

# Errors induced by pronunciation variants typical of casual speech

Mirjam Ernestus

# The phenomenon

 *It was probably last Tuesday*



# The phenomenon



*It was pro bly last Tuesday*




# The phenomenon



*He has been at the top of the  
British government now for twelve years*



# The phenomenon

 *He has been at the top of the  
British government now for twelve years*



# The phenomenon



*wedstrijd*



*Wagen*



*probably*



*fenêtre*



*entonces*



*jestli*

....

Ernestus & Warner (2011)

# The phenomenon



word tokens lacking a sound: 25%  
word tokens lacking a syllable: 6%  
Johnson (2004)



Adda-Decker, Boula de Mareüil, Adda, & Lamel (2005)  
Schuppler, Ernestus, Scharenborg & Boves (2011)

# Present talk

- No speech errors
- Reduced pronunciation variants are problematic for
  - native listeners
  - non-native listeners
  - automatic speech recognizers



# No speech errors

- Very frequent
  - French: **revue**, **mesure**

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- Reduced variant is no likely mistake
  - Dutch:
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    - /b<sub>ε</sub>ivorbelt/ versus /vɔlt/

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- Reduced variant is no likely mistake
  - Dutch:
    - /natyrlək/ versus /tyk/
    - /b<sub>ɛ</sub>ivorbelt/ versus /vɔlt/
- Language change
  - French: **bracelet**

# Young Dutch native listeners

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**Group 1:** some context

*zo snel mogelijk naar eh*

'as fast as possible to uhm'



**Group 2:** Very little context

*el mogelijk na*

'ast possible to'



**Group 3:** no context

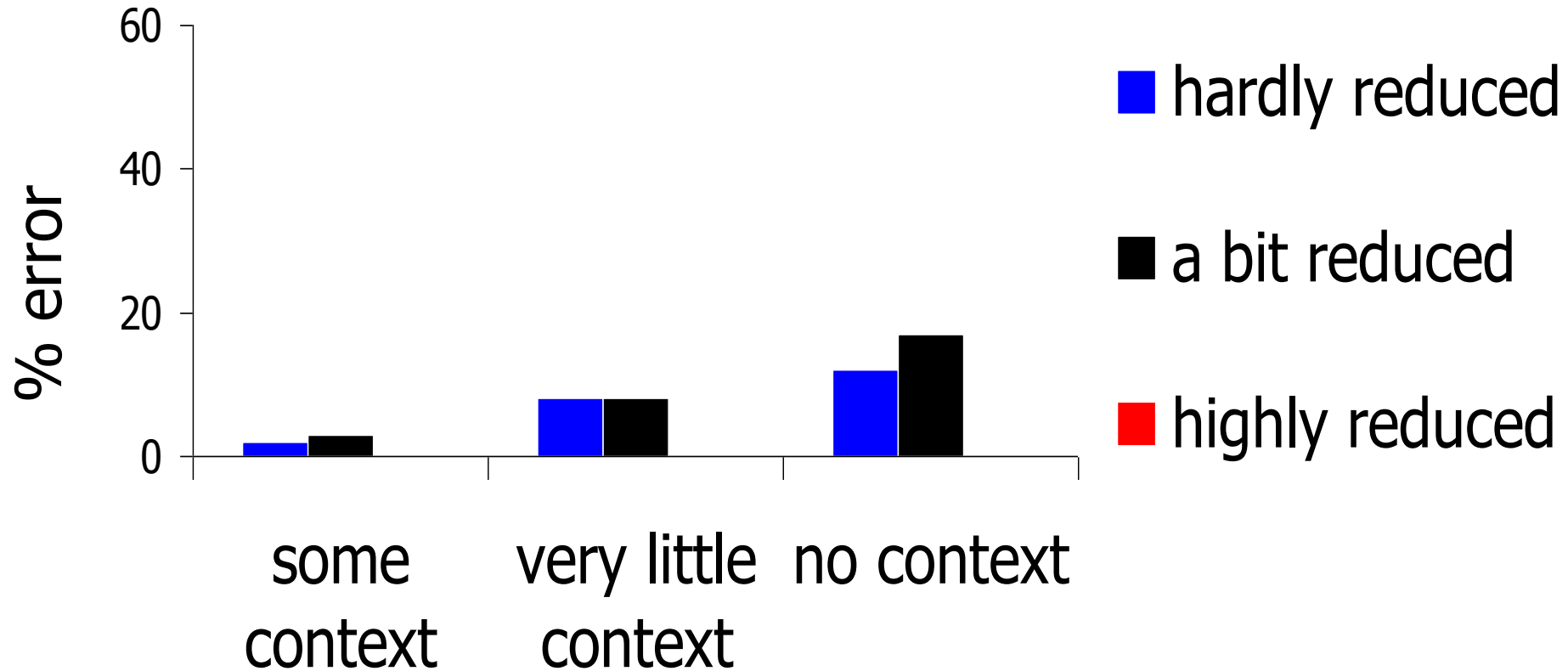
*mogelijk*

'possible'



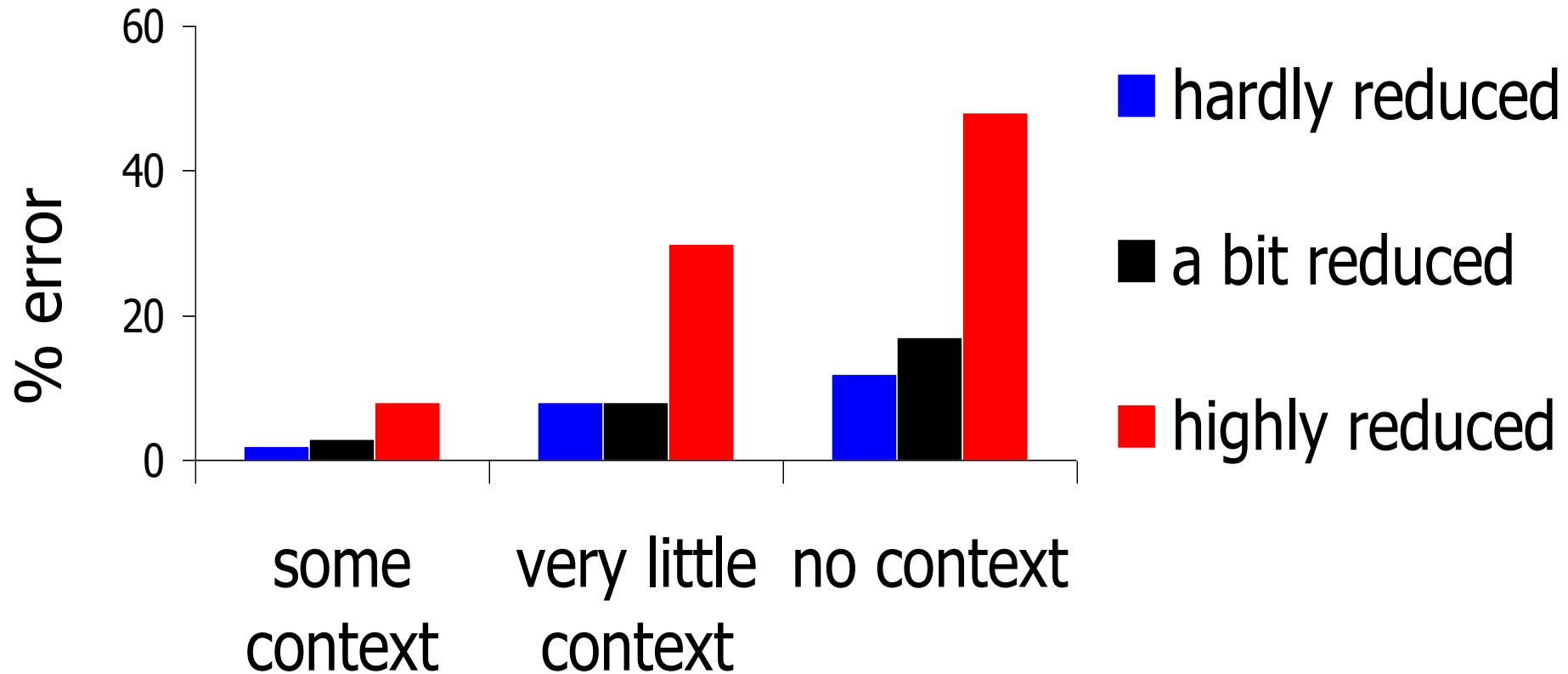
Ernestus, Baayen & Schreuder (2002)

# Young Dutch native listeners



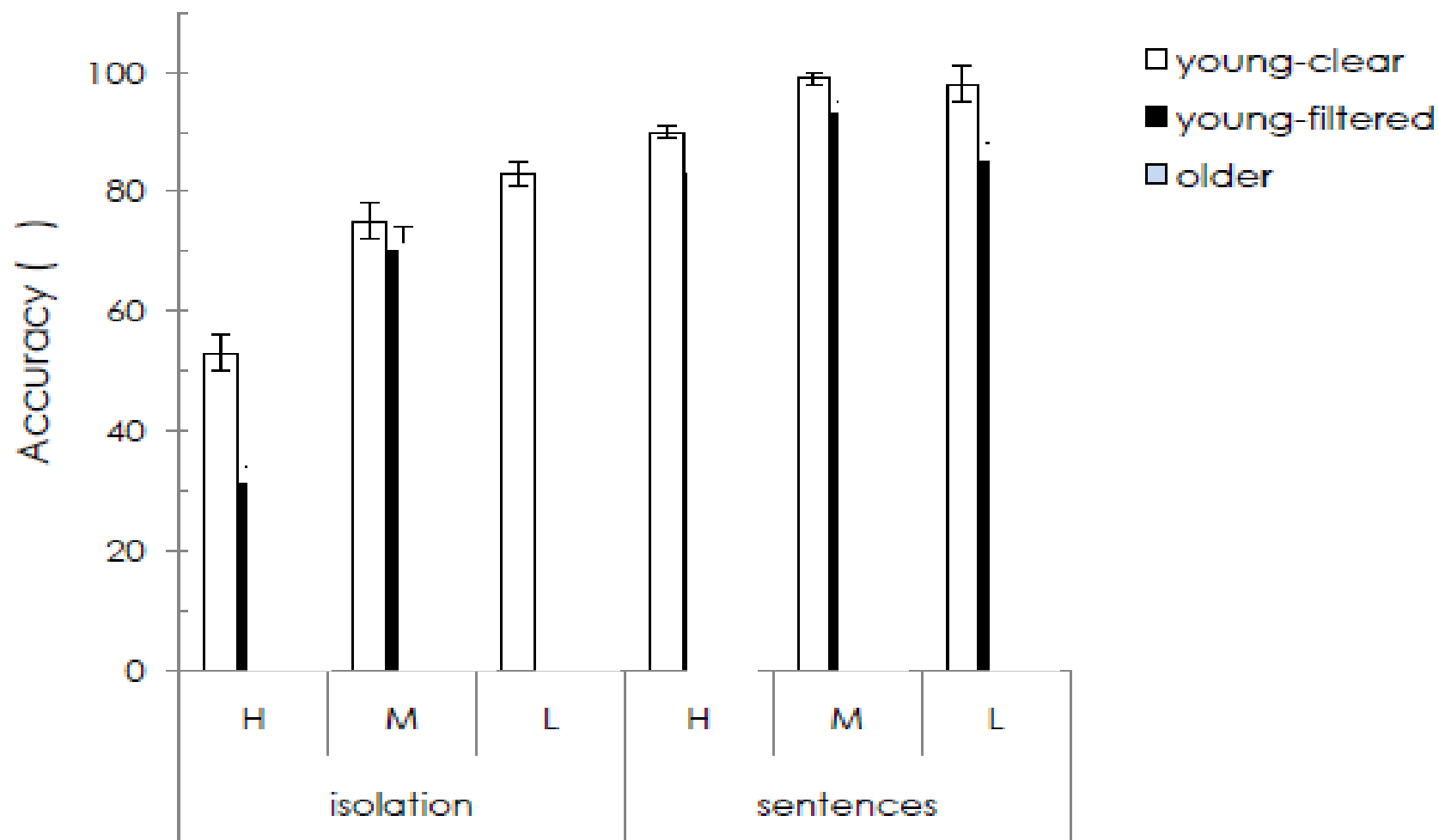
Ernestus, Baayen & Schreuder (2002)

# Young Dutch native listeners



Ernestus, Baayen & Schreuder (2002)

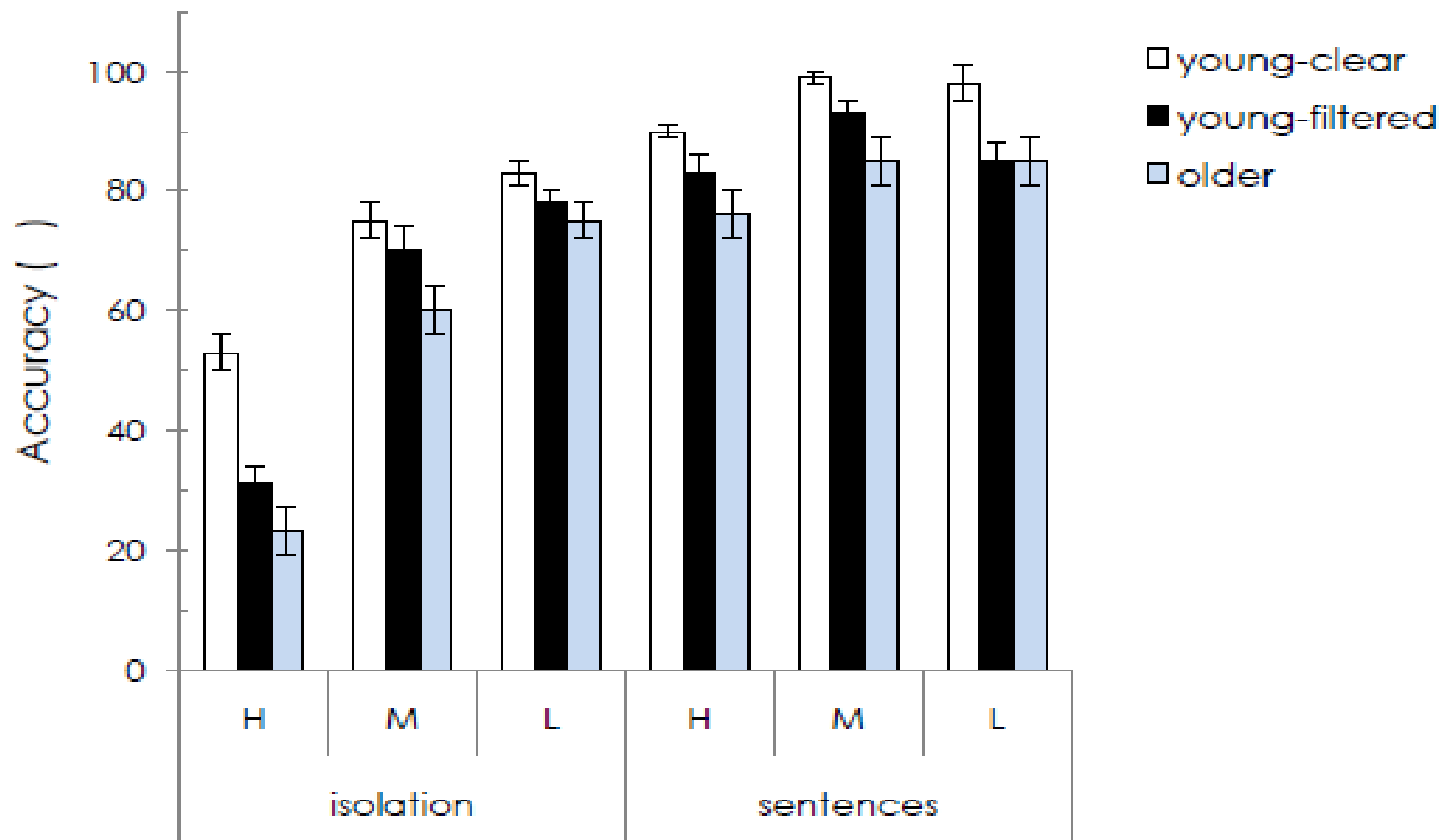
# Older Dutch native listeners



Janse & Ernestus (2011)



# Older Dutch native listeners



Janse & Ernestus (2011)

# Native listeners: How?

- Sensitivity to
  - acoustic detail
  - semantic/syntactic context
- Lexical representations for (some) reduced variants

# Non-native listeners



# Non-native listeners

## Dictation task 1



- Learners of Dutch (A2)
- Slow speech rate



Giezenaar, Bakx & Ernestus (in prep)

# Non-native listeners



## Dictation task 1

- Learners of Dutch (A2)
- Slow speech rate 
- Few errors if context helps 
  - /opəbarfəfur/ and /ob:arfəfur/: 0 errors

Giezenaar, Bakx & Ernestus (in prep)

# Non-native listeners

## Dictation task 1

- Learners of Dutch (A2)
- Slow speech rate 
- Few errors if context helps 
  - /op**p**əbarfəfur/ and /ob:arfəfur/: 0 errors
- Errors for short discourse markers
  - /darɔm/ : 0/8 errors; /dam/: 6/8 errors

Giezenaar, Bakx & Ernestus (in prep)

# Non-native listeners

## Dictation task 2

- Spanish learners of English (B1/B2)
- Recordings from radio



Nijveld, Ten Bosch & Ernestus (in prep)

# Non-native listeners

## Dictation task 2

- Spanish learners of English (B1/B2)
- Recordings from radio



- **British government** /bɪʃgəvm/



– *Briscoven, Brishgovern, prision govern, prish govern, press coffee, pressing government, Britisch coffee, British council*

Nijveld, Ten Bosch & Ernestus (in prep)



# Non-native listeners

Auditory lexical decision: *pelouse*, *p'louse*

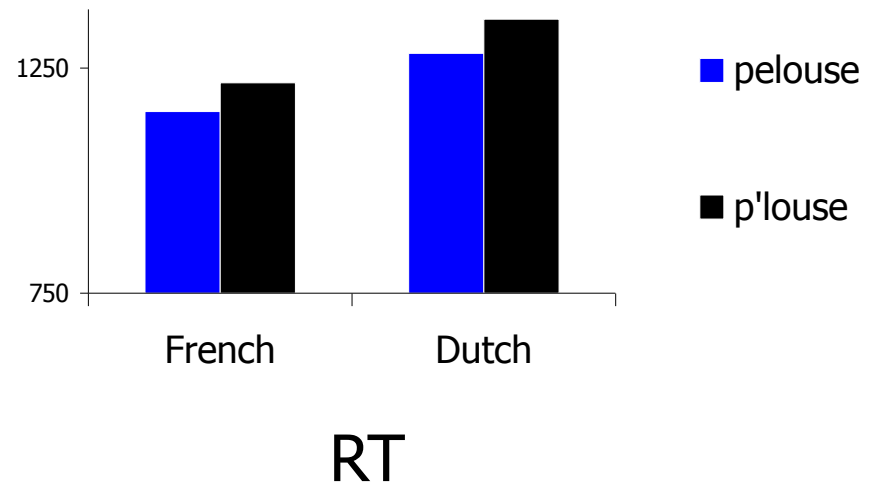
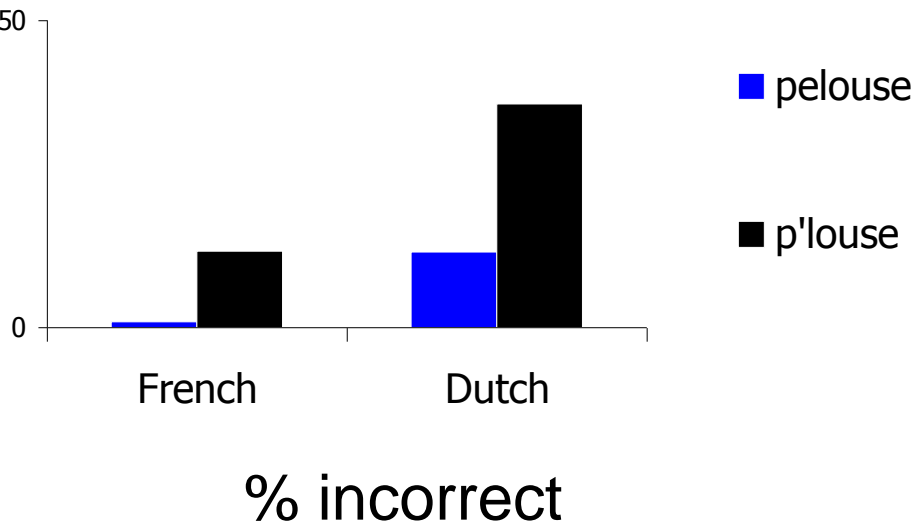
- High proficiency Dutch learners (C1, C2)

Brand & Ernestus (in prep)

# Non-native listeners

Auditory lexical decision: *pelouse*, *p'louse*

- High proficiency Dutch learners (C1, C2)



Brand & Ernestus (in prep)

# Non-native listeners

- Important role of orthography (full form)
- Little experience with reduced variants
- Less sensitive to relevant acoustic information



# Automatic speech recognition

- Problems if variant not in pronunciation dictionary
- Problems if variants are in pronunciation dictionary
  - Many homophones
  - Many short words

Ten Bosch & Ernestus (in prep)

# Conclusions

Pronunciation variation typical of casual speech

- **no** speech error by itself
- can only be well recognized in its natural context
- presents difficulties for
  - Listeners with hearing problems
  - Older listeners
  - Non-native learners
  - ASR