Cross Language perception of Coda by Min speakers

Presenter: Chris & Tzu-Hsuan

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Purpose

- Final stop sound in Min was dropped, affected by Mandarin
  e.g. 新竹 “ti**k**”

Research question

- Do Min speakers have the ability to discriminate the final stop sound?

Prediction

- We can predict the final stop sound by comparing the transition size of f2

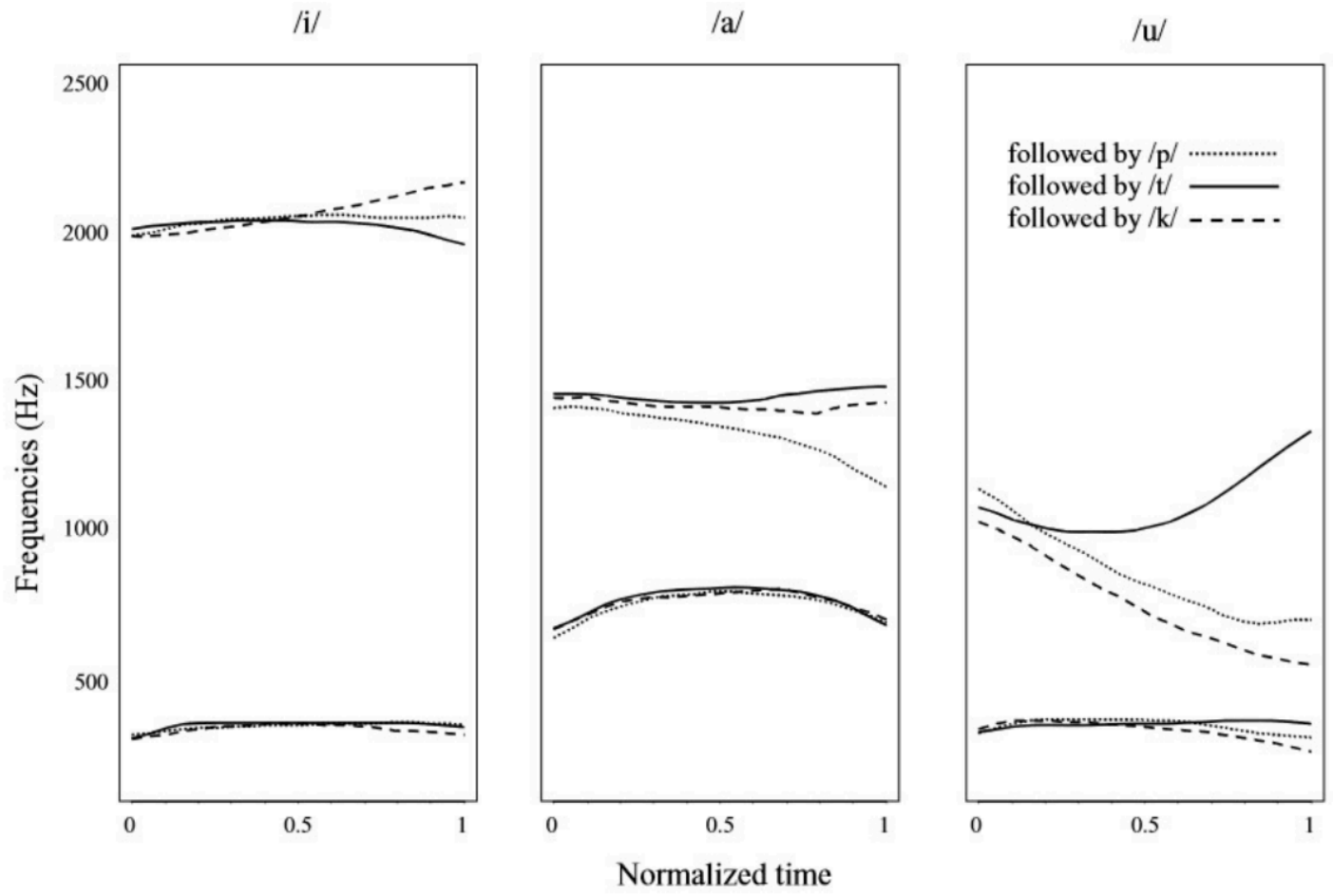


Figure 2. Formant trajectories of Thai vowels /i a u/ as a function of the stop place.

Participant

- Speaker_1 : male speaker
- Speaker_2: female speaker

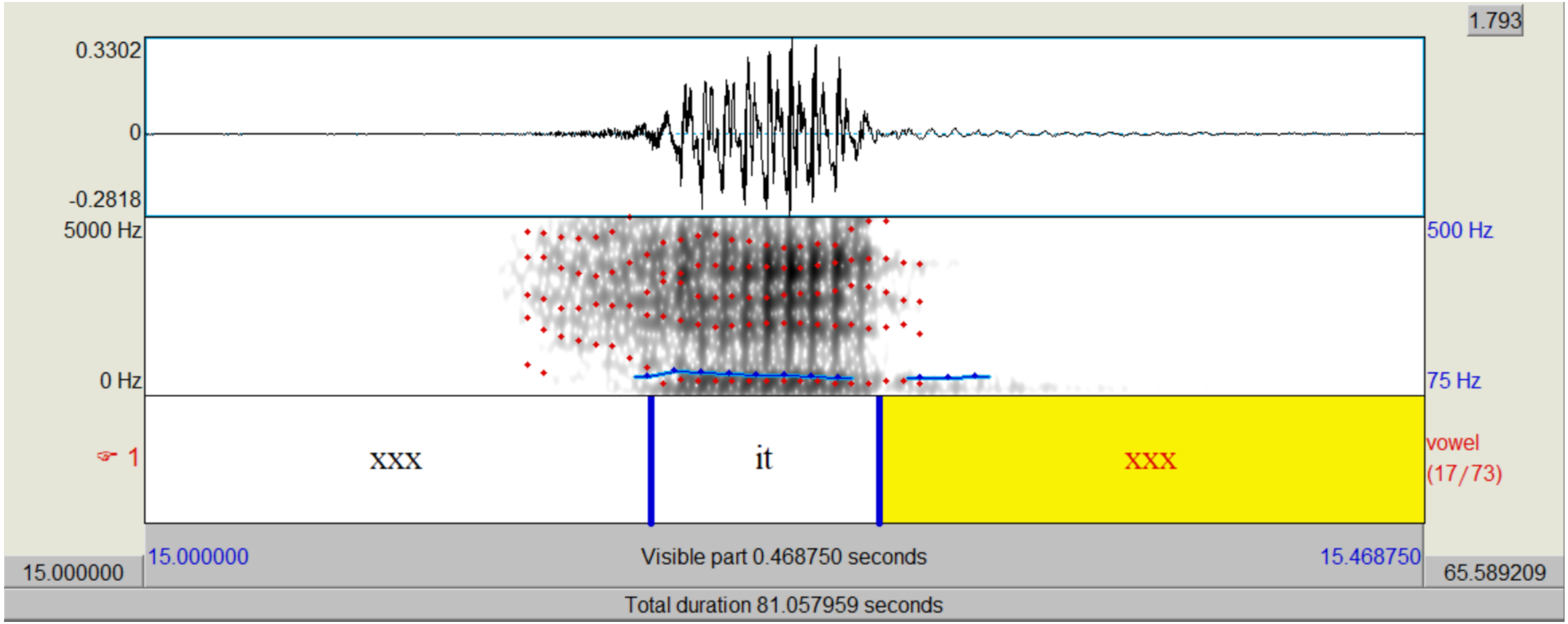
Stimuli

- /a/ with /p/ ending - 6 words
- /a/ with /t/ ending - 6 words
- /a/ with /k/ ending - 6 words
- /i/ with /p/ ending - 6 words
- /i/ with /t/ ending - 6 words
- /i/ with /k/ ending - 6 words

total: 36 words

Sound processing

- Praat



Sound processing

- Praat script

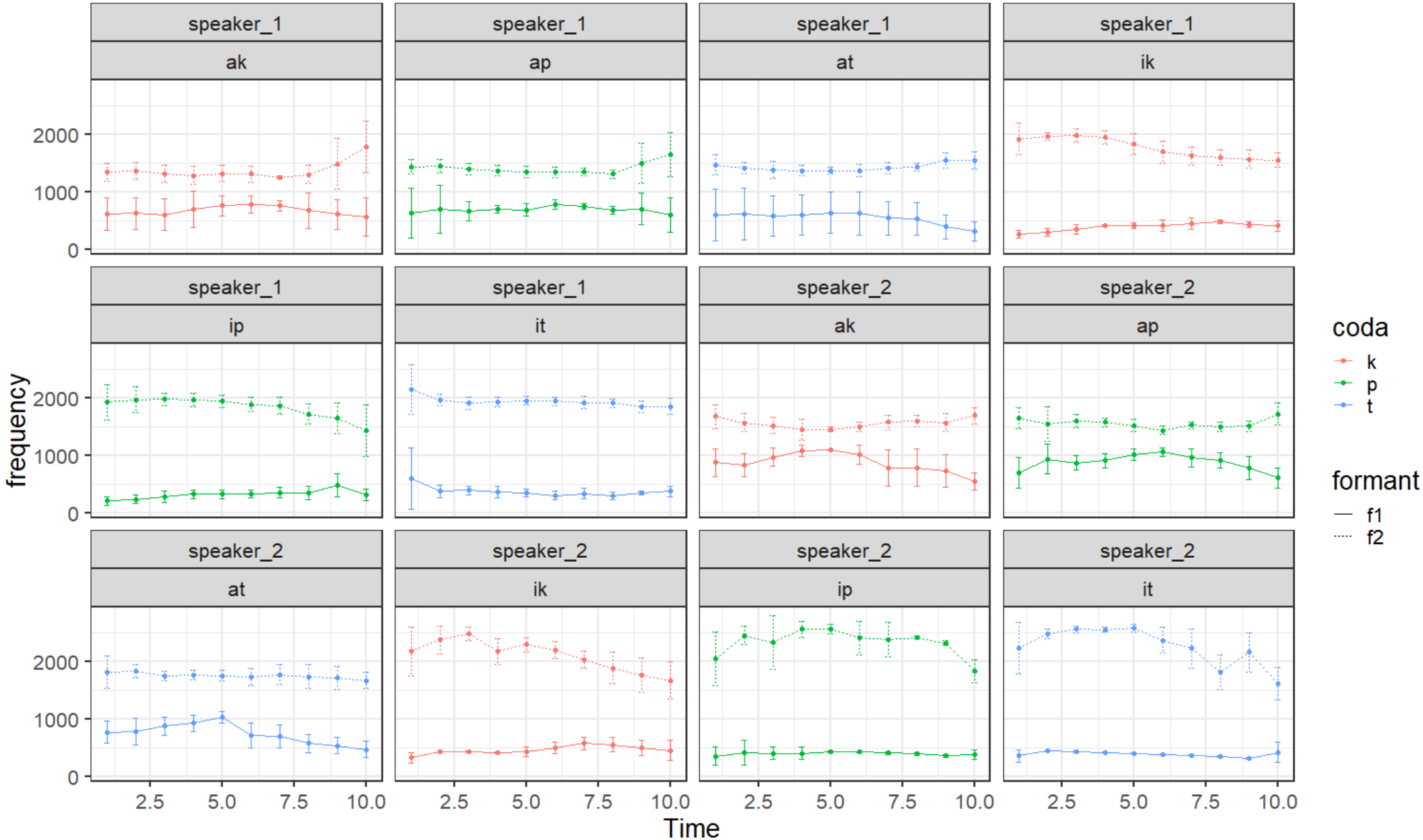
  cut each lable into ten intervals

Data processing

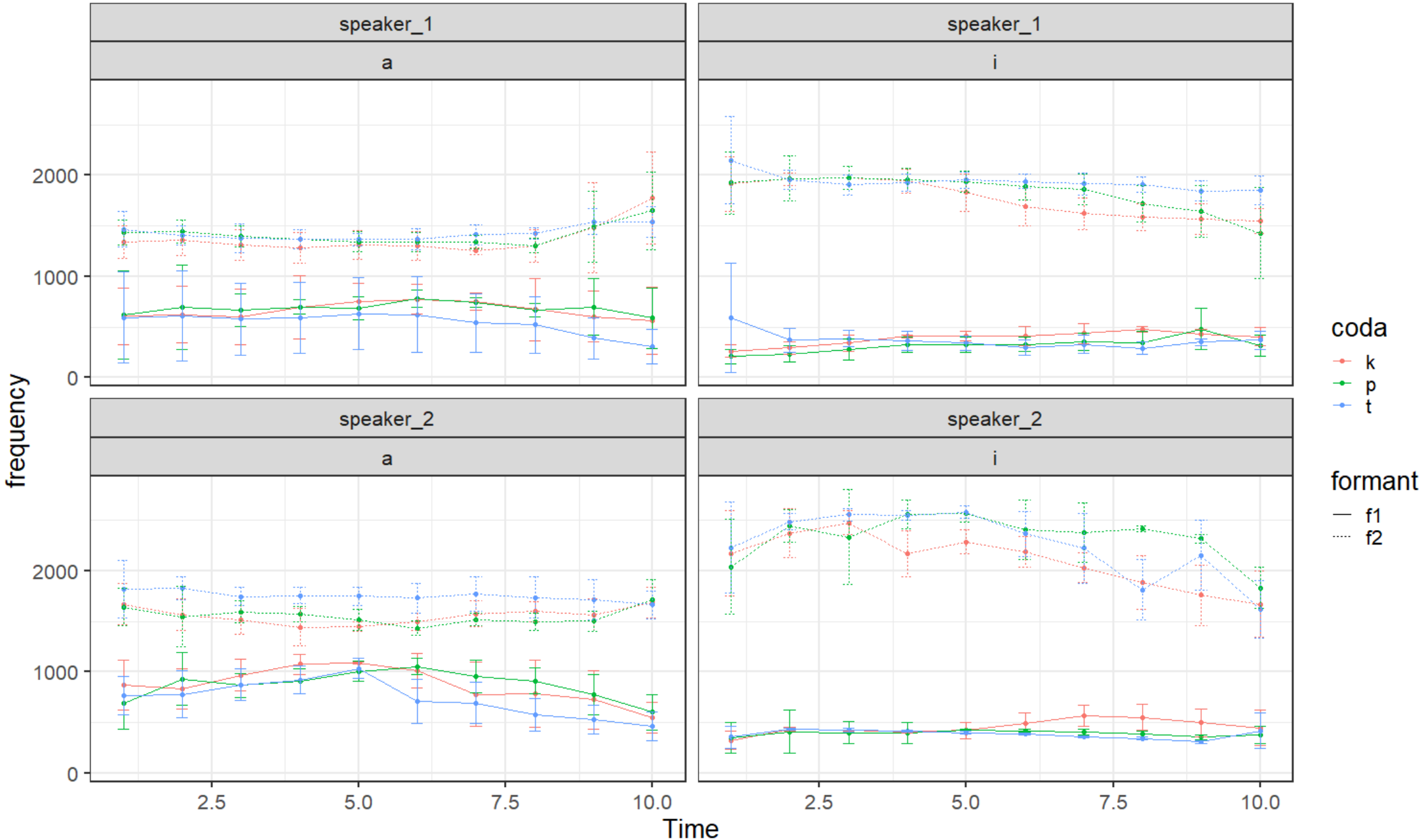
- Run R

Data visualization – plotting

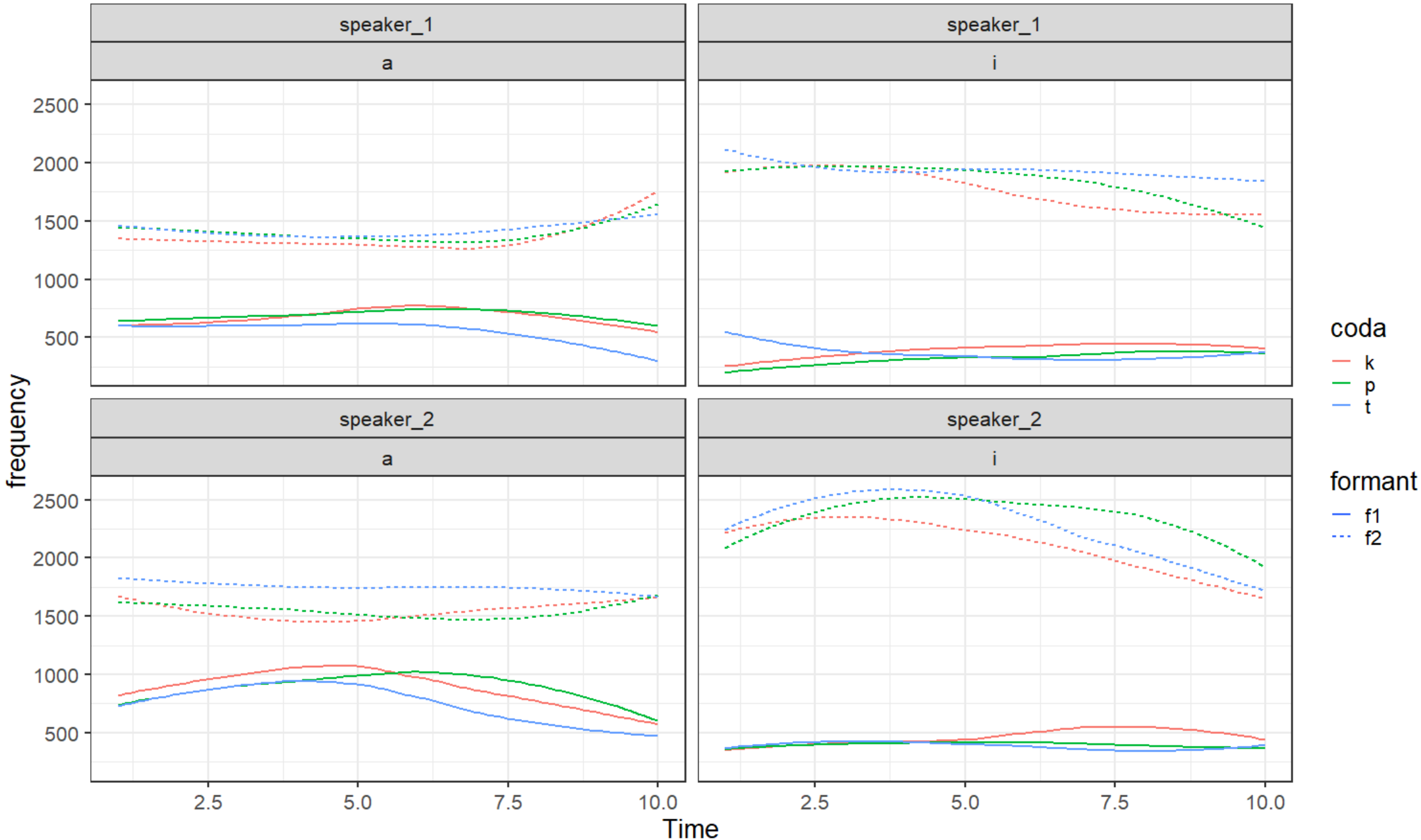
```
#formant.plot with error bar in separate words
formant.plot+
  stat_summary(fun.y=mean,
               geom="point")+
  stat_summary(fun.y=mean,
               geom="line")+
  stat_summary(fun.data=mean_cl_normal,
               geom="errorbar",
               width=.2)+
  ylab("frequency")+
  xlab("Time")+
  theme_bw(base_size=20)+
  facet_wrap(filename~word)
```


speaker_1
ak
speaker_1
ap
speaker_1
at
speaker_1
ik
speaker_1
ip
speaker_1
it
speaker_2
ak
speaker_2
ap
speaker_2
at
speaker_2
ik
speaker_2
ip
speaker_2
it
frequency
2000
1000
0
2.5
5.0
7.5
10.0
Time
coda
k
p
t
formant
f1
f2

```r
#data visualization
library(tidyverse)
#install.packages("Hmisc")
library(Hmisc)
formant.plot=ggplot(data=formant.new,aes(x=timepoint,y=frequency,colour=coda,lty=formant))
#formant with error bar in three codas
formant.plot+
  stat_summary(fun.y=mean,
               geom="point")+
  stat_summary(fun.y=mean,
               geom="line")+
  stat_summary(fun.data=mean_cl_normal,
               geom="errorbar",
               width=.2)+
  ylab("frequency")+
  xlab("Time")+
  theme_bw(base_size=20)+
  facet_wrap(filename~Vowel)
```


speaker_1
a
speaker_1
i
speaker_2
a
speaker_2
i
frequency
2000
1000
0
2.5
5.0
7.5
10.0
Time
coda
k
p
t
formant
f1
f2

```r
#formant.plot with smoothing only
formant.plot2<-ggplot(data = formant.new,
                      aes(x = timepoint, y = frequency,colour=coda,lty=formant)) +
  geom_smooth(method="loess", se=F)+
  ylab("frequency")+
  xlab("Time")+
  theme_bw(base_size=20)+
  facet_wrap(filename~Vowel)
formant.plot2
```


speaker_1
a
speaker_1
i
speaker_2
a
speaker_2
i
frequency
2500
2000
1500
1000
500
2.5
5.0
7.5
10.0
Time
coda
k
p
t
formant
f1
f2

Link to Github repo

- https://github.com/chrisweng12/NCTU-R-Programming-2018.git

Work distribution

- Data processing: Chris
- Data visualization: Tzu-hsuan

Thank you!