

# EFFECTS OF MUSICAL AND LANGUAGE BACKGROUND ON PITCH IMITATION ABILITY

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# Vocal Imitation

- “attempt to match the acoustic event with the vocal motor system” (Mercado, Mantell, & Pfordresher, 2014)
- Vocal imitation plays a critical role in:
  - Learning a language
  - Learning to sing a song
- Pitch imitation: important for both language and music
- Why are there individual differences?
  - Long-term experience with pitch in language and music

# Benefits of Long-term Experience

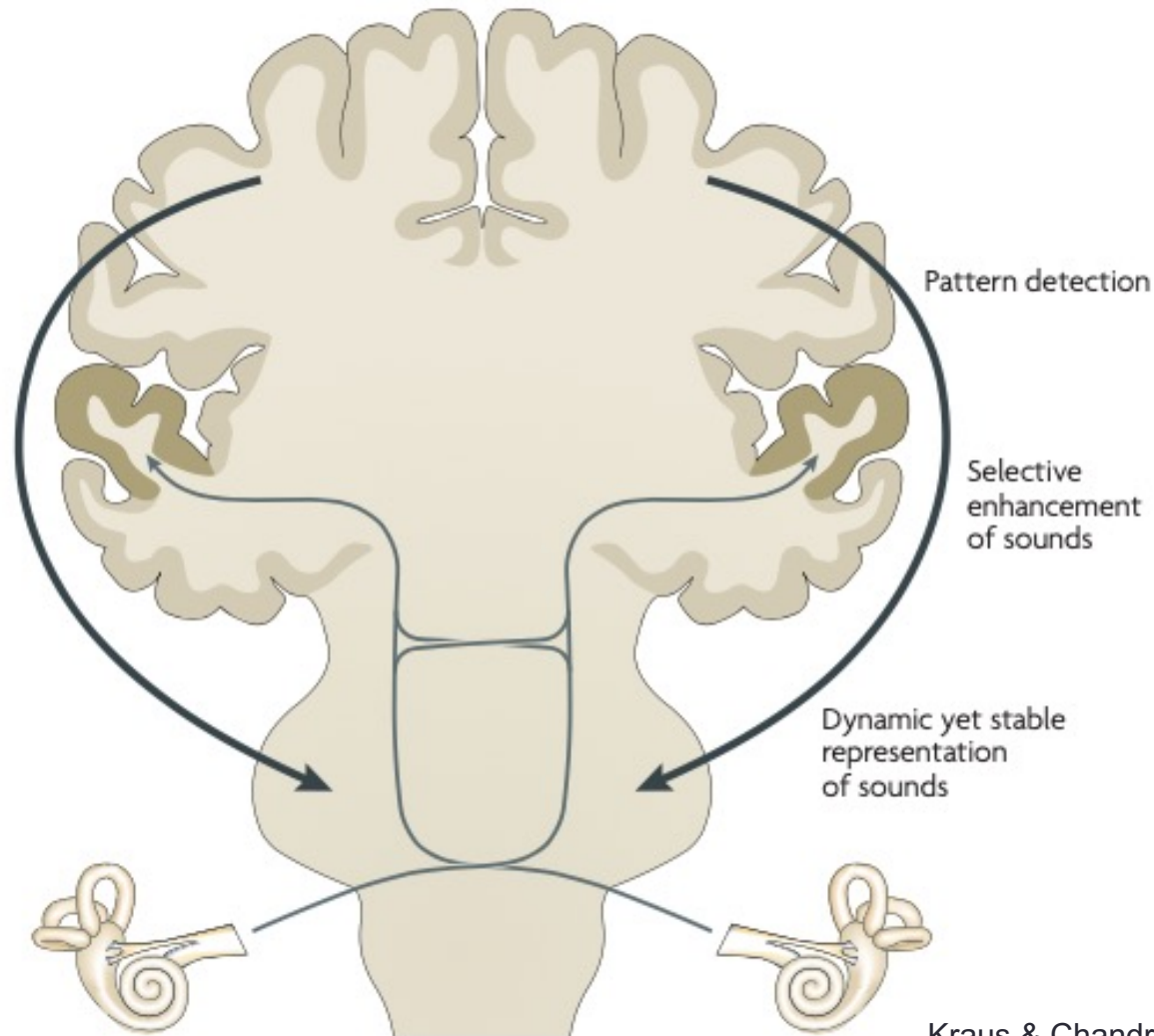
- **Musical Training:**

- OPERA hypothesis (Patel, 2011)
- Musicians exhibit enhancements in language abilities:
  - Sensitivity to Prosody (Thompson, Schellenberg, & Husain, 2004)
  - Lexical tone identification (Lee & Hung, 2008)

- **Tonal Language:**

- Tone language speakers show superior performance in music perception task (Bidelman, Hitka, & Moreno, 2013)
- Tone-language speakers are better at imitating musical pitch (Pfordresher & Brown, 2009)

# Top-down vs Bottom-up

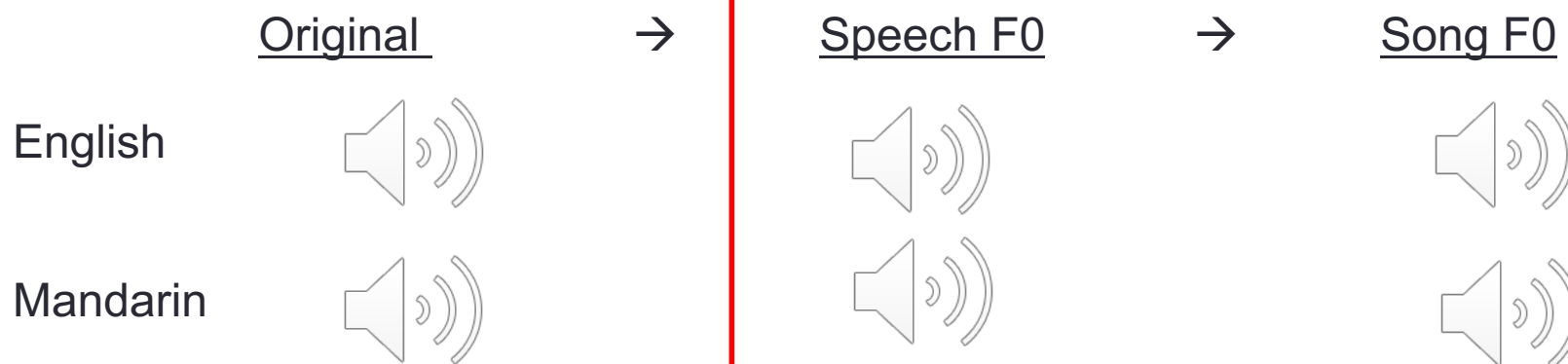


# Present Study: Method

## • Participants

	English Speaker	Mandarin Speaker	Total
Musician (+3 yrs of training)	21	23	<b>44</b>
Non-Musician (< 3 yrs of training)	30	52	<b>82</b>
<b>Total</b>	<b>51</b>	<b>75</b>	<b>126</b>

## • Stimuli

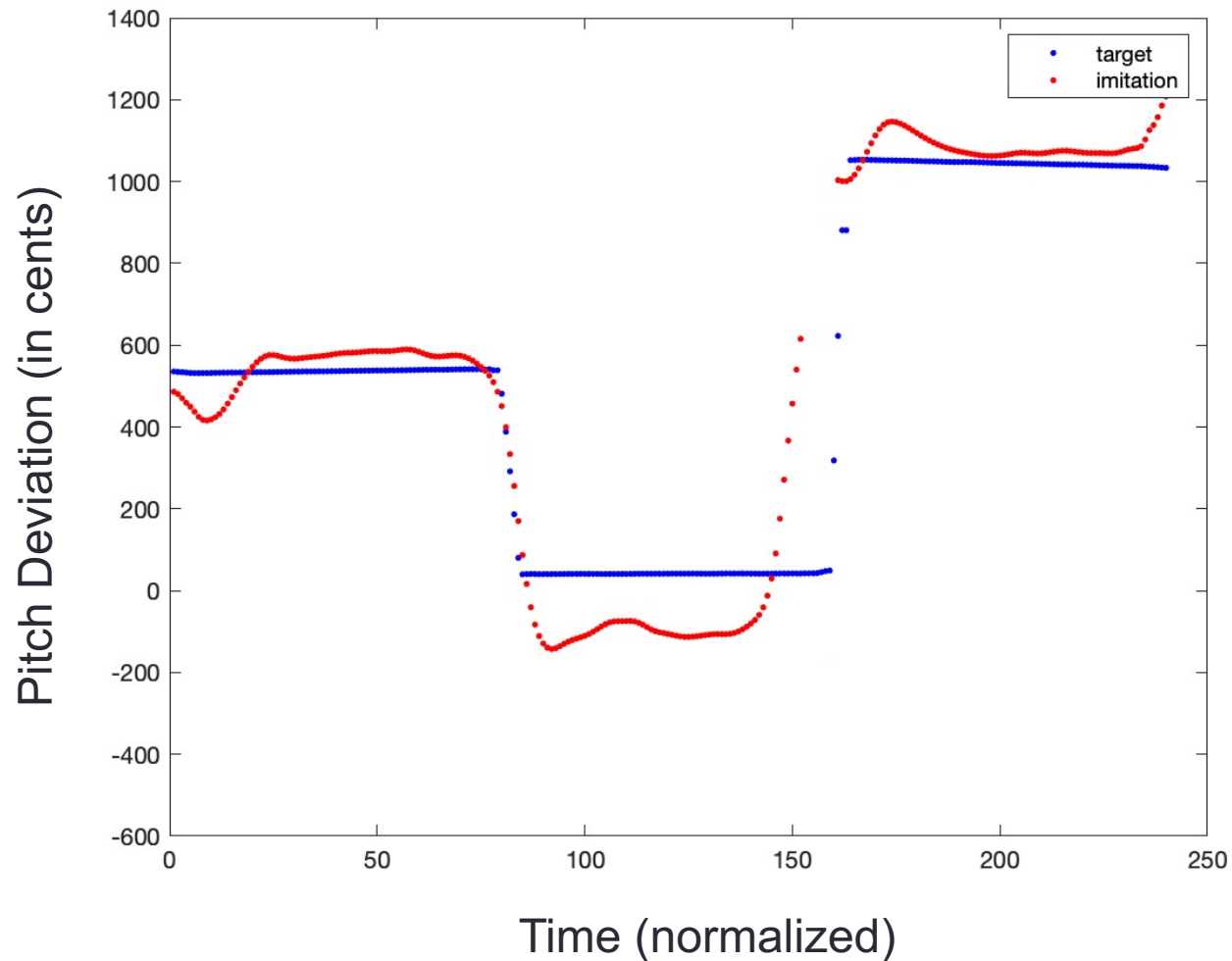


*Used in Experiment*

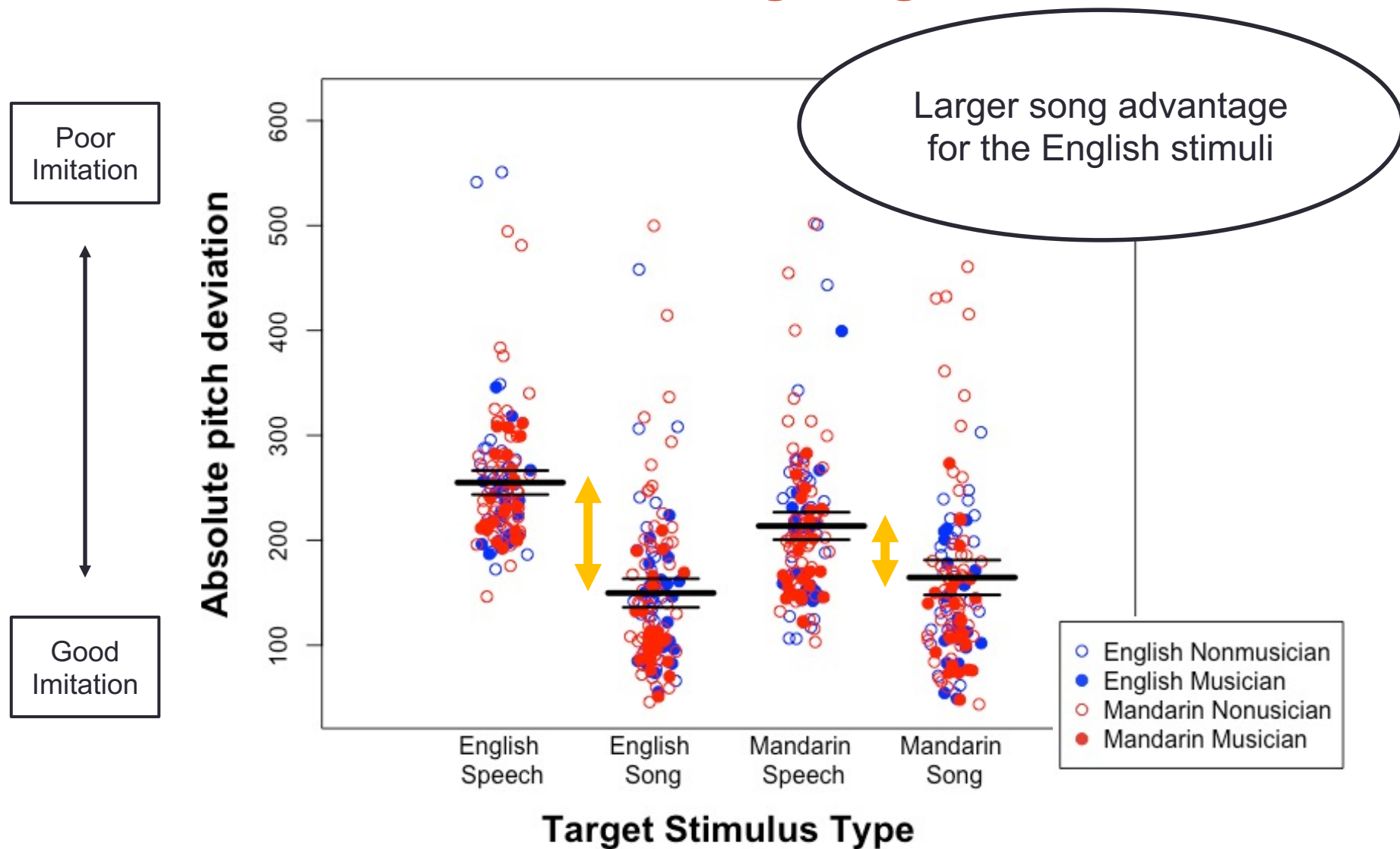
# Predictions

- 1) Better imitation for song than speech
  - Song advantage over speech (Mantell & Pfordresher, 2013)
  
- 2) Enhanced pitch imitation ability across domains based on long-term experience
  - Those with musical training and/or Mandarin speaking experience would show enhanced imitation ability in both music and language domains

# Pitch Deviation Analysis

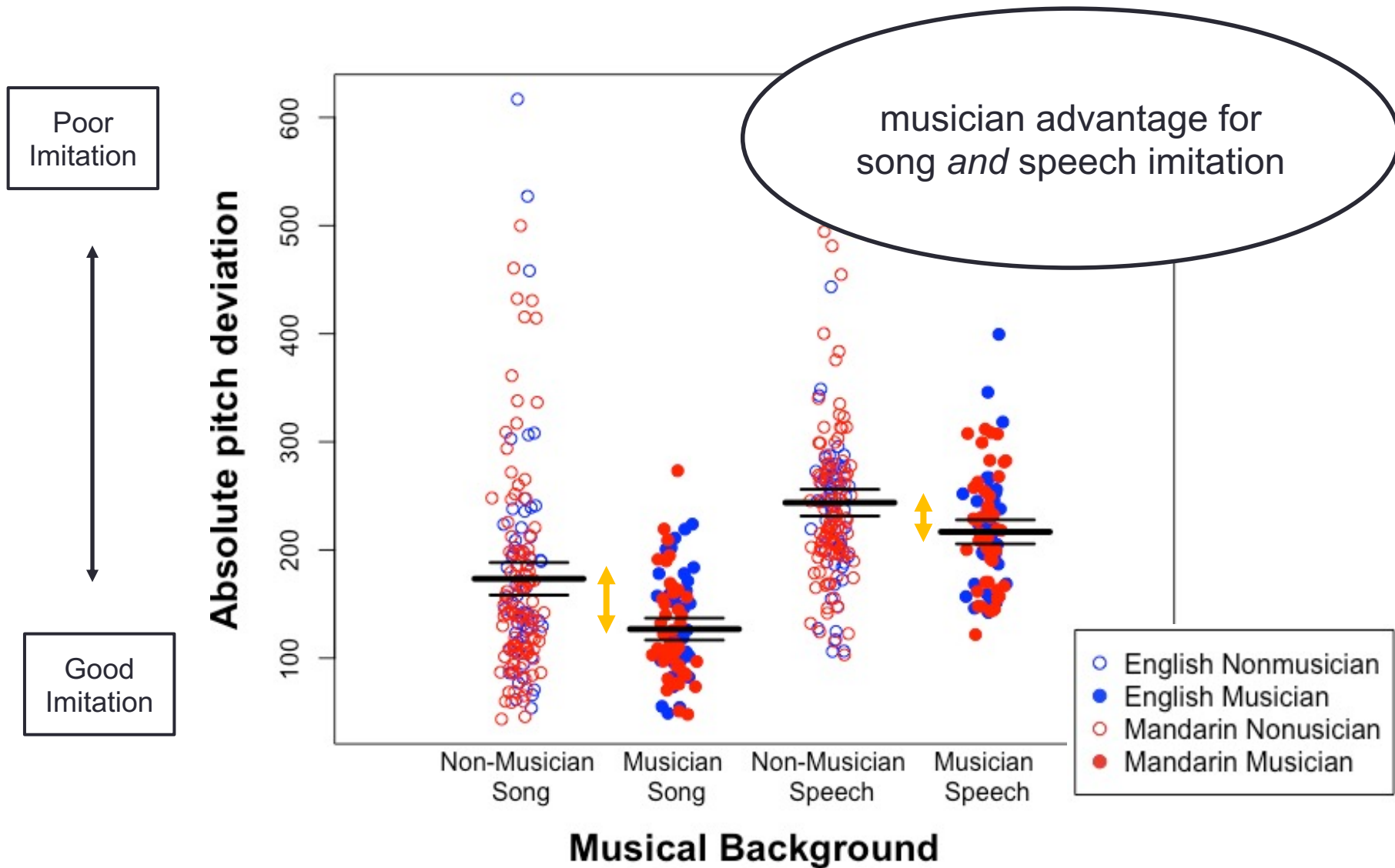


# Results: Stimulus language x domain

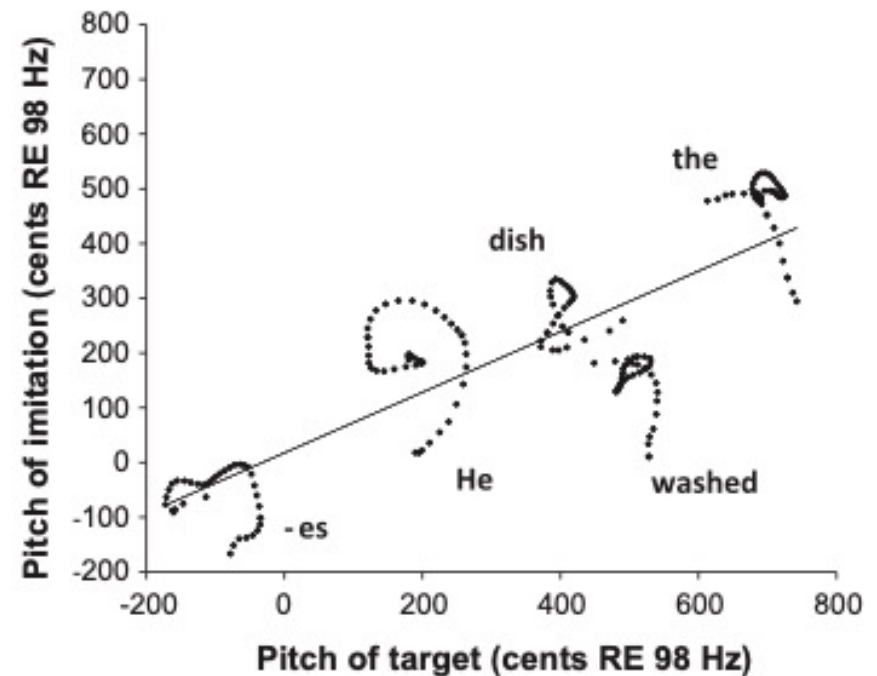
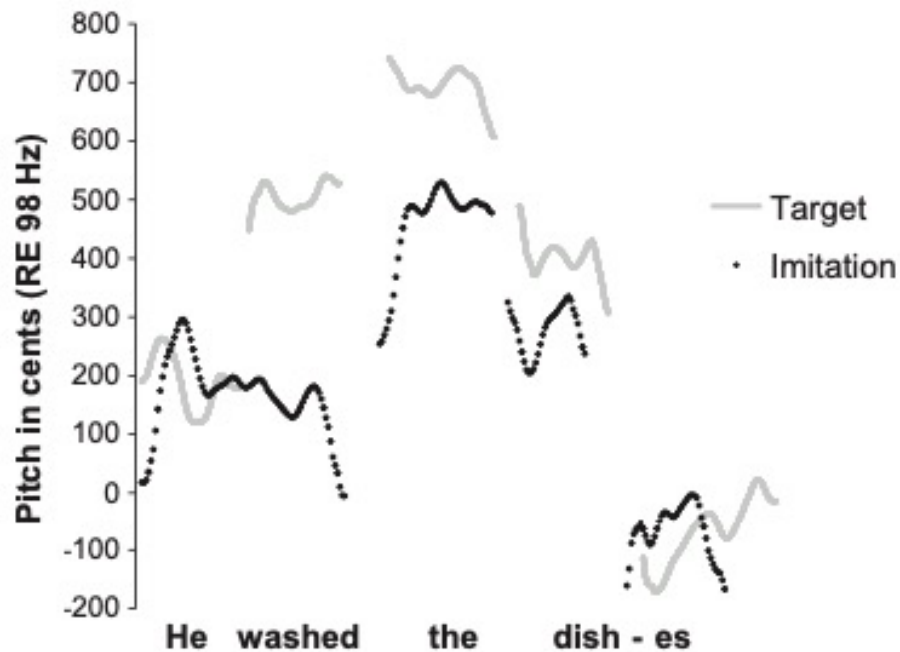




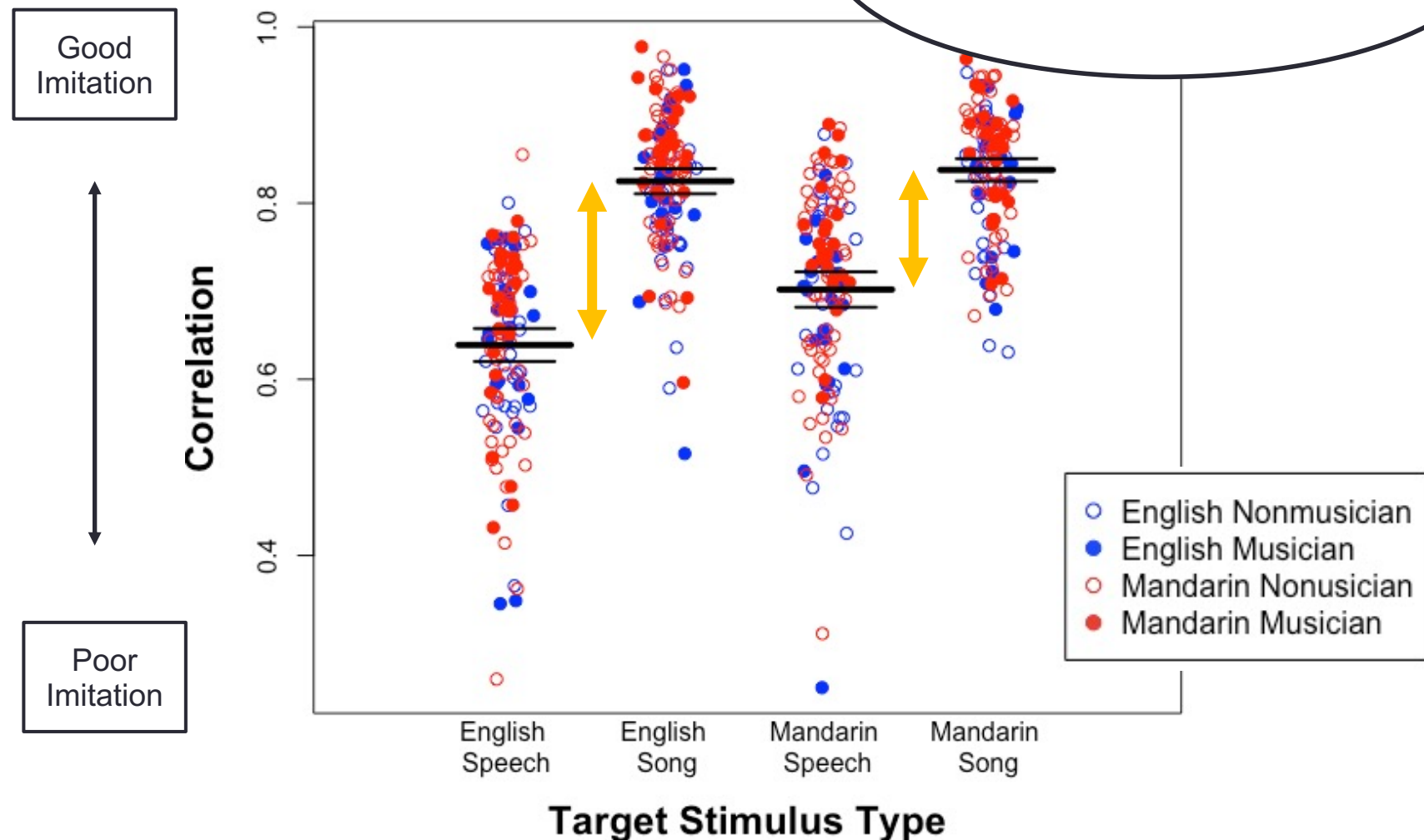
# Results: Musician vs Non-musician



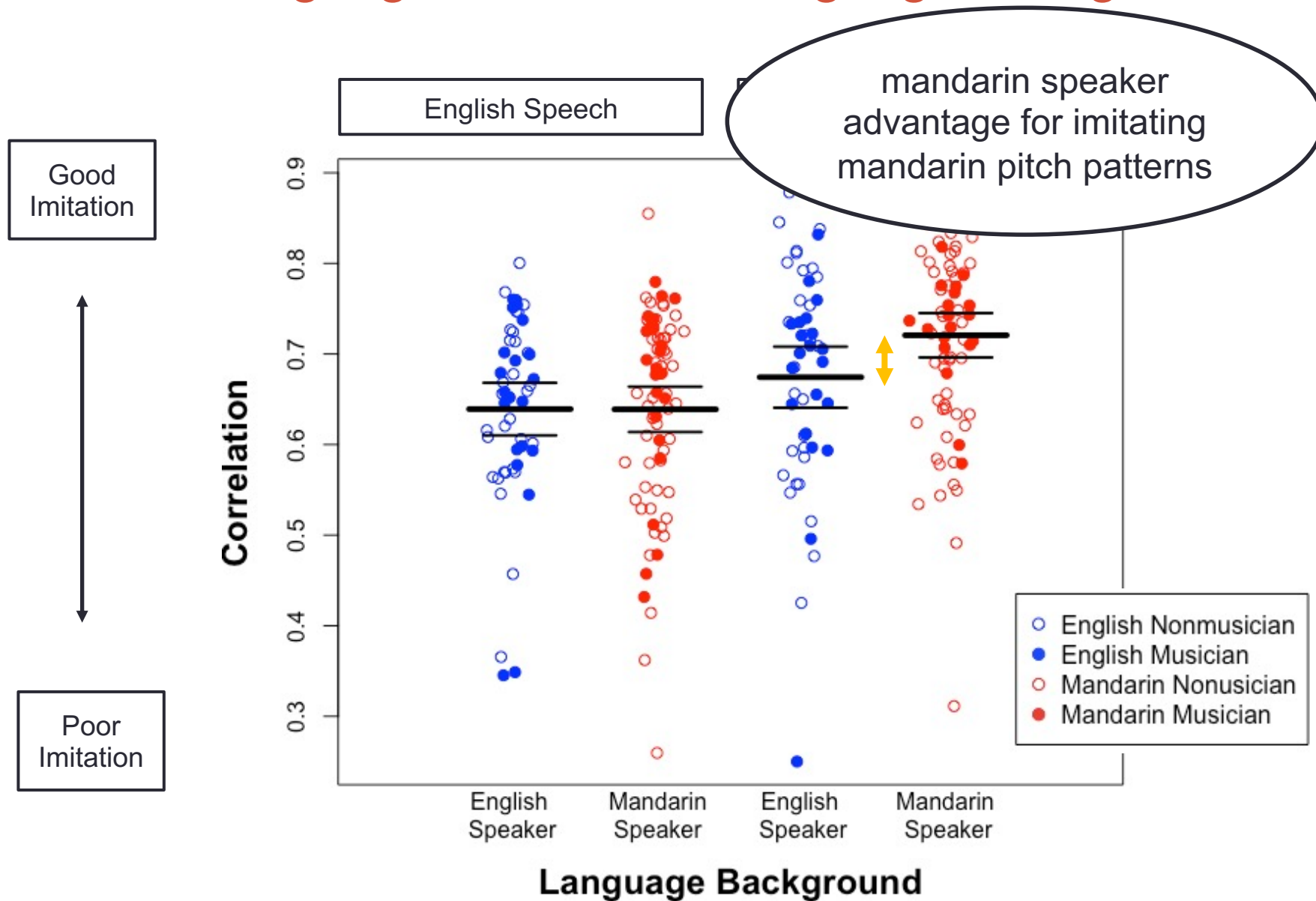
# Pitch Correlation Analysis



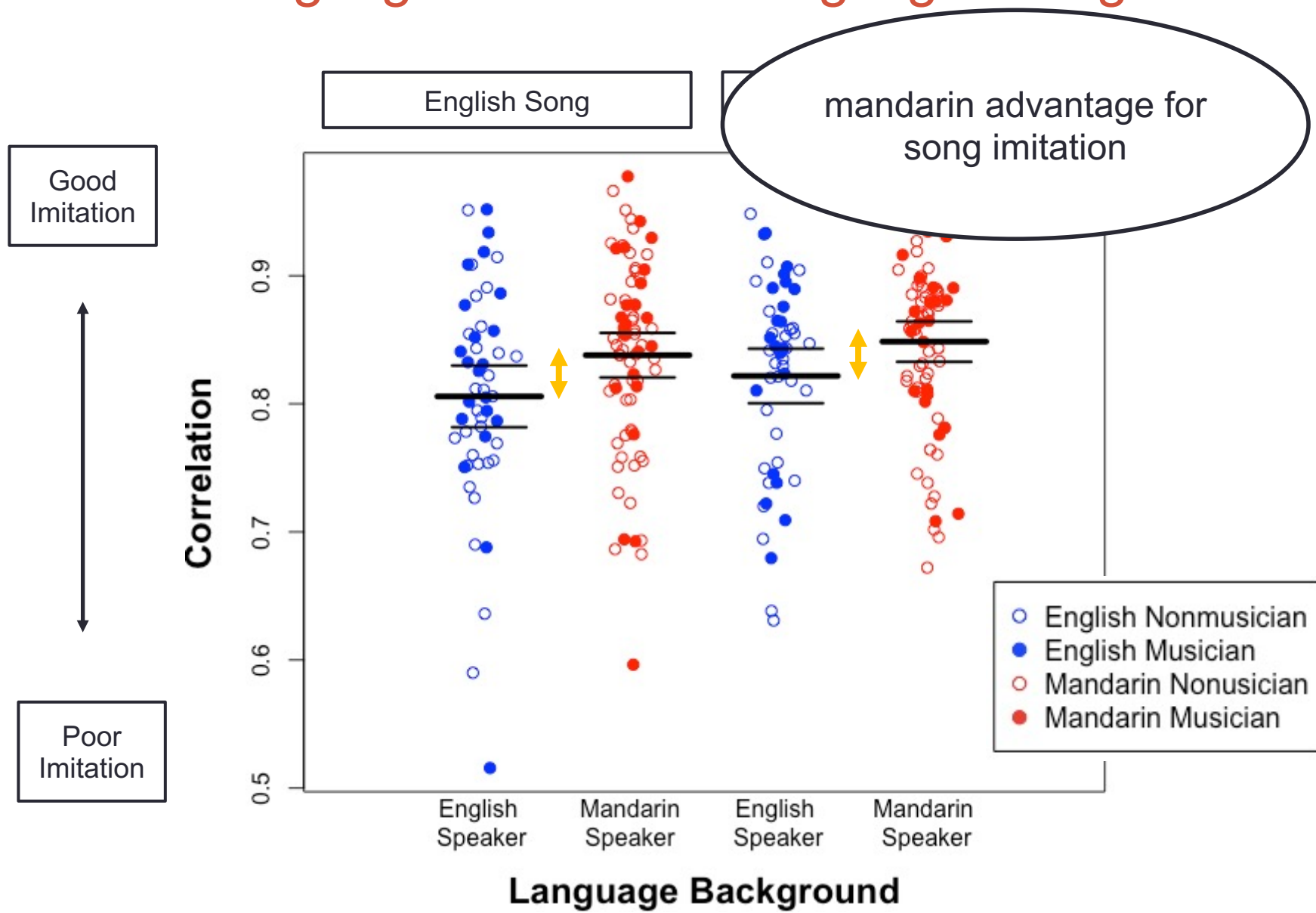
# Results: Stimulus language x domain



# Stimulus Language x Domain x Language Background



# Stimulus Language x Domain x Language Background



# Discussion

- 1) Imitation of song was more accurate than that of speech intonations.
  - Larger song advantage for English stimuli
  
- 2) Musicians performed matched exact pitch better than non-musicians in both song and speech imitation.
  - Musical training facilitates ability to match target pitch
  
- 3) Mandarin speakers imitated the pitch changes in Mandarin speech and in all song sequences better than English speakers.
  - Experience in speaking a tonal language facilitates the ability to imitate pitch changes.

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