# Modelling an ongoing sound change in the East Franconian dialect by means of an agent-based model

**Johanna Cronenberg**

LMU Munich

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Individual behaviours of agents lead to patterns of changes at the system level

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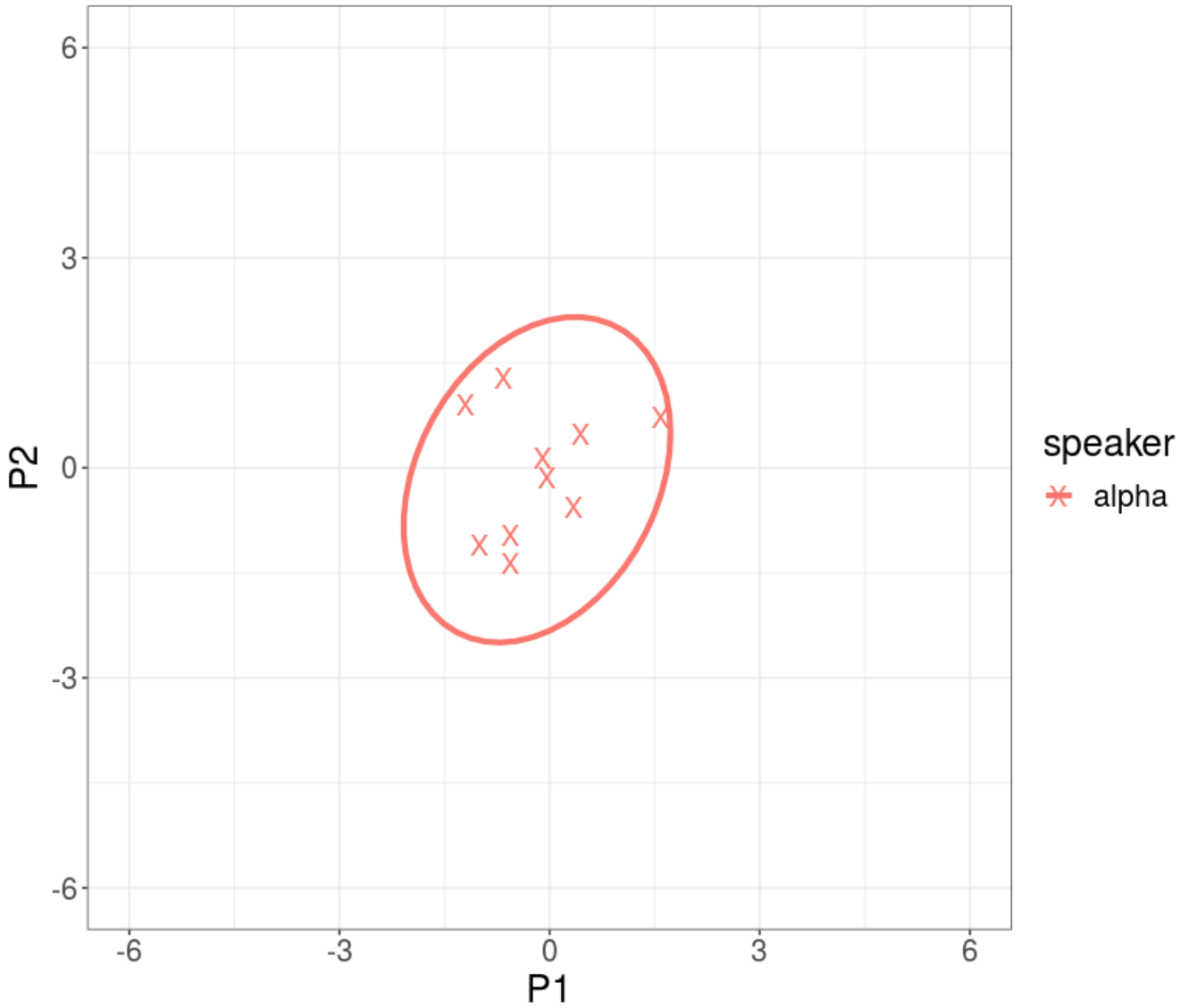
**Predicting sound change**
Ultimately, we want to predict diverse kinds of sound changes from natural speech data

# How to: ABM



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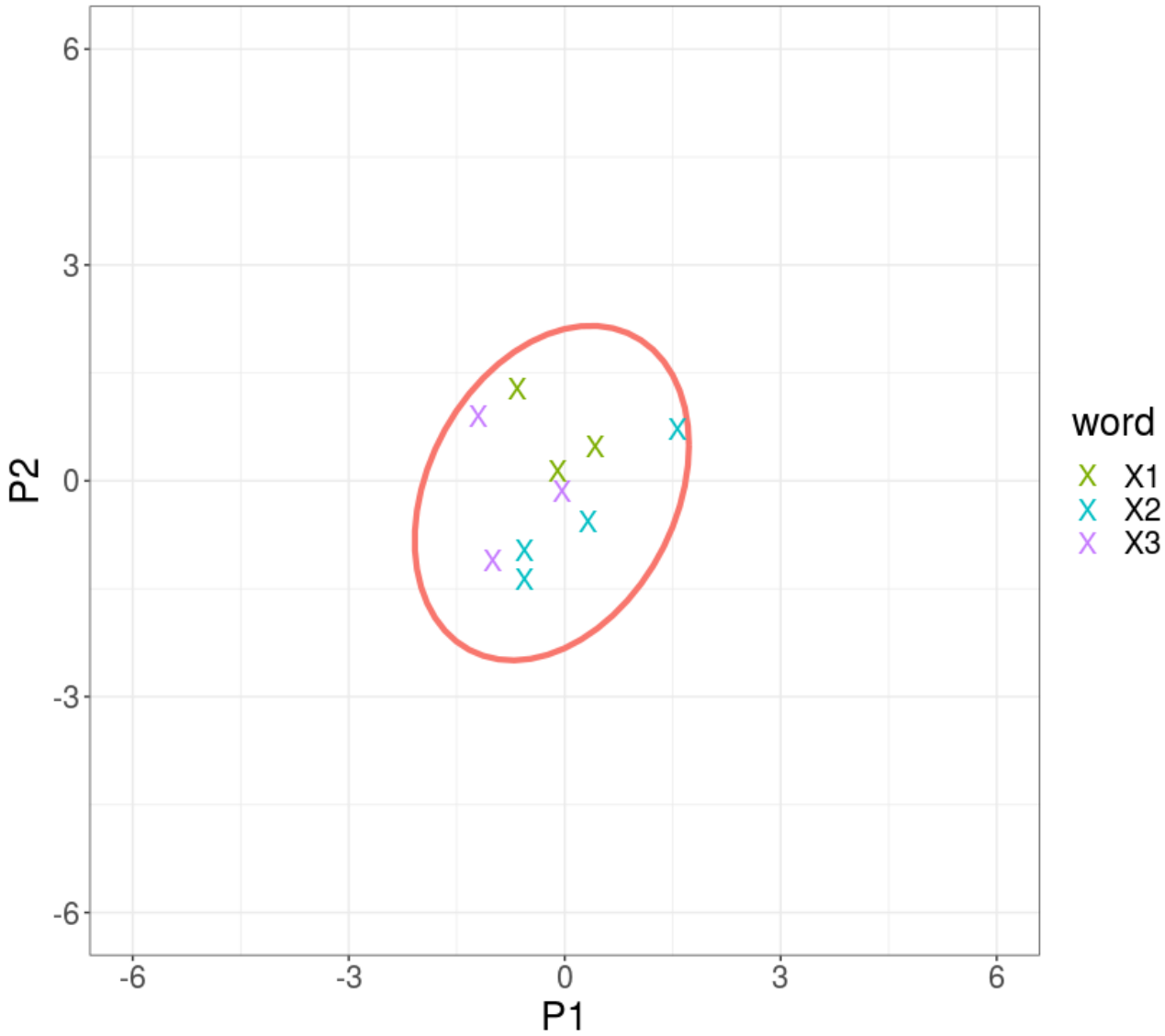

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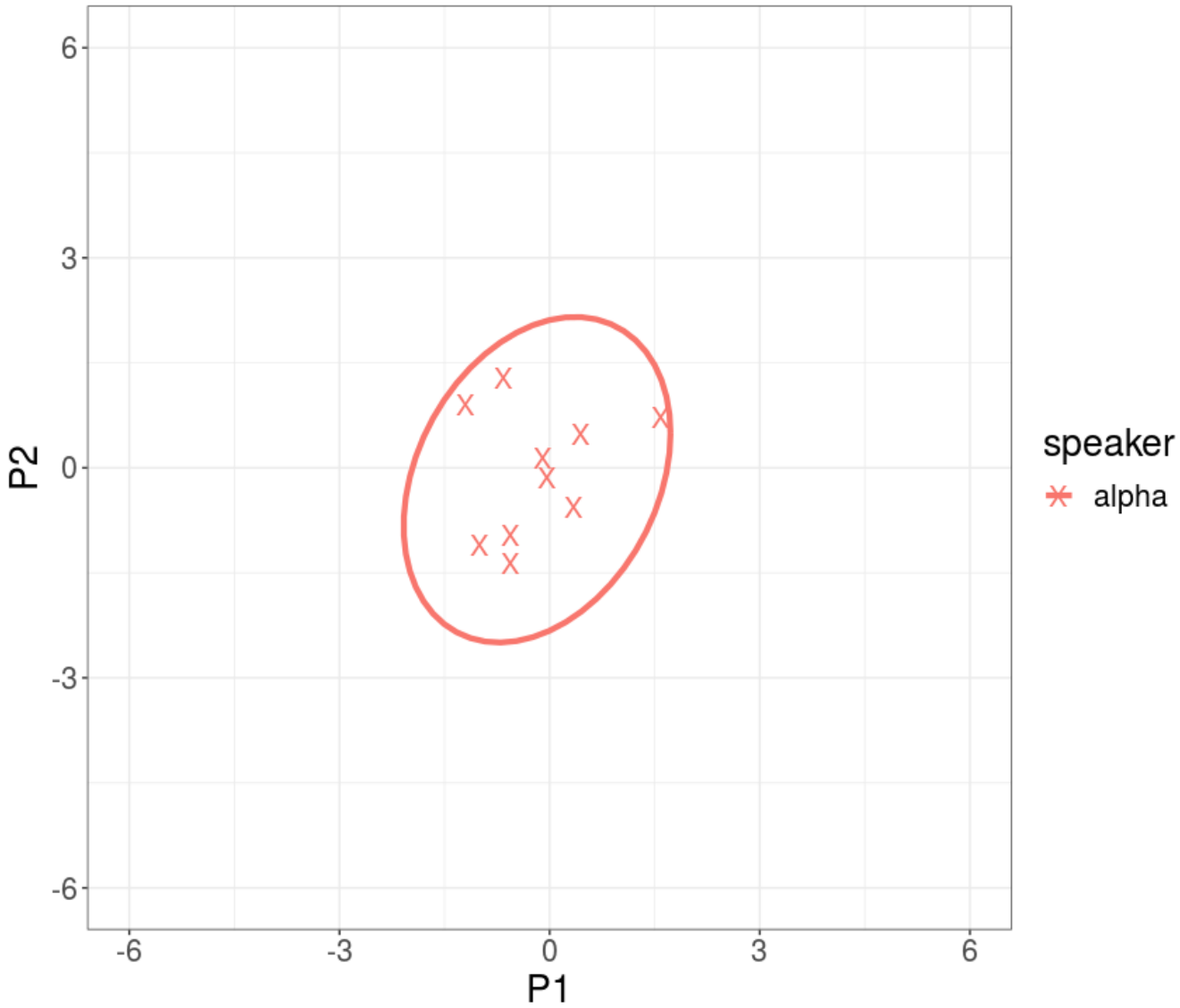

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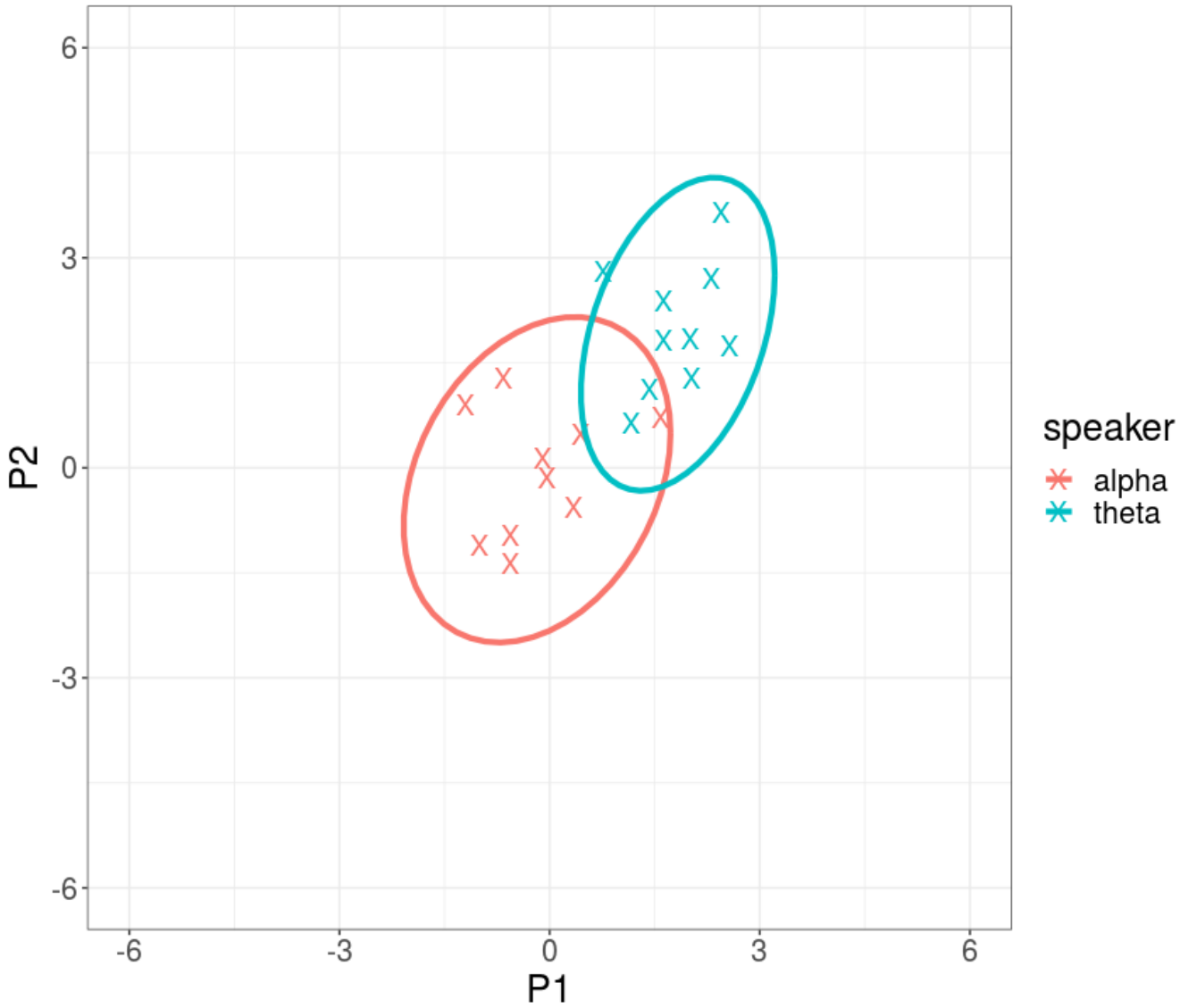

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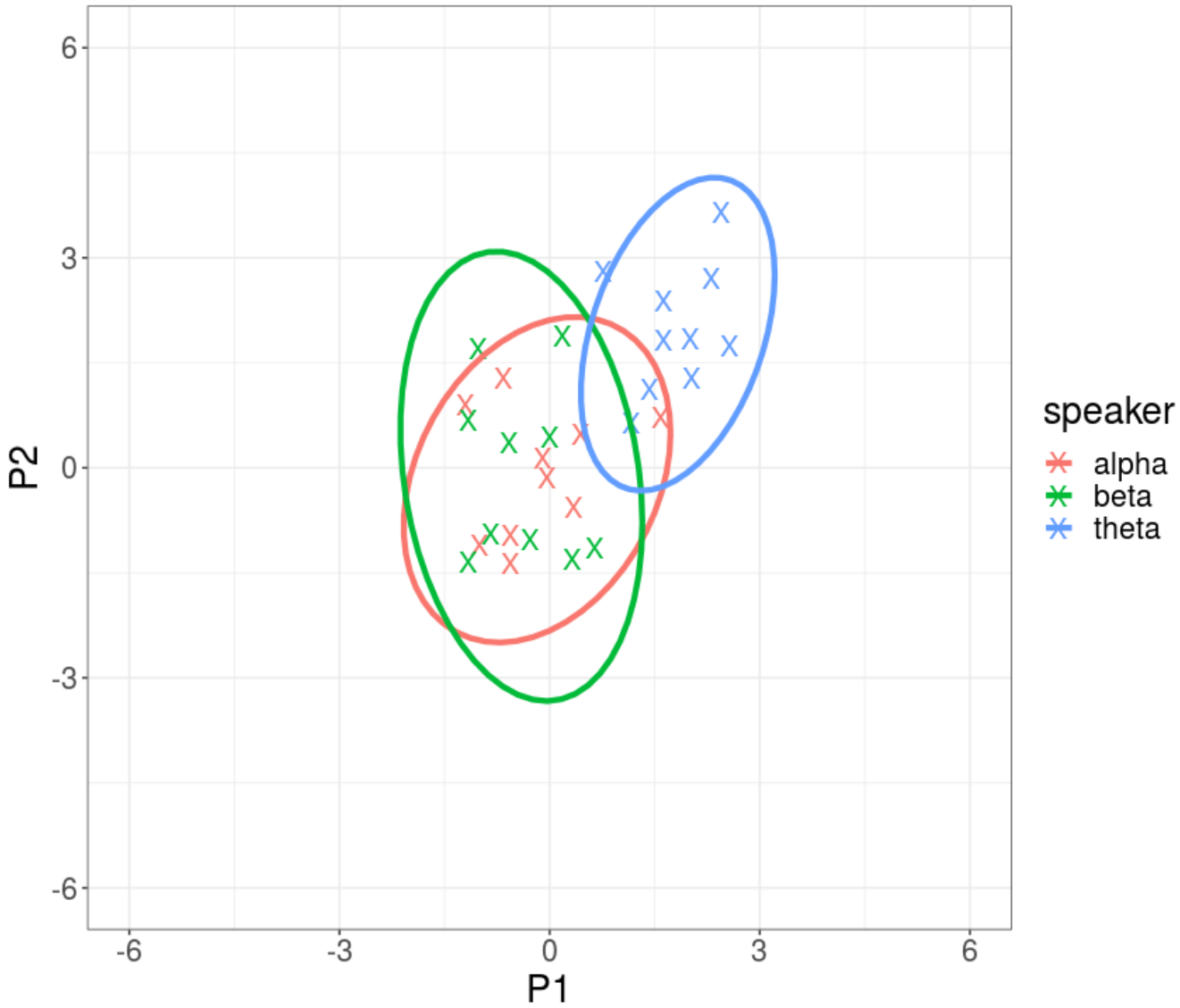

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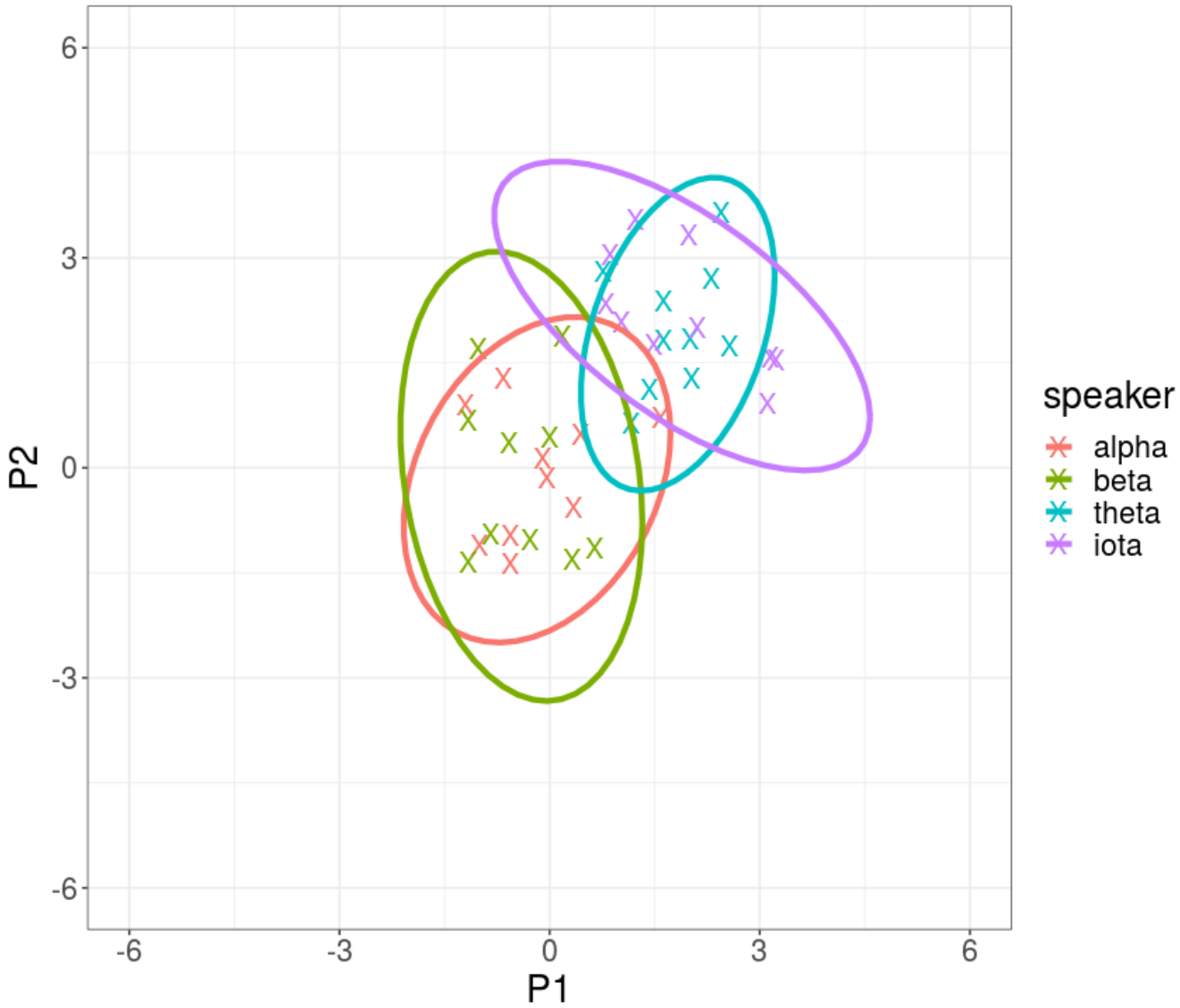

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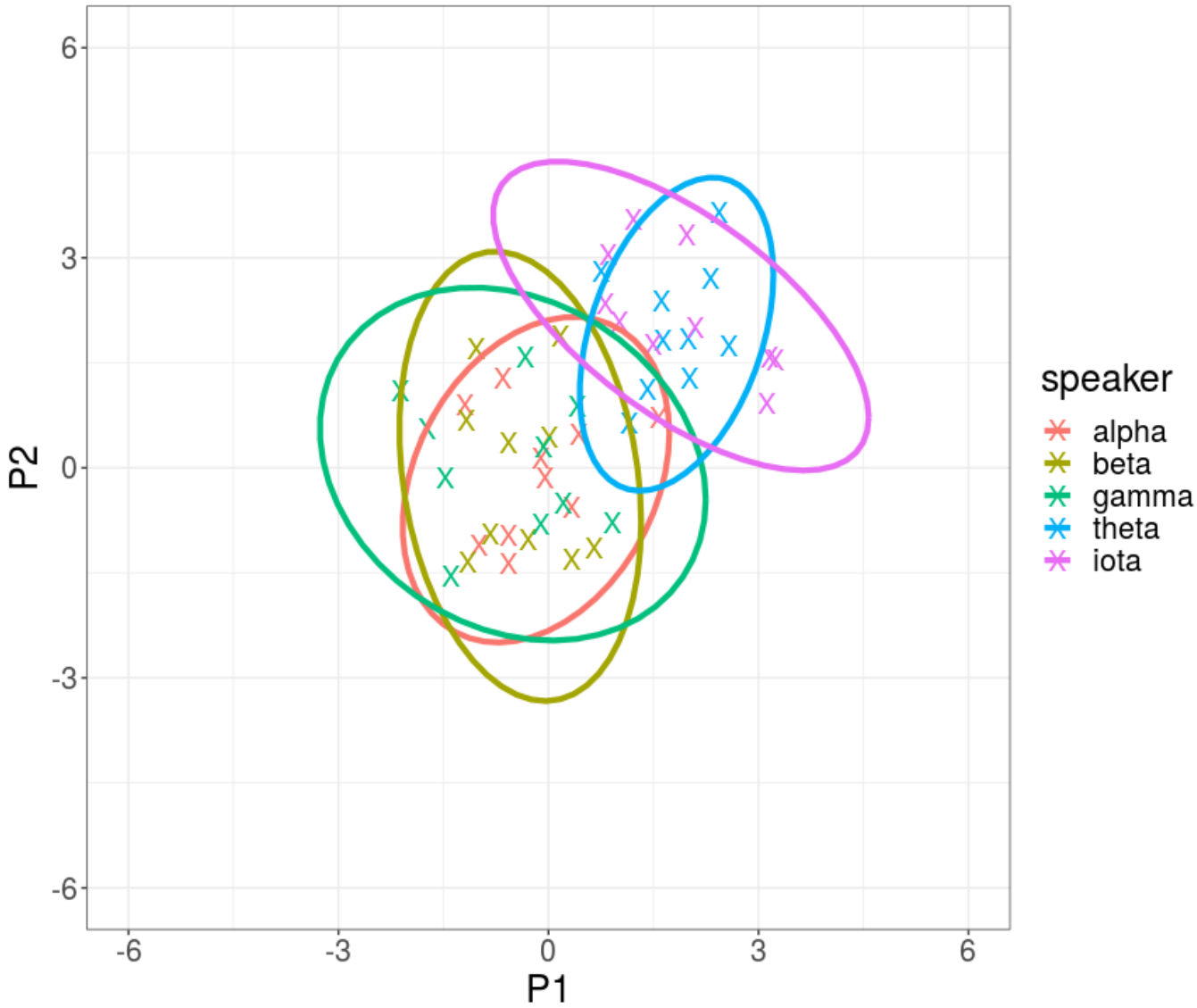

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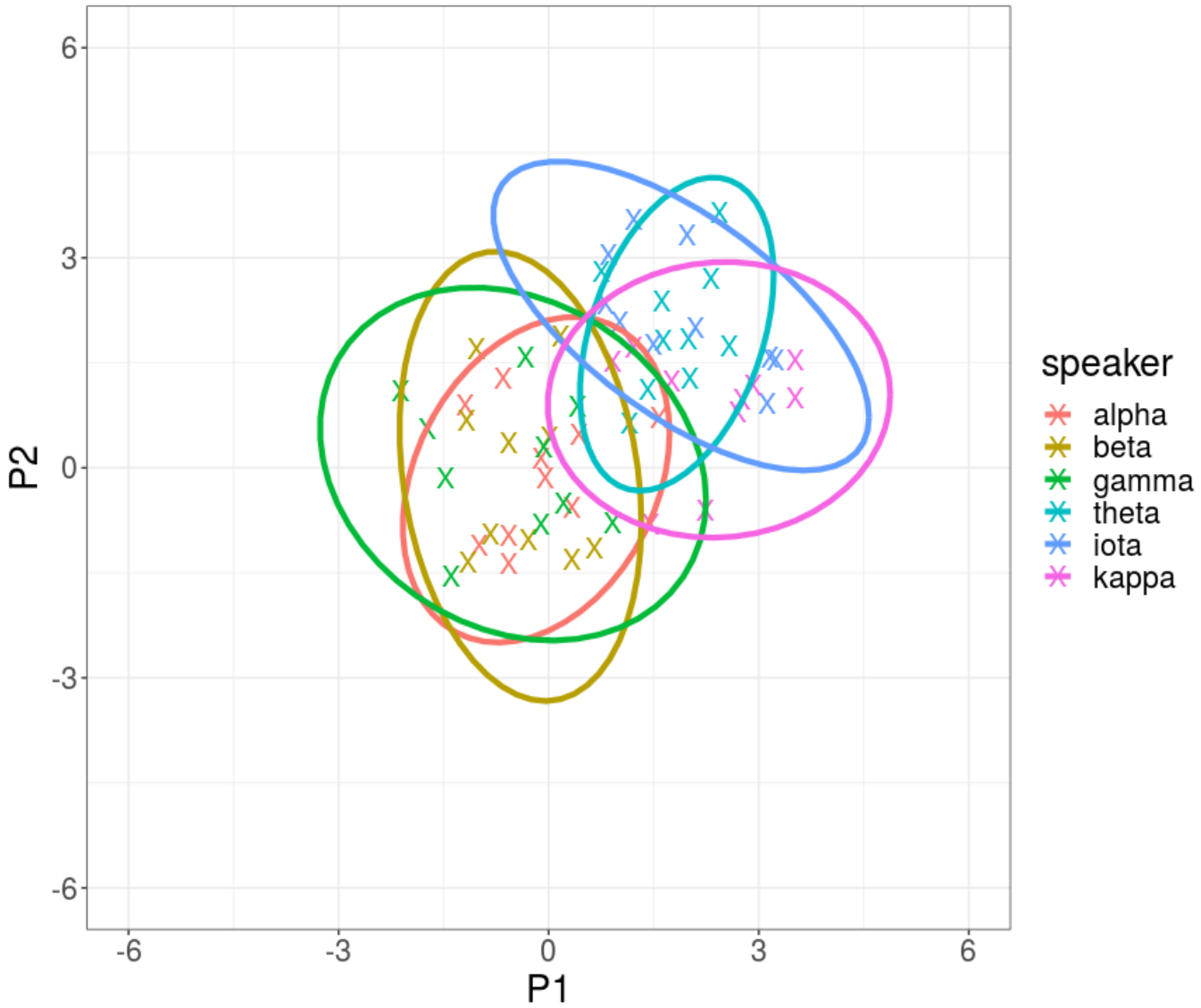

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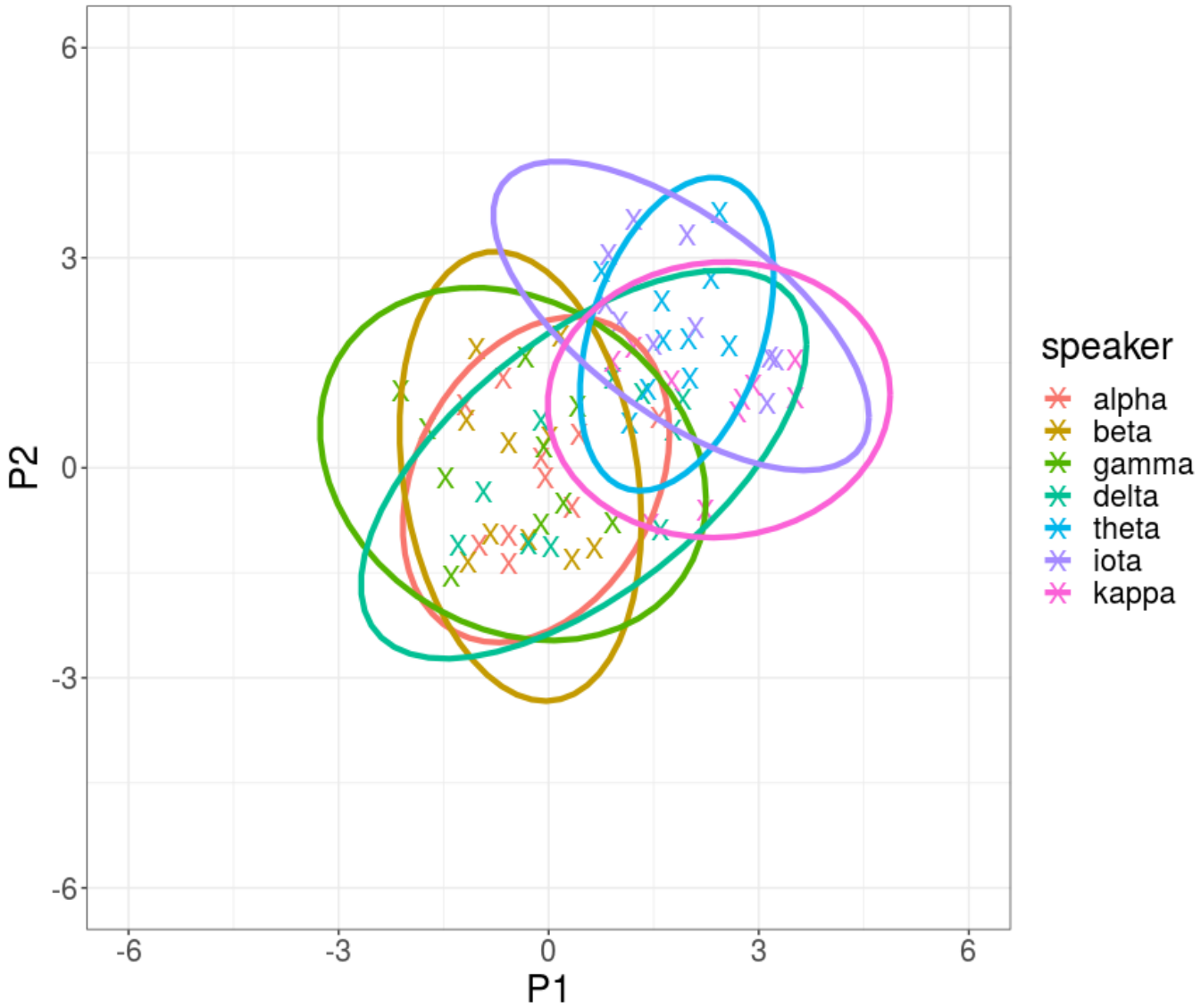
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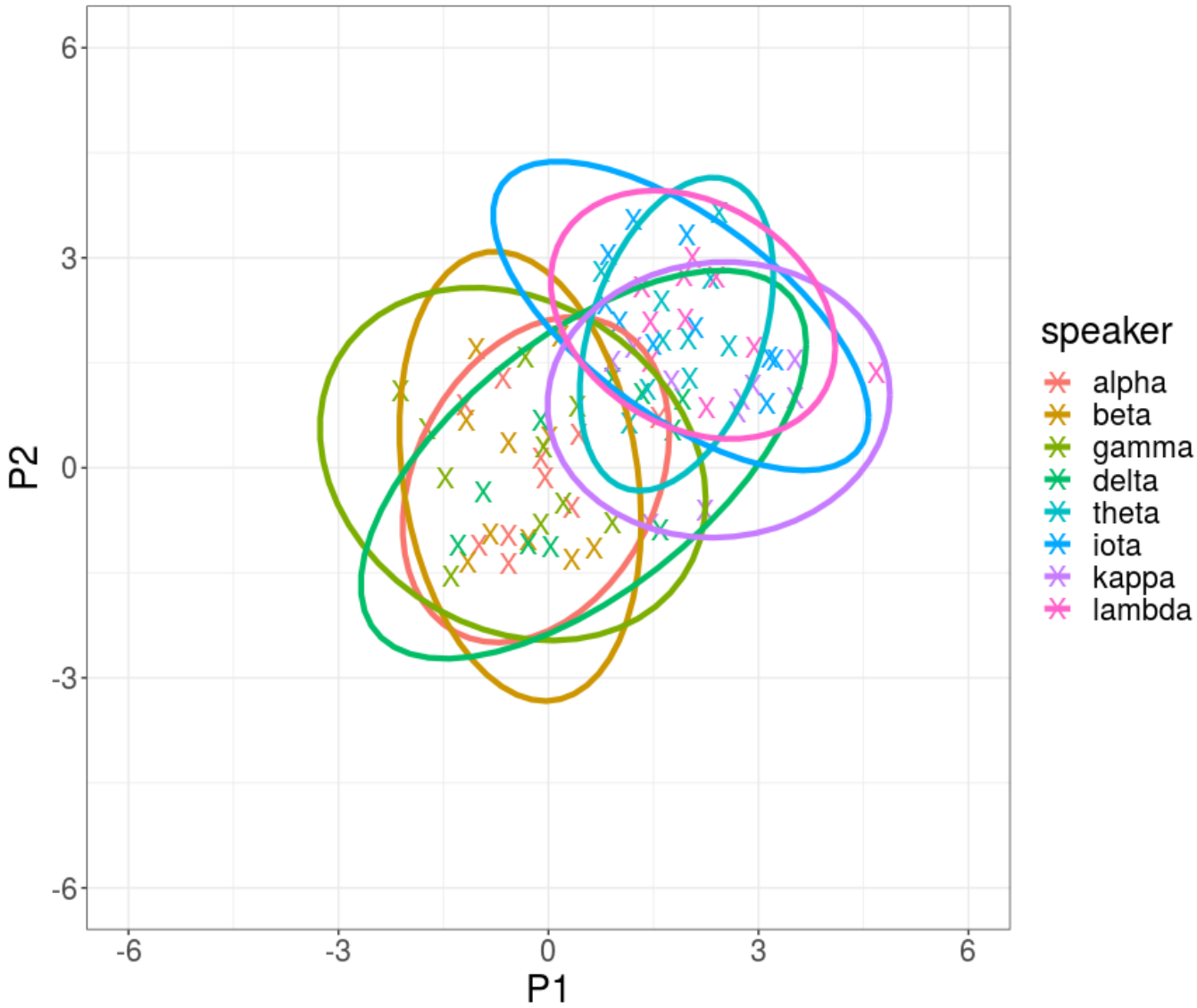
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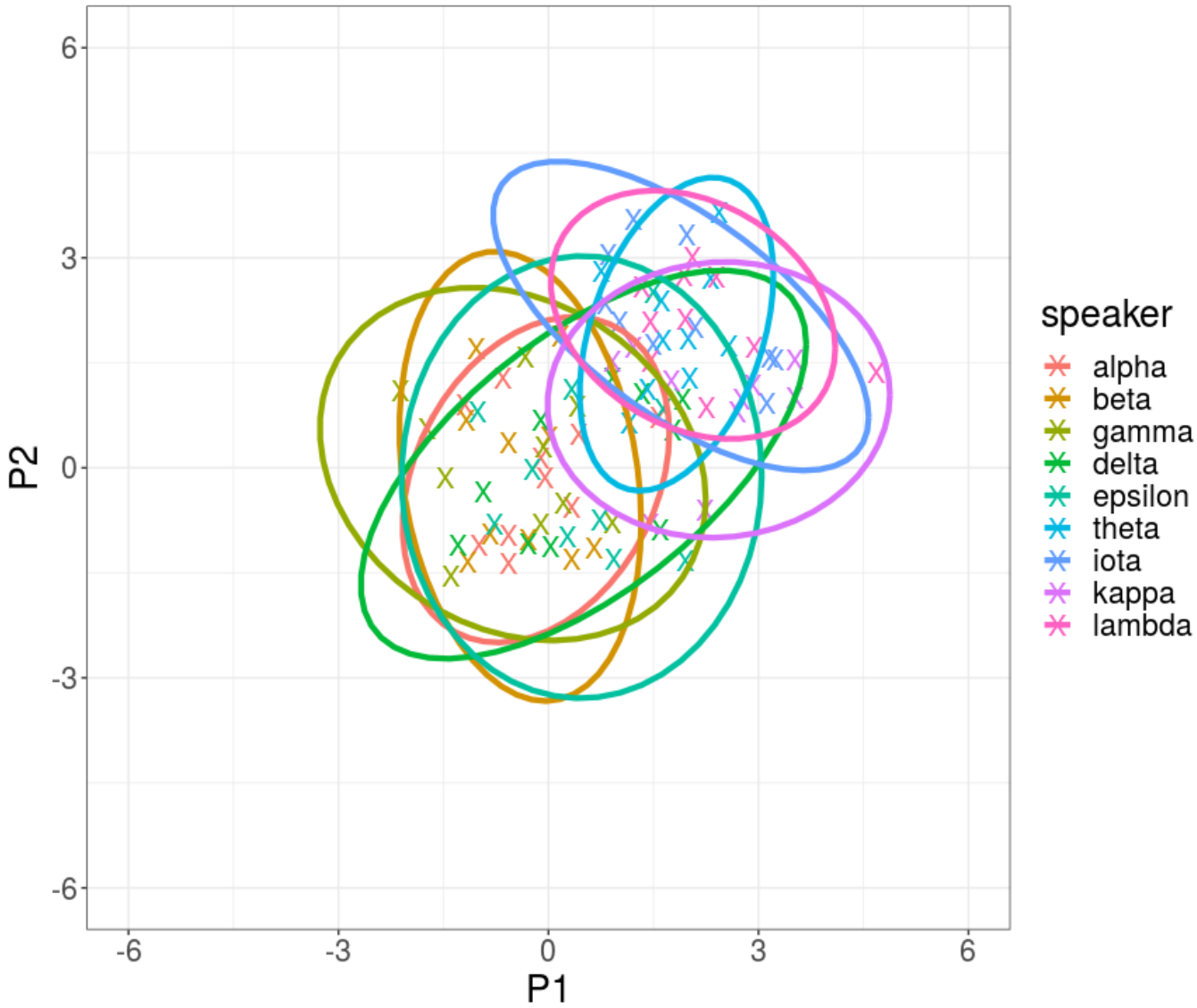
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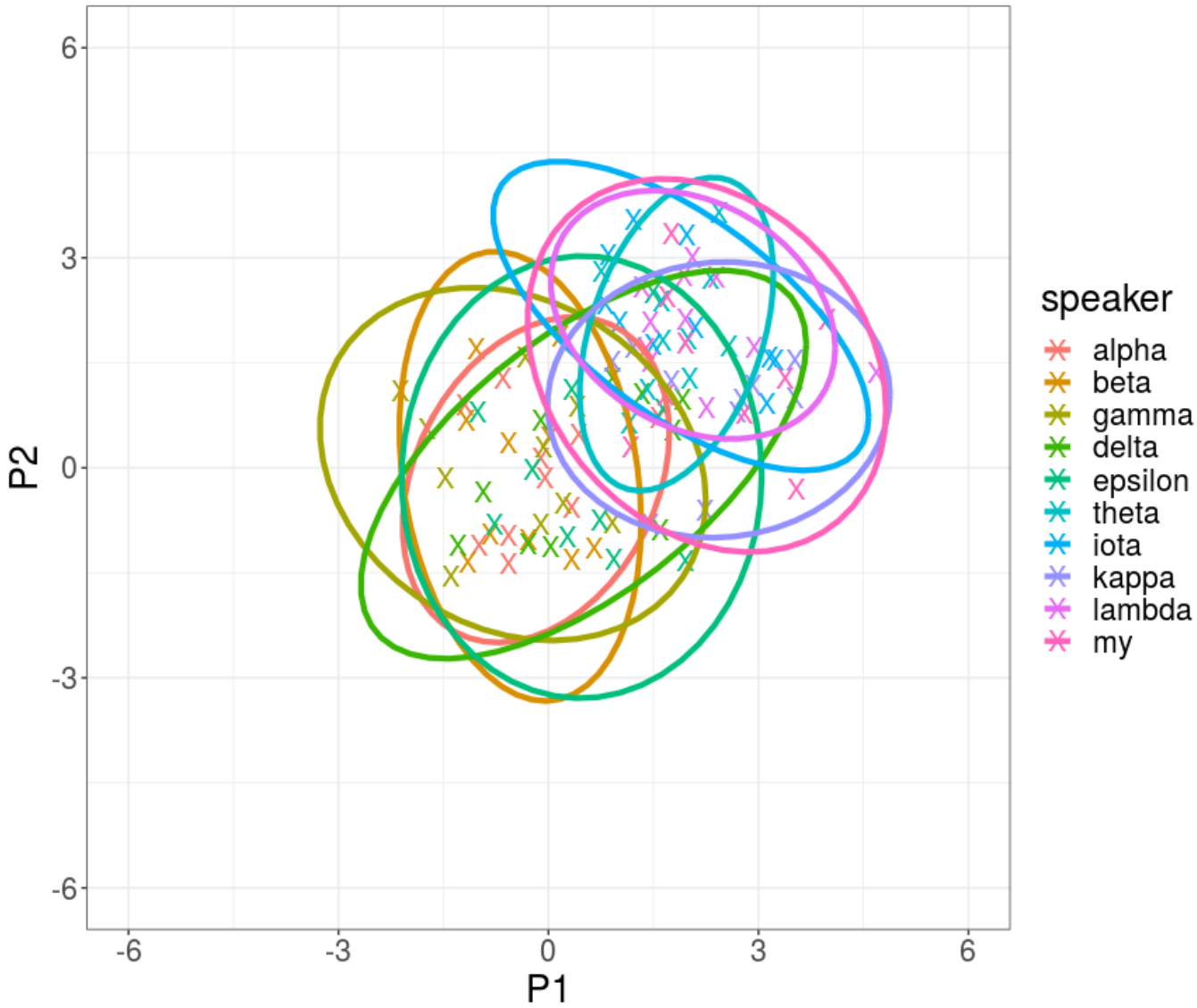
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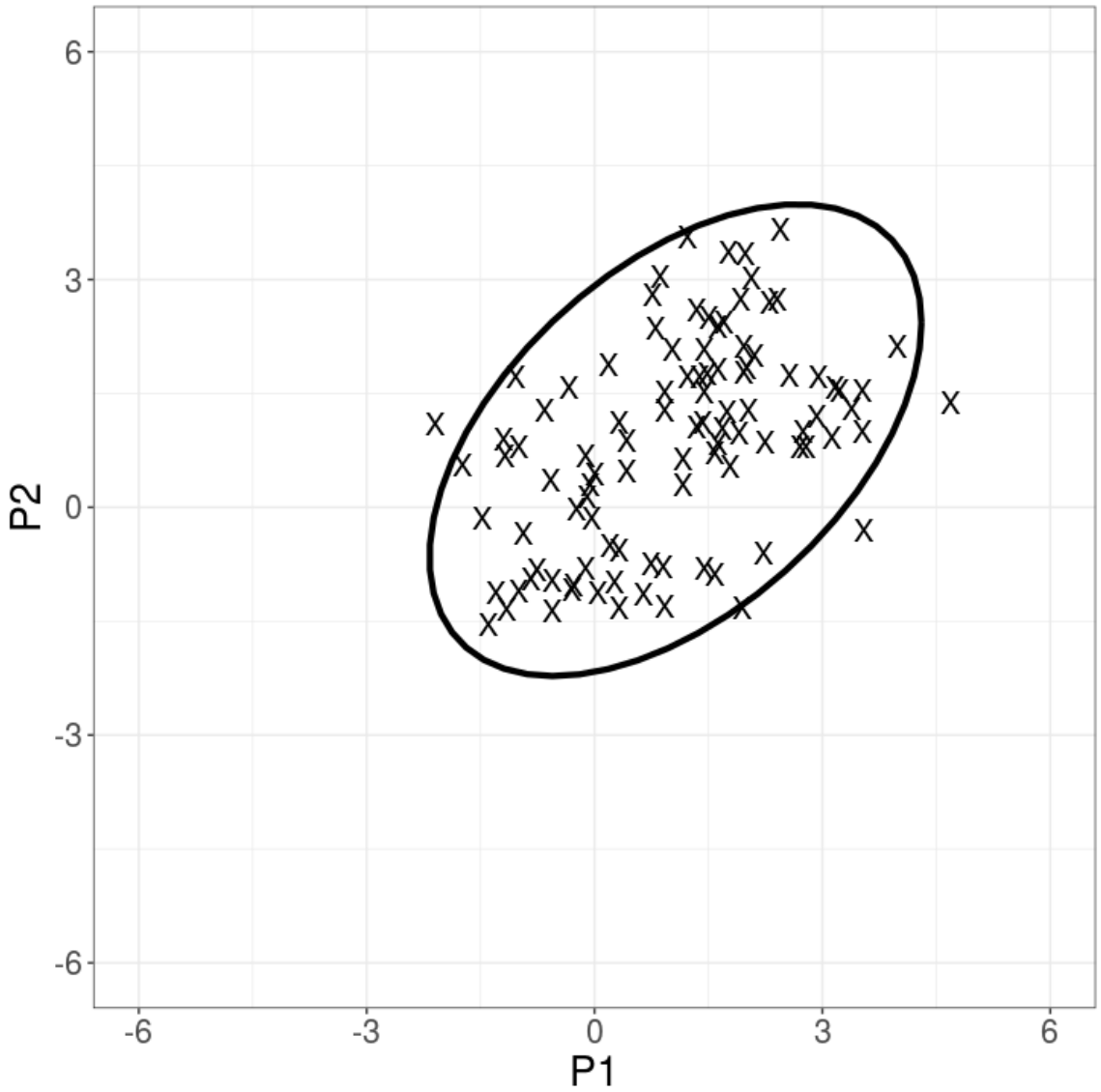

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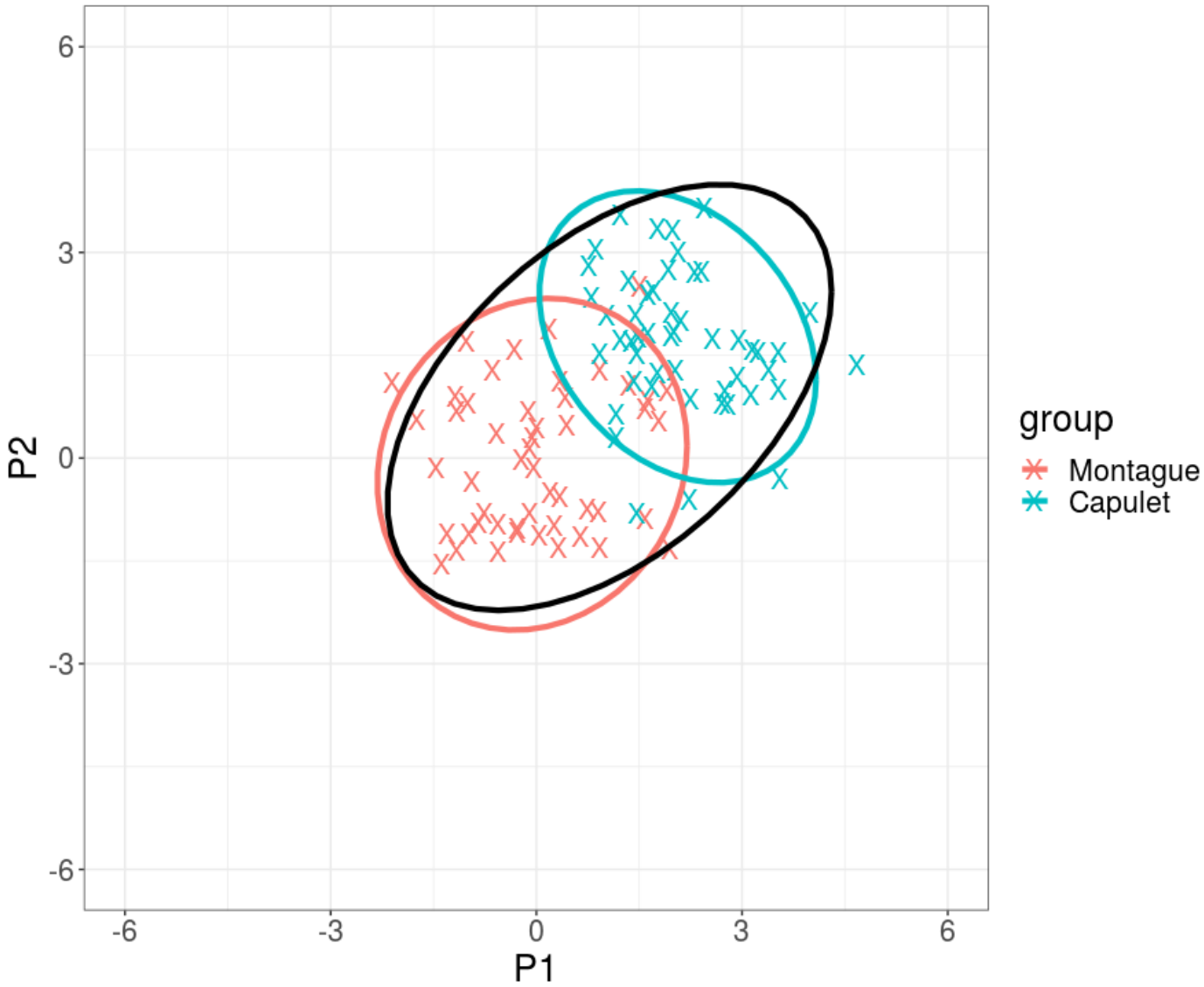

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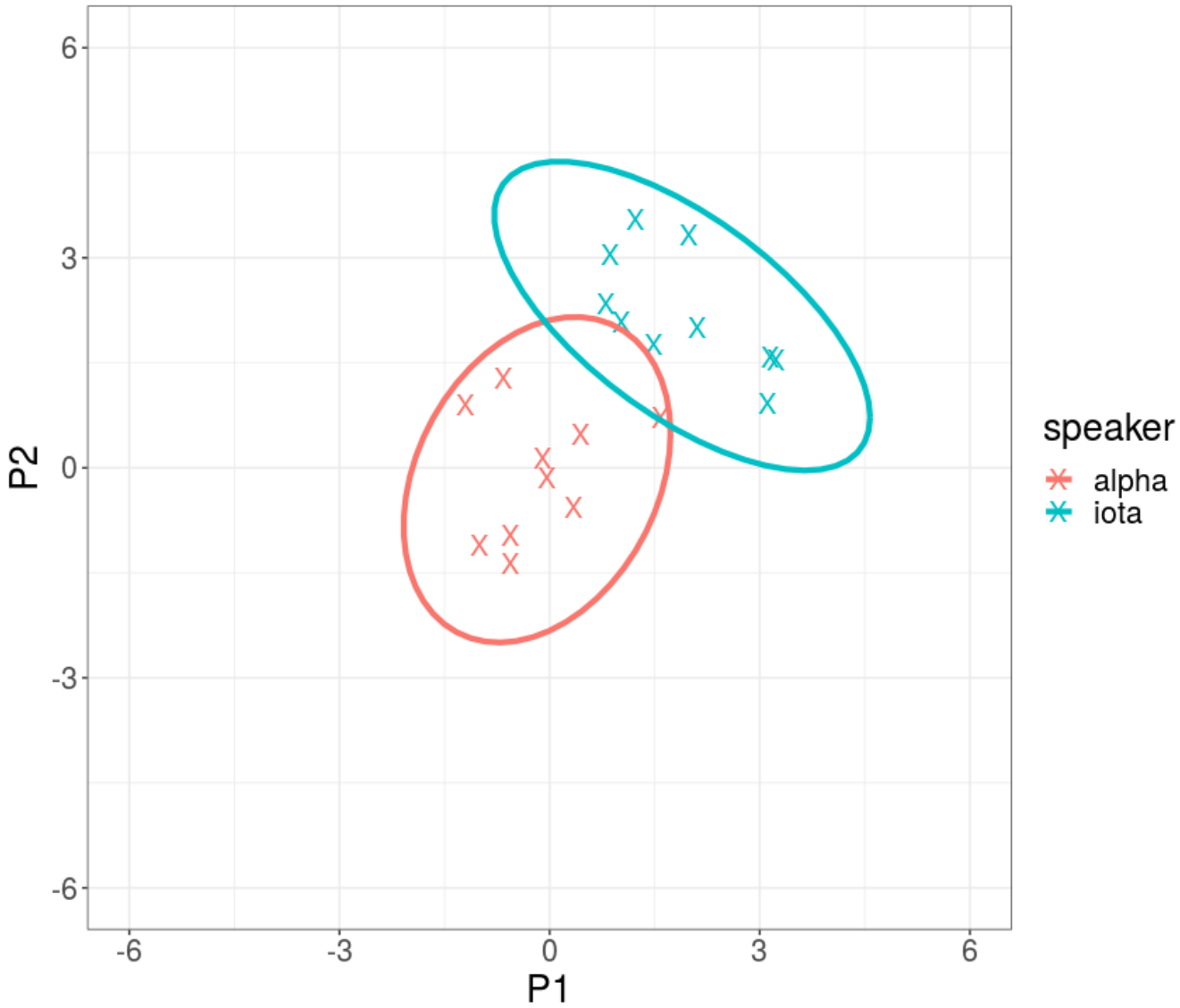

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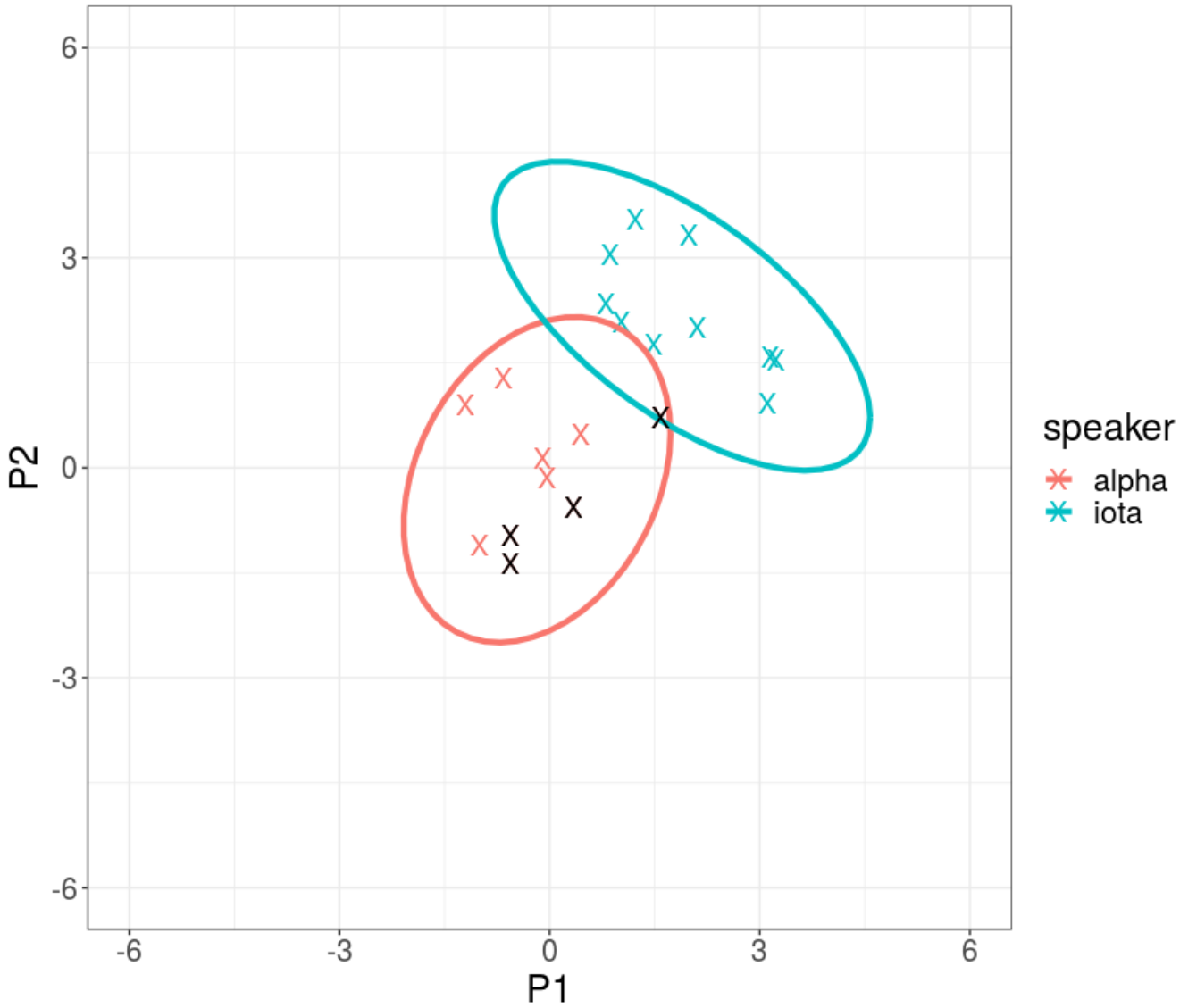

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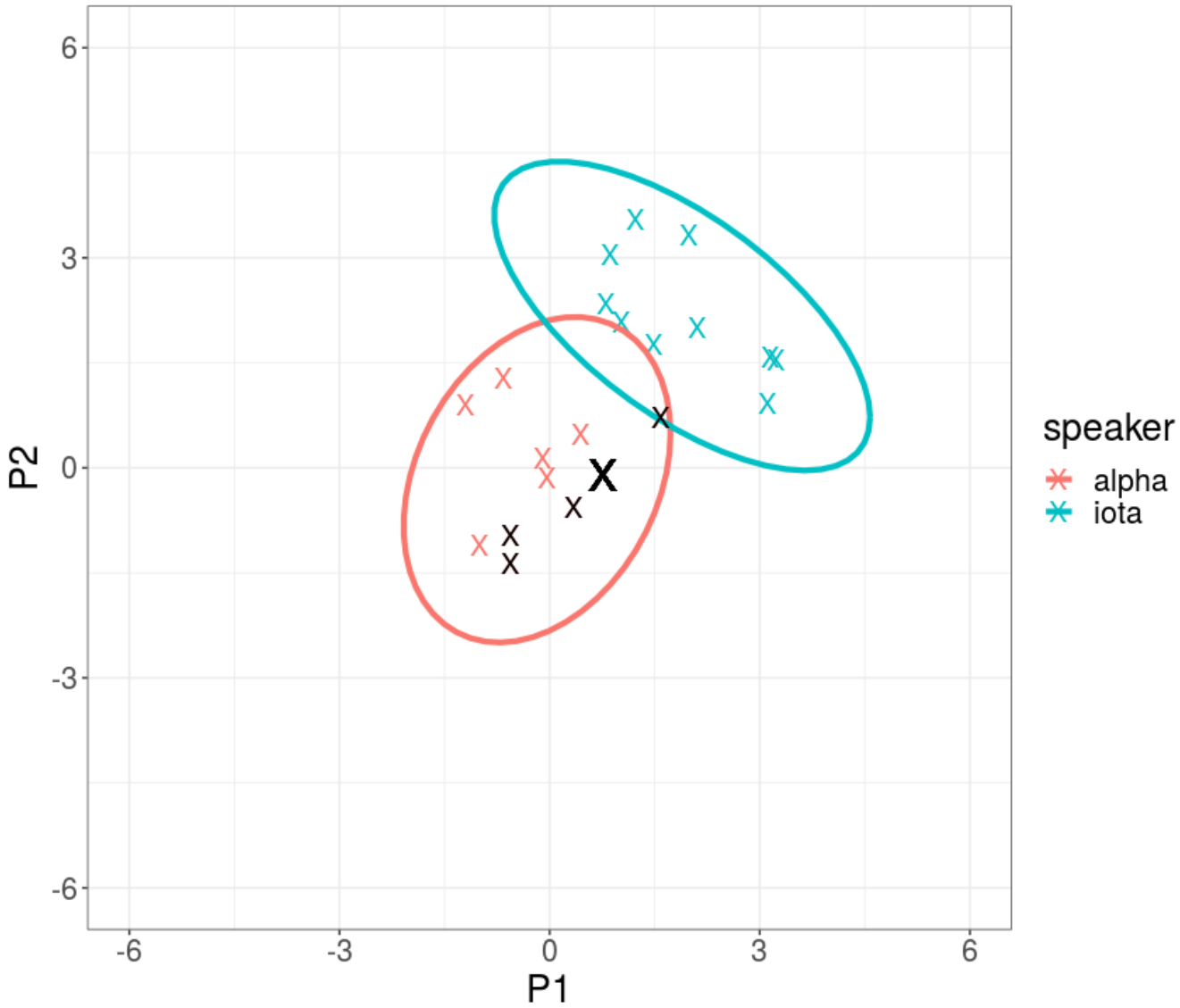

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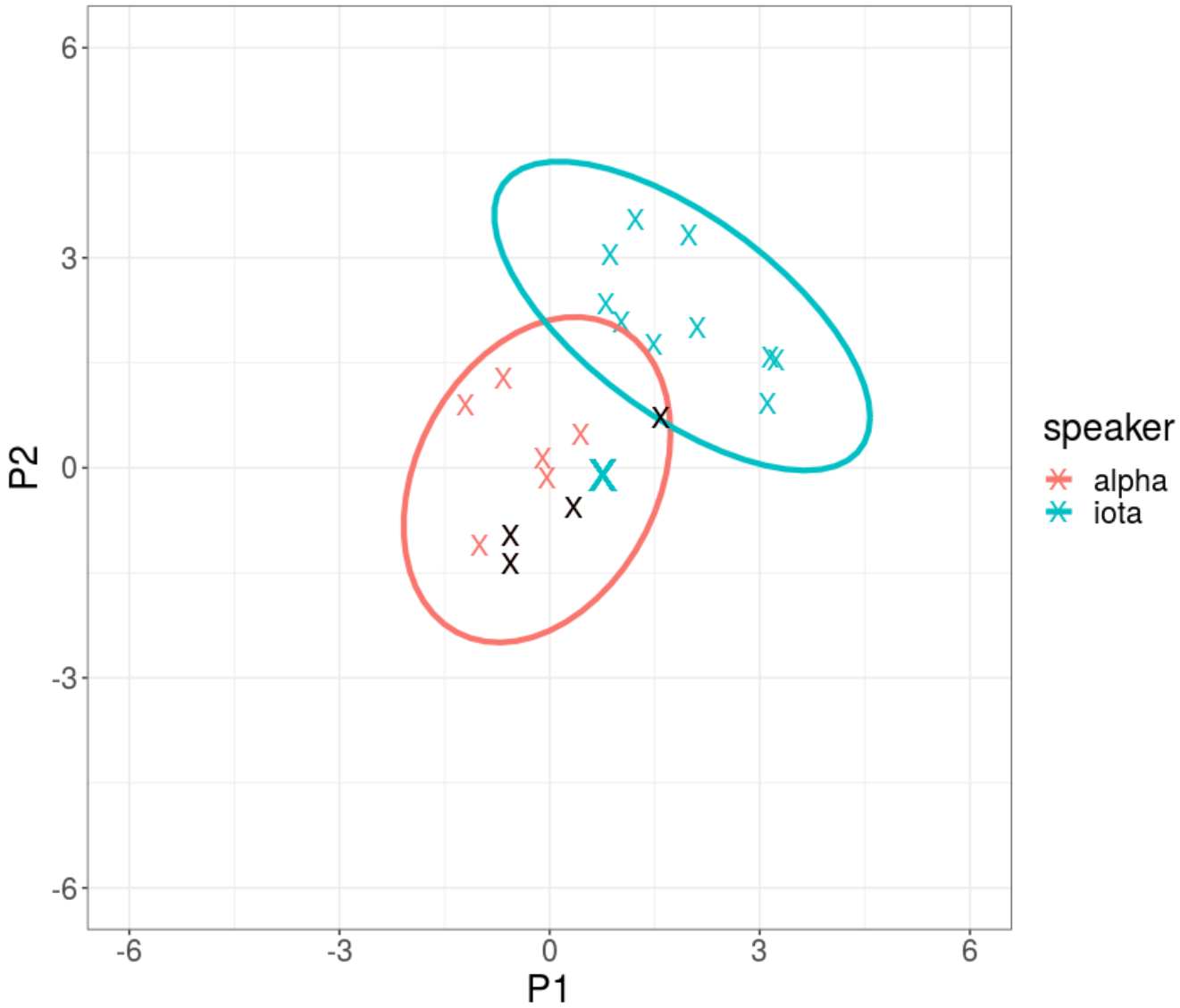

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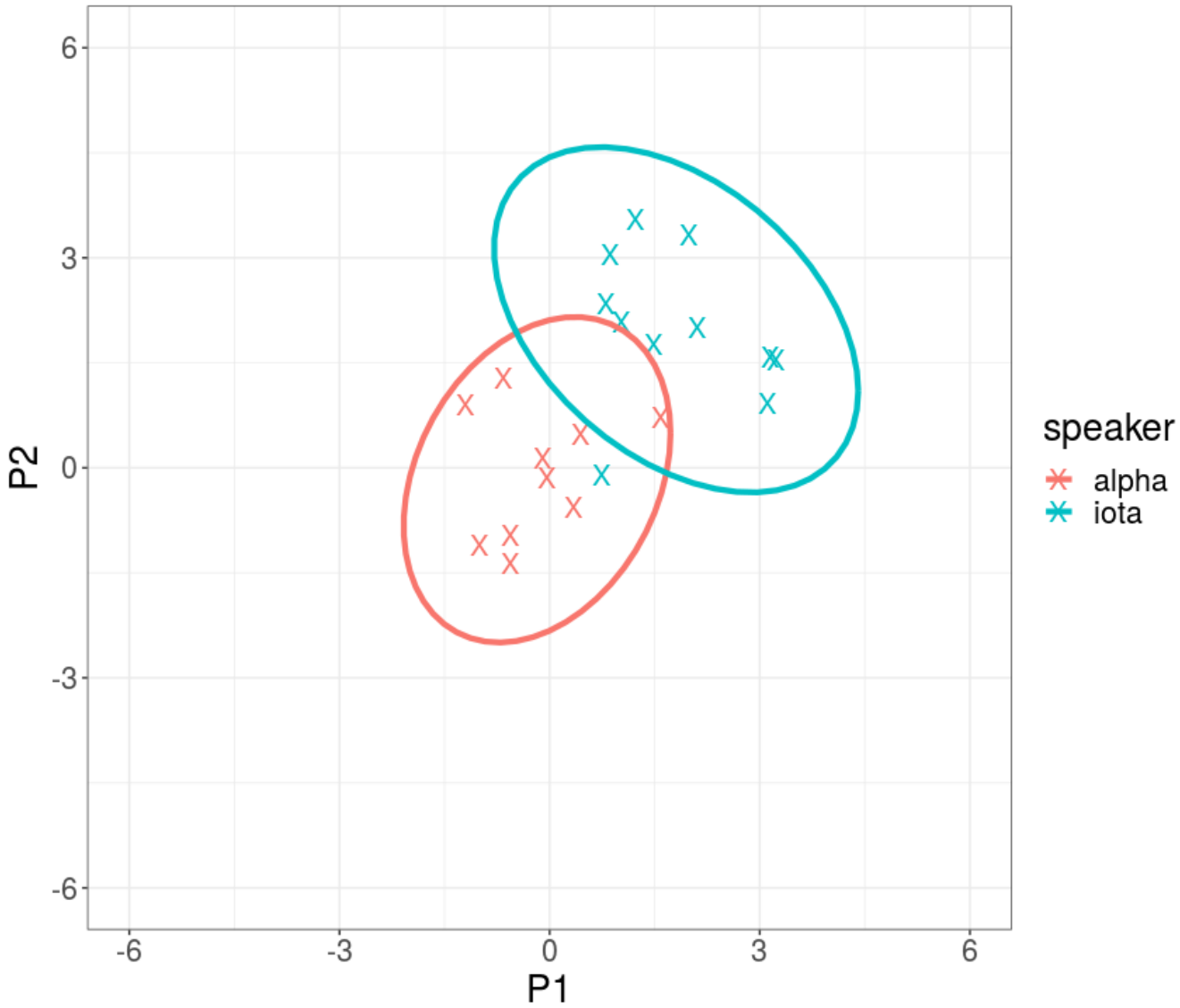
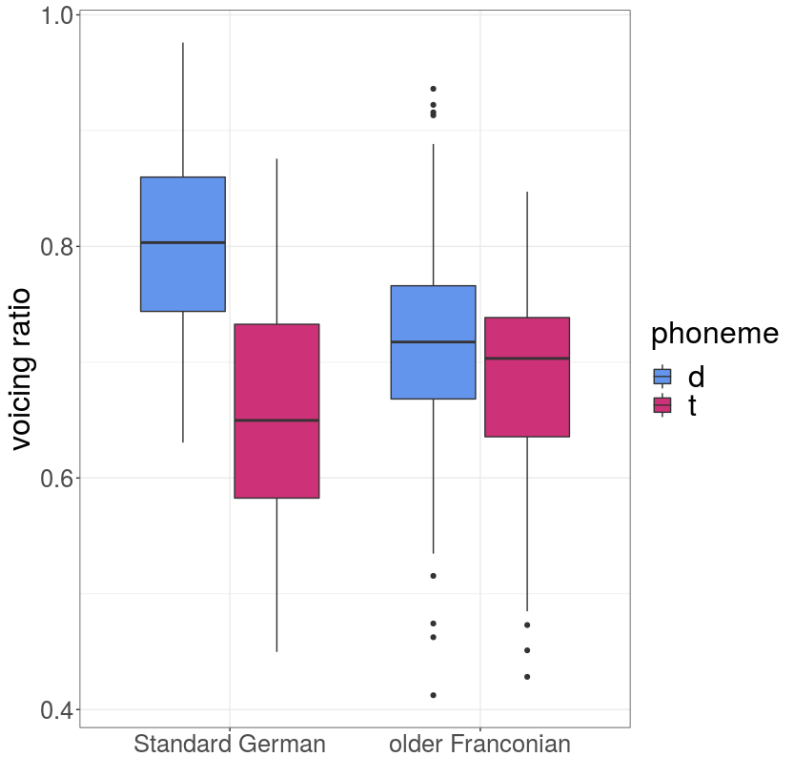


# Franconian Dialect

**Voicing ratio**:
perceptual cue to the distinction between voiced and voiceless postvocalic plosives in Standard German[1]:
/t/ < /d/

**Neutralisation**:
Franconian speakers neutralise the contrast in favour of /d/[2][3]




[1] Kohler (1979): Phonetica 36, 331-343.
[2] Harrington, Kleber, Reubold (2012): In: Fuchs et al., 33-55.
[3] Müller, Harrington, Kleber, Reubold (2011): Interspeech, 633-636.

# Franconian Dialect

**Sound change**: differentiation between voiced and voiceless stops is gradually becoming greater, both acoustically and perceptually[4][5]

**Aim of the study**: Simulate the sound change using our agent-based model (ABM) and natural speech data

[4] Harrington, Kleber, Reubold (2012): In: Fuchs et al., 33-55.
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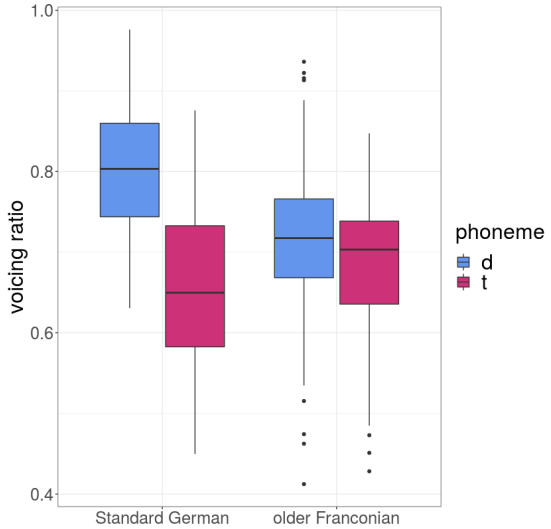
# Data & Hypotheses

**Speakers**: 6 older Franconian (OF) speakers, 5 Standard German (SG) speakers
**Material**: 8-9 repetitions of *leiden/leiten, mieden/mieten, baden/baten*[6], characterised by vowel & closure duration

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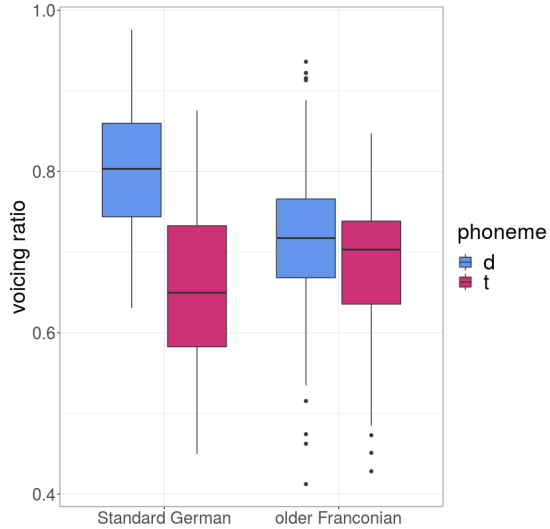


**H1**: OF agents will gradually develop a contrast between voiced and voiceless stops as a consequence of the interactions with SG agents
**H2**: OF agents will reach and possibly surpass a state that resembles the state of younger Franconian (YF) speakers

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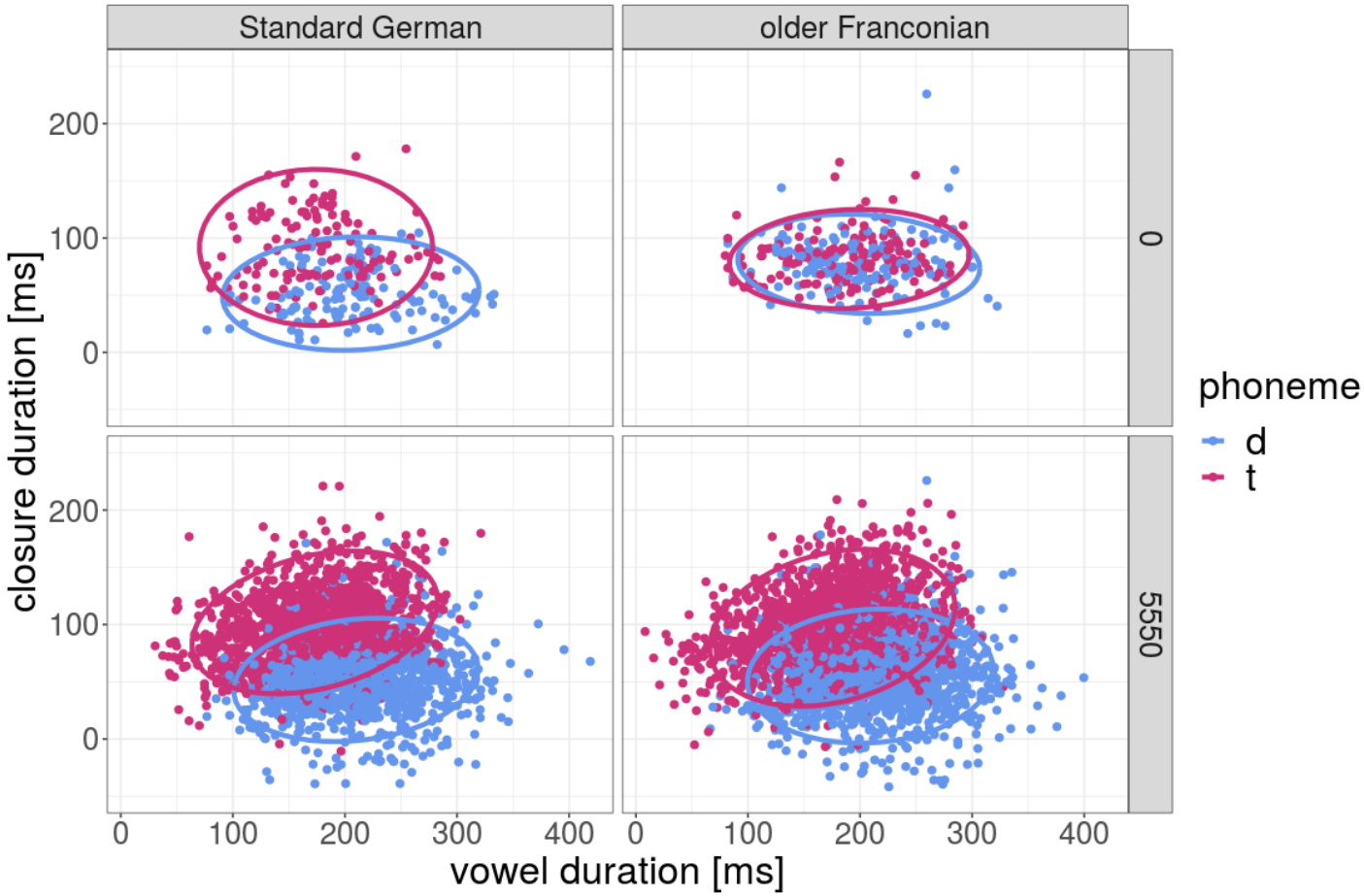

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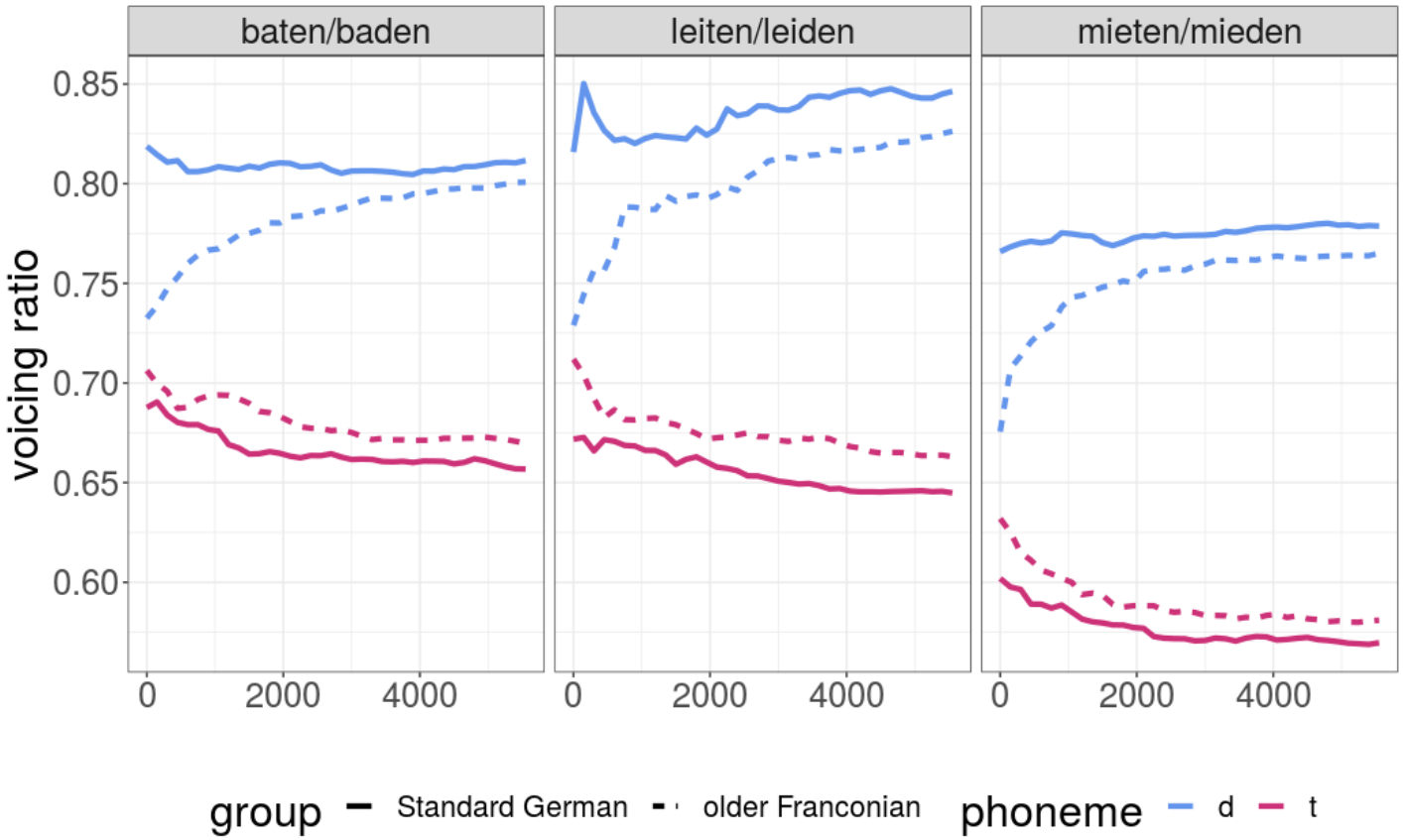
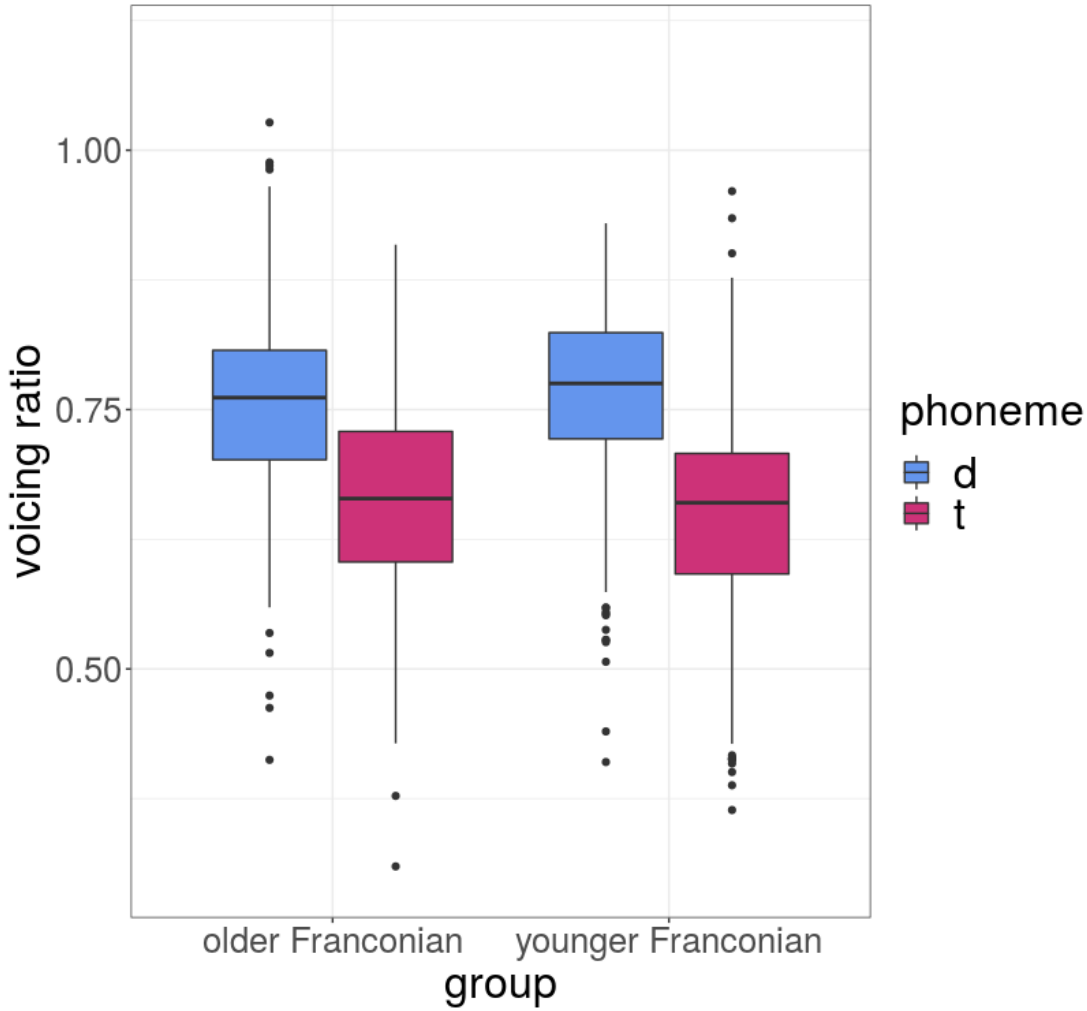


# Results

**H2**: OF agents will reach and possibly surpass a state that resembles the state of younger Franconian (YF) speakers



# Conclusion & Discussion

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## ABM

- ABMs model system-level change from individual behaviours $\rightarrow$ helpful tool in sound change research
- Full potential is yet to be explored
- Limitations: How should agents forget exemplars? How can we encode the process of phonologisation, e.g. in tonogenesis, umlaut, metathesis?

Thank you very much for your attention!

Questions?