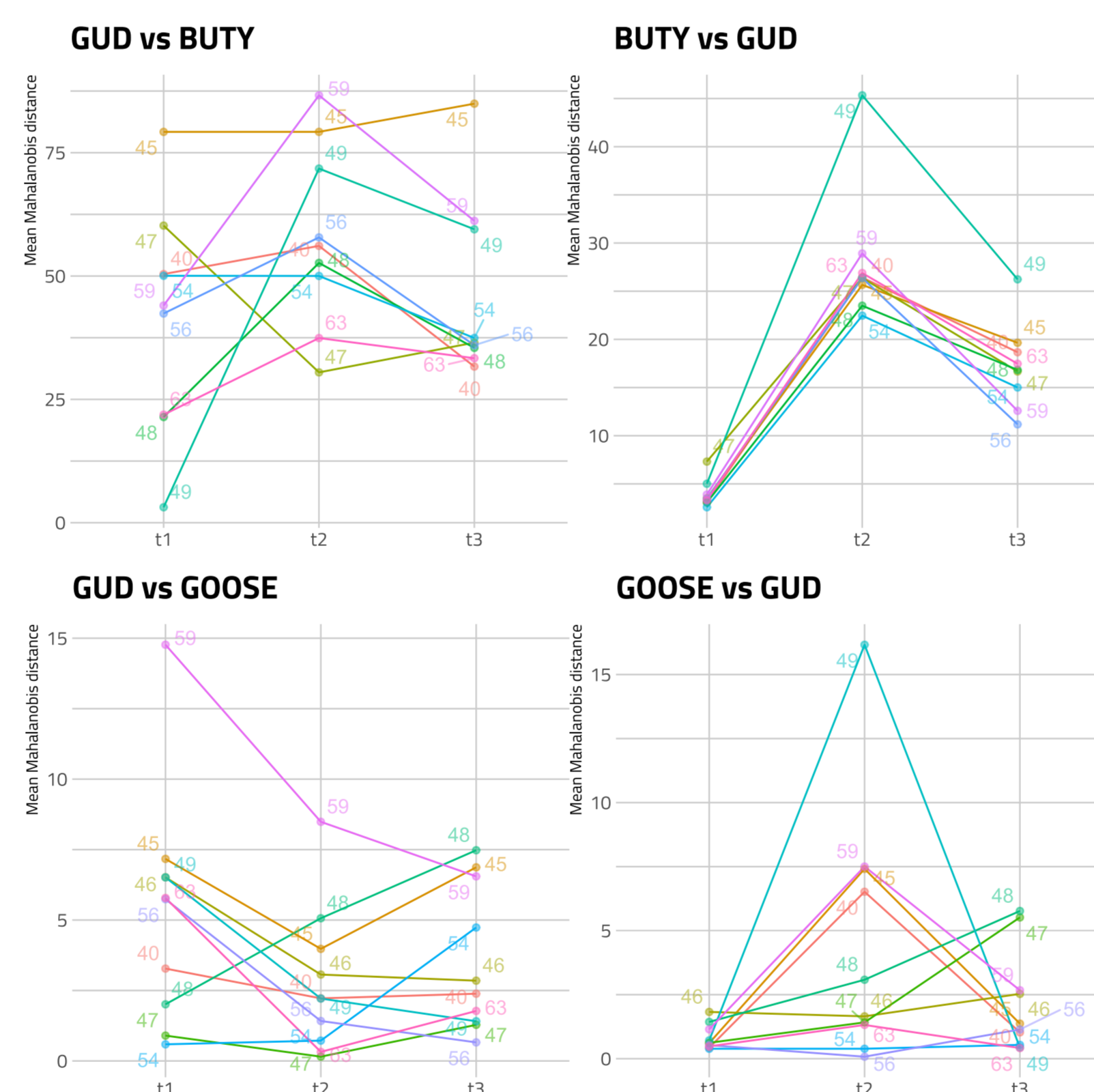


Figure 3. Mahalanobis distances for T1, T2, and T3. Distance measured from a token to the distribution of the other category (bidirectional). Each line represents one speaker.

Discussion

- GOOSE forms its own category at T1. It is phonetically sufficiently distinct from BUTY. H1 confirmed. (Cf. [5].)
- GUD shows non-Polish qualities despite the interfering spelling already at T1. H1 confirmed, H2 disconfirmed. (L2 facilitation?)
- Considerable spectral overlap between GOOSE and GUD. (L2 interference?)
- BOK shows phonetic interaction from L2 but orthographic interaction from L1, confirming H2 and H3.
- However, there is considerable inter-speaker variability in all aspects of development, particularly for BOK (among the three vowels under study).

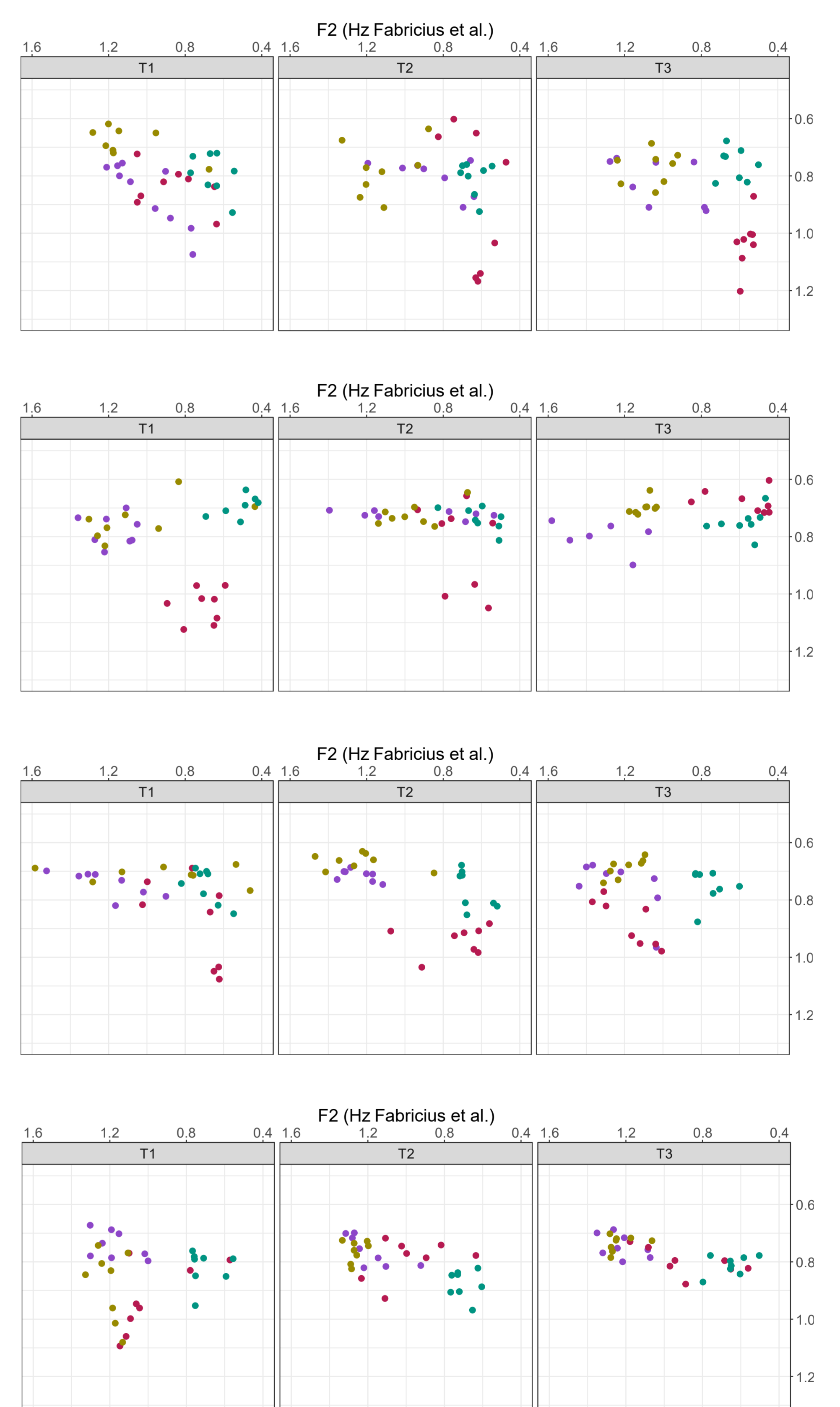


Figure 4. Four different speaker-specific developmental trajectories for Norwegian BOK /u:/ against Norwegian GUD, English GOOSE and Polish BUTY. BOK shows qualities both like the target ([u]), GUD/GOOSE and Polish /ɔ/ (due to the spelling of <o>).

- Some speakers develop good separation between categories, and progress towards a more target-like system.
- Others display little change, or even reconfigurations away from the target.
- Measures of overlap over time are somewhat difficult to interpret. Mixed-effects regression models fitted to each vowel pair, with Mahalanobis distance as the response variable, returned time as a significant factor.
- T2 seems anomalous, presumably due to the forward ‘leap’ of GUD at T2.

References

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