N400 evidence that mismatch detection is sensitive to the phonetics but not the phonology of Mandarin tones

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nǐ

hǎo

ní
hǎo

Third Tone Sandhi

/ Low . Low / → [Rising . Low]

The N400

*I drink my coffee with cream and **sugar**.*
*I drink my coffee with cream and **dog**.*

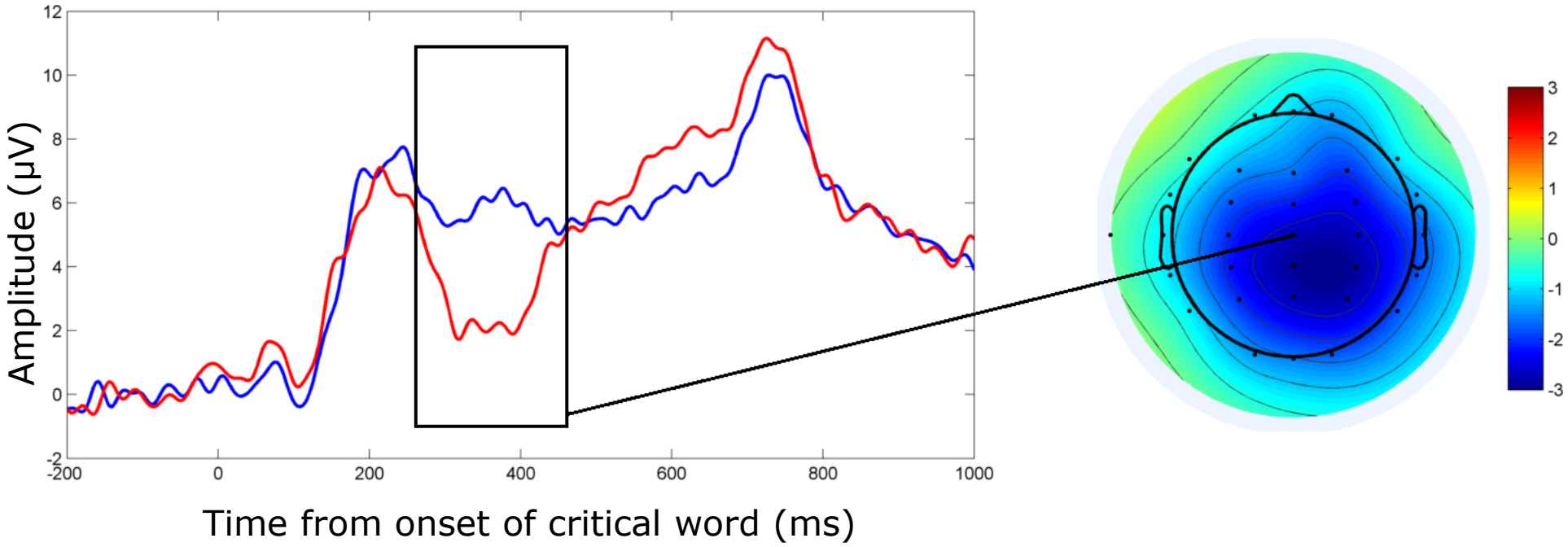
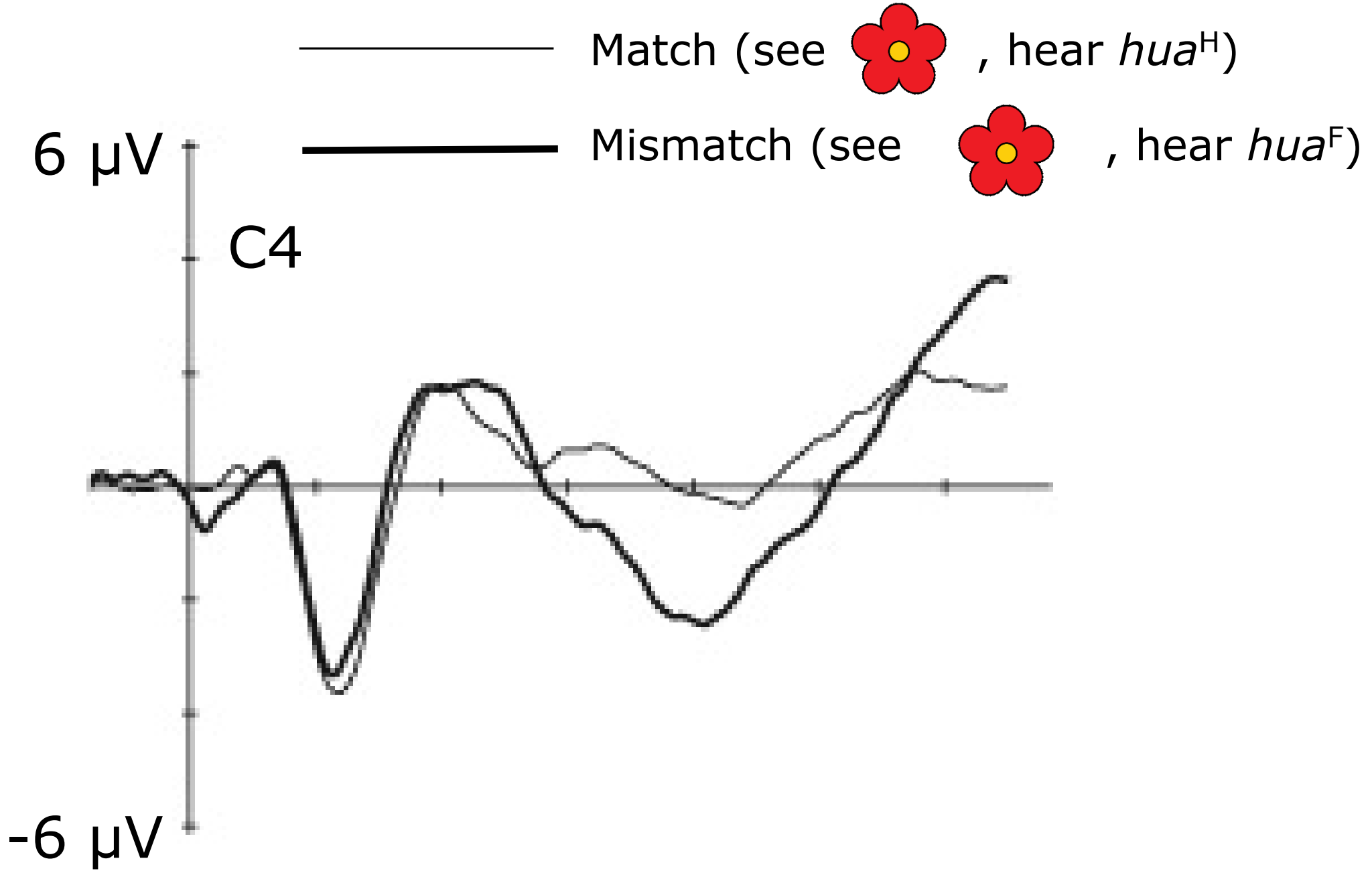
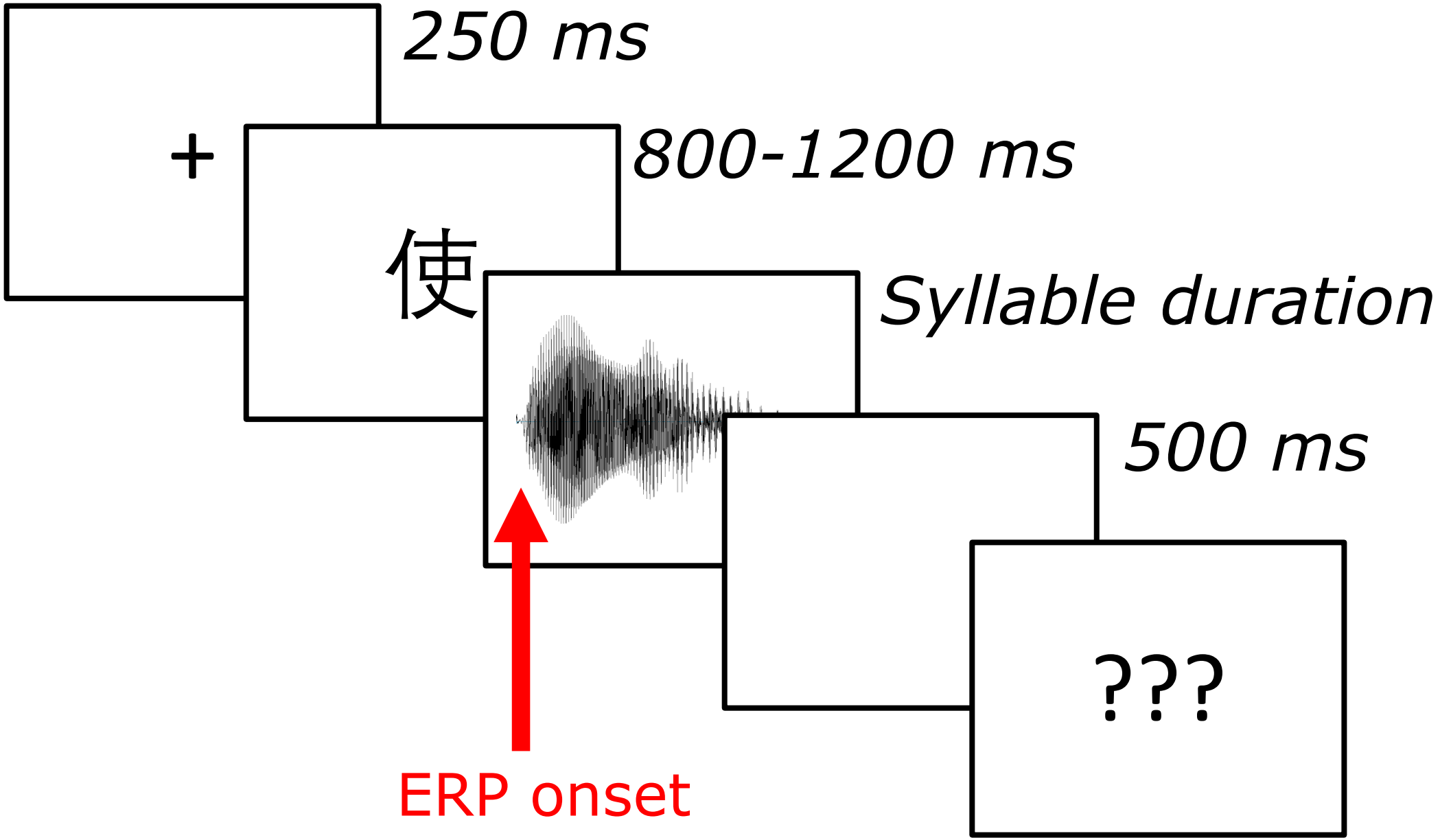


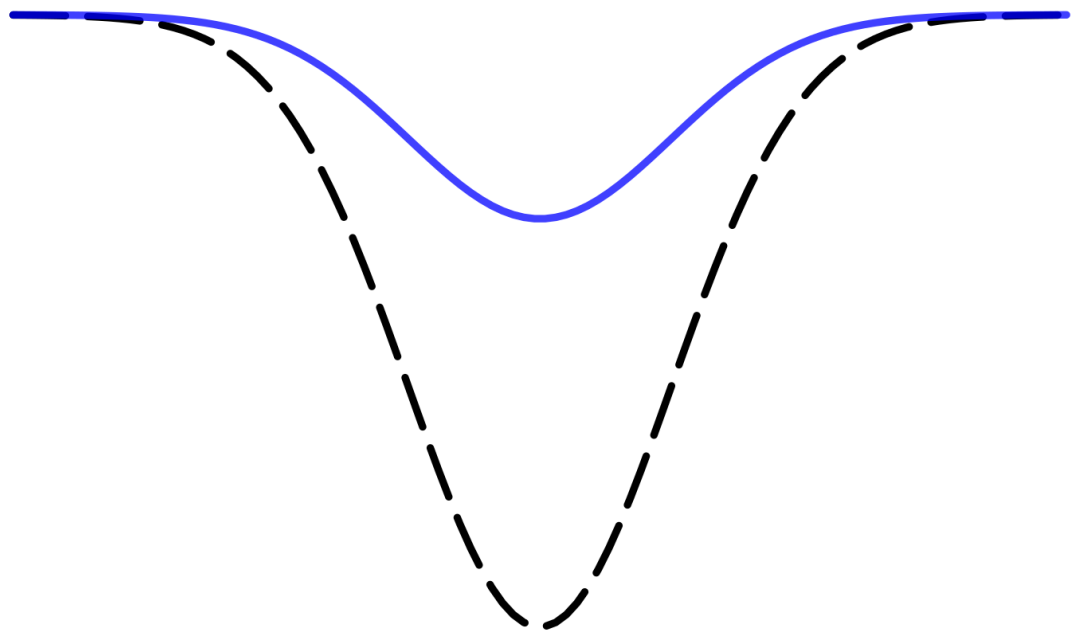
Figure adapted from Hunt, Politzer-Ahles, Gibson, Minai, & Fiorentino (2013)



Malins & Joanisse (2012)


250 ms
+
800-1200 ms
使
Syllable duration
500 ms
???
ERP onset

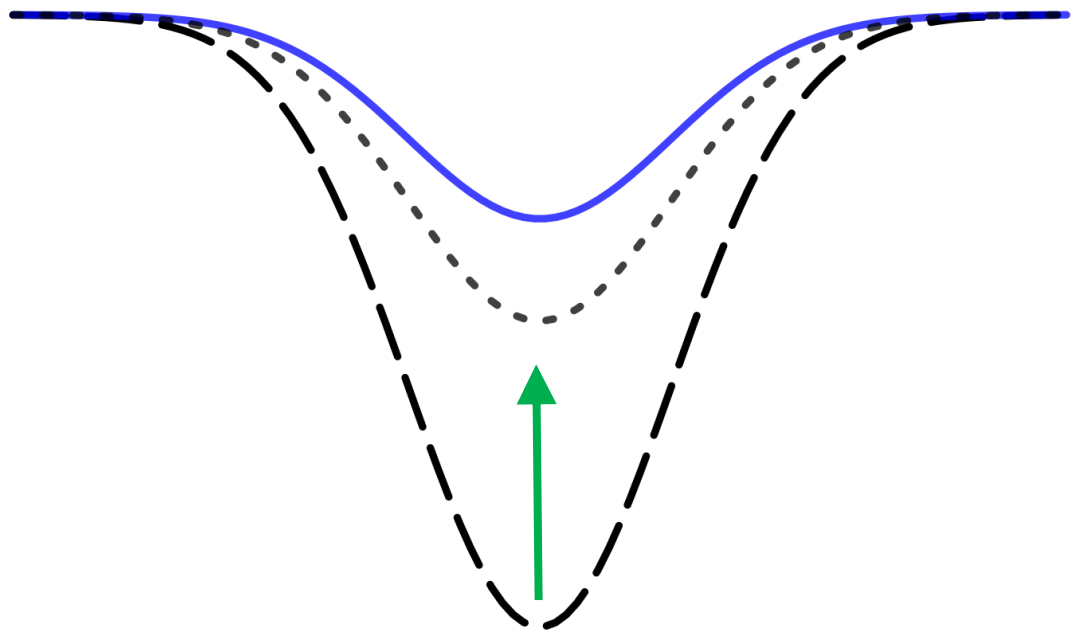
Hear *shi*^{R}



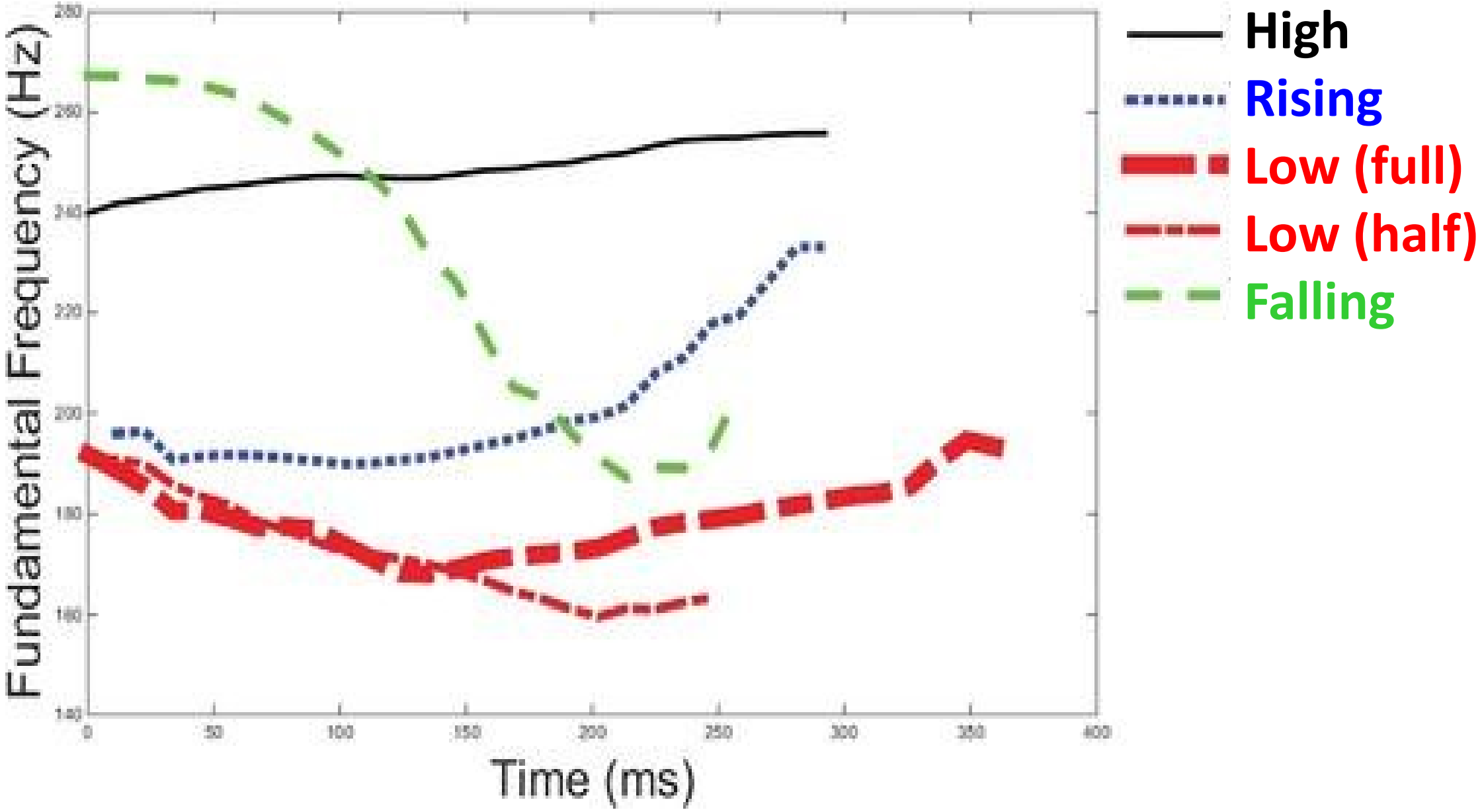
After expecting *shi*^{R}

After expecting *shi*^{H} or *shi*^{F}

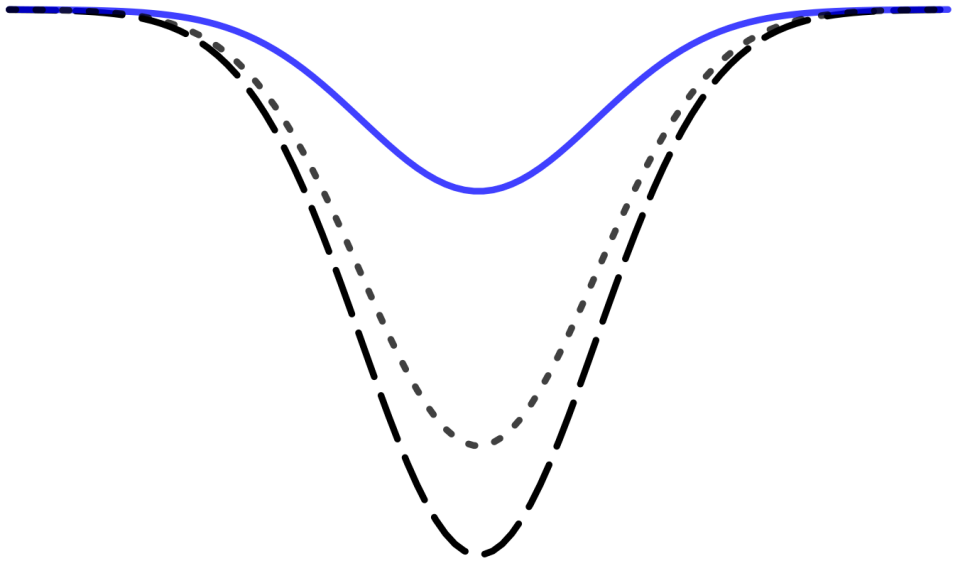
Hear *shi*^{R}



After expecting *shi*^{R}
After expecting *shi*^{L}
After expecting *shi*^{H} or *shi*^{F}

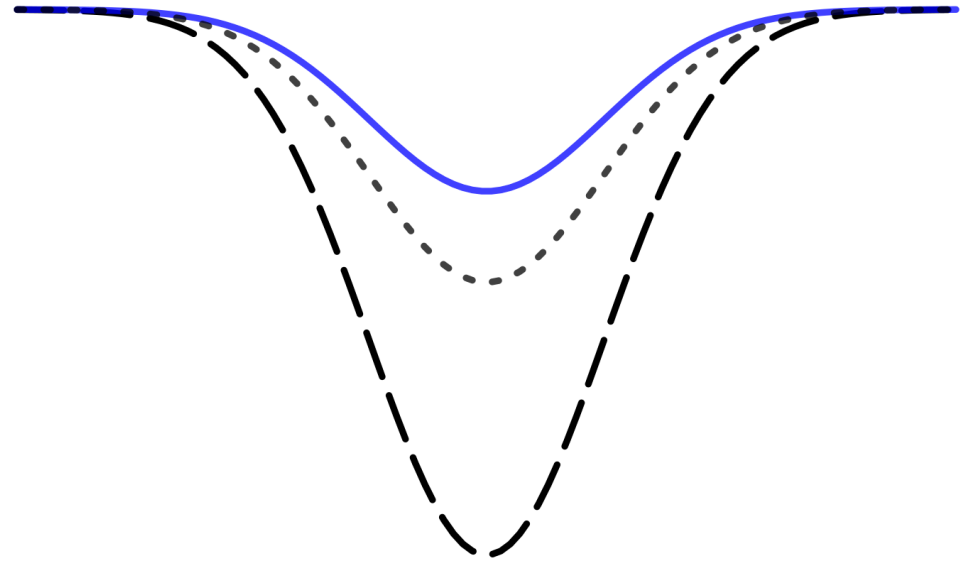

Fundamental Frequency (Hz)
280
260
240
220
200
180
160
140
0
50
100
150
200
250
300
350
400
Time (ms)
High
Rising
Low (full)
Low (half)
Falling

Hear *shi*^{L}



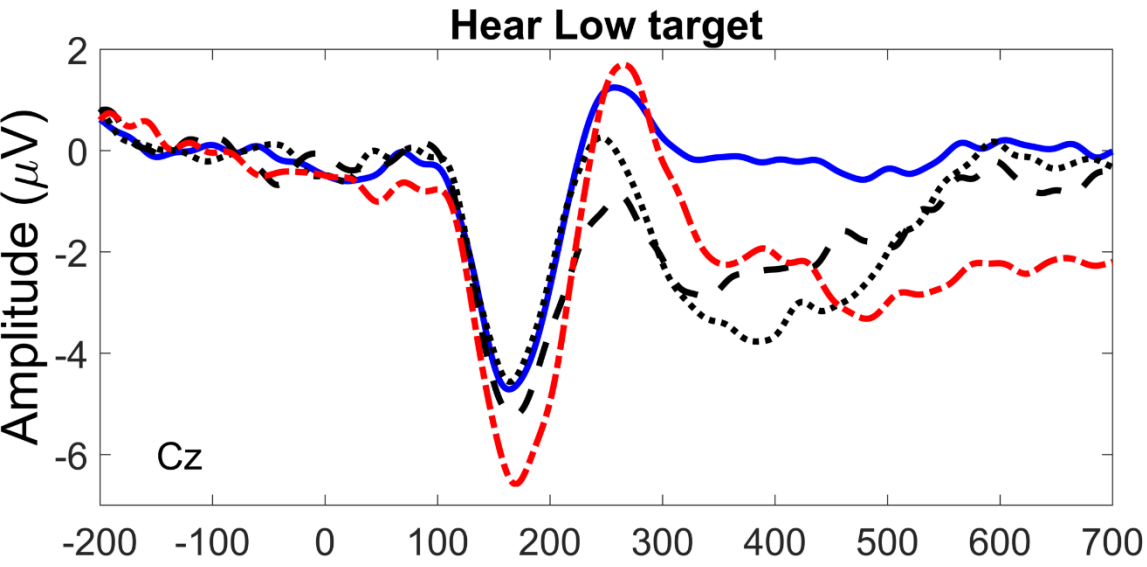
After expecting *shi*^{L}
After expecting *shi*^{R}
After expecting *shi*^{H} or *shi*^{F}

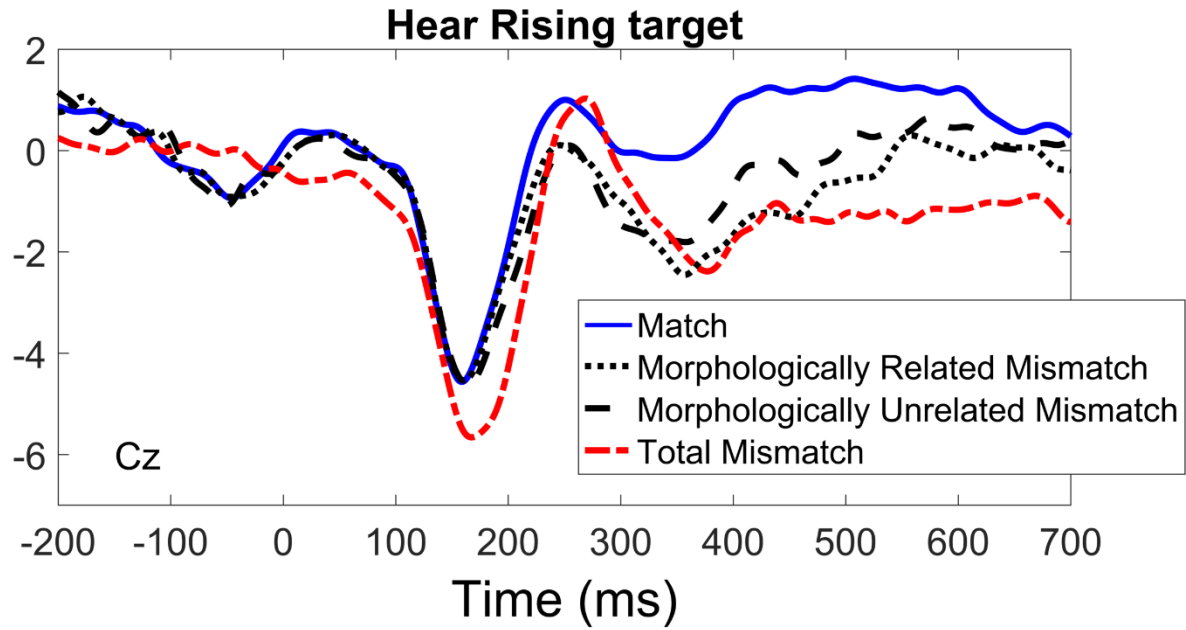
Hear *shi*^{R}



After expecting *shi*^{R}
After expecting *shi*^{L}
After expecting *shi*^{H} or *shi*^{F}

Results (*N*=80)

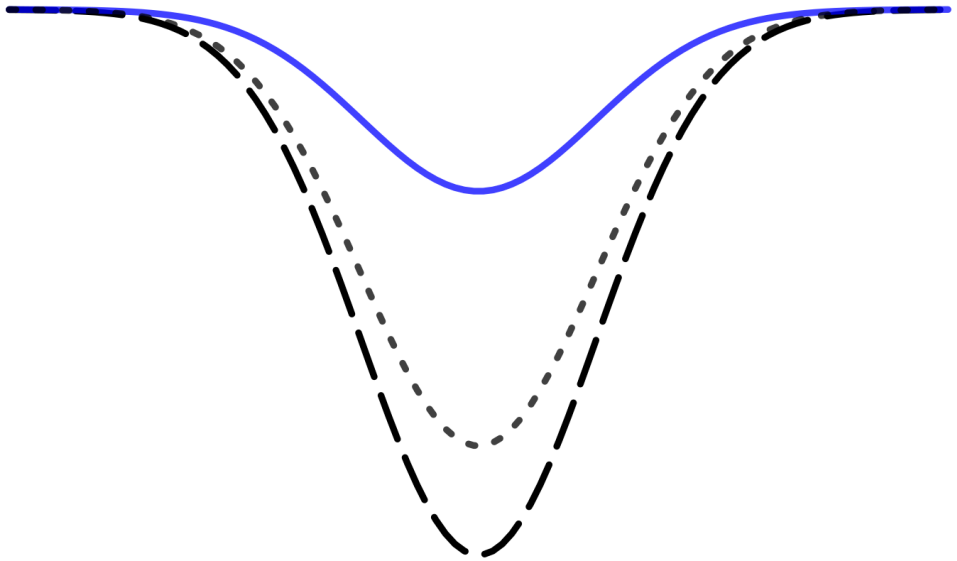

Hear Low target
Amplitude (μV)
2
0
-2
-4
-6
Cz
-200
-100
0
100
200
300
400
500
600
700


Hear Rising target
2
0
-2
-4
-6
Cz
Match
Morphologically Related Mismatch
Morphologically Unrelated Mismatch
Total Mismatch
-200
-100
0
100
200
300
400
500
600
700
Time (ms)

Third Tone Sandhi

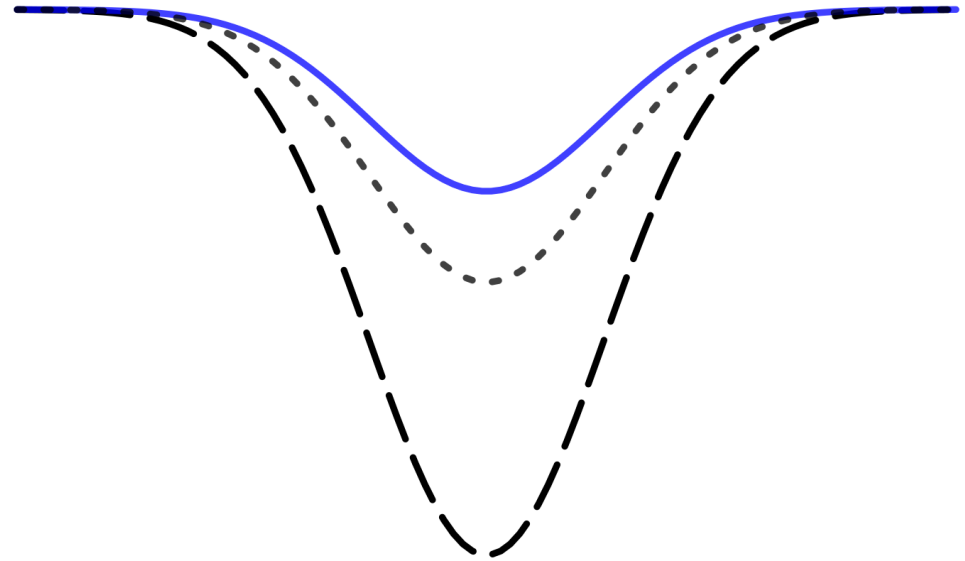
/ Low . Low / → [Rise . Low]

Hear *shi*^{L}



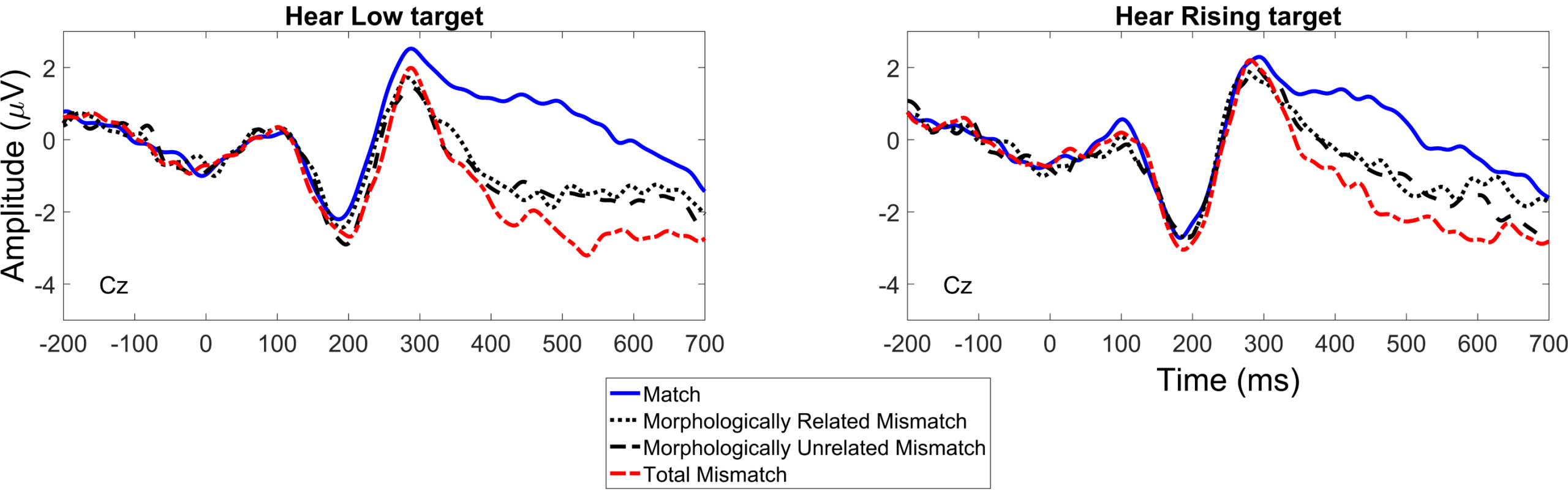
After expecting *shi*^{L}
After expecting *shi*^{R}
After expecting *shi*^{H} or *shi*^{F}

Hear *shi*^{R}



After expecting *shi*^{R}
After expecting *shi*^{L}
After expecting *shi*^{H} or *shi*^{F}

Preliminary results (*N*=66)



Thank you!

شكرا

多謝!