

Summary

Listeners identify voices more accurately when they understand the language being spoken – a phenomenon known as the **language-familiarity effect** (LFE).
(Goggin et al, 1991; Perrachione & Wong, 2007)

Highly-proficient speakers of a foreign language persist in identifying voices more accurately in their native language than the second language.
(Perrachione & Wong, 2007; Bergman & Creel, 2014; Xie & Myers, 2015)

We assessed two hypotheses that might explain magnitude of the LFE among highly-proficient second-language speakers. That the LFE depends on:

- #1: How much listeners currently use the other language (**immersion**)
- #2: When listeners began learning the other language (**age of acquisition**)

We found that **degree of second-language immersion**, not age of acquisition, accounts for a reduction in the LFE among highly-proficient bilinguals.

Methods

A. Task design

Listen Practice Listen Practice Listen Practice Listen Practice Test

B. Passive listening (10 trials per block)

1 2 3 4 5 1 ...

C. Practice with feedback (10 trials per block)

1 2 3 4 5 Correct! 1 2 3 4 5 Incorrect: #4 1 2 3 4 5 Incorrect: #1 ...

D. Test without feedback (50 trials total)

1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 ...

Participants

- Adult native speakers of American English (N = 16)
- Adult native speakers of Mandarin (N = 30)
 - currently living and working in the United States

Stimuli

- Recordings of 10 English sentences spoken by female native American English speakers (N = 10) (IEEE, 1969)
- Recordings of 10 Mandarin sentences spoken by female native Mandarin speakers (N = 10) (Fu et al., 2011)

English Sentences

Type out three lists of orders.
The tiny girl took off her hat.
The harder he tried the less he got done.

Mandarin Sentences

今天的阳光真好
jīn tiān de yáng guāng zhēn hǎo
It's a nice sunny day.
晚上一块去跳舞
wǎn shàng yí kuài qù tiào wǔ
Let's go dancing together tonight.
这些衣服洗过吗
Zhè xiē yī fú xǐ guò ma
Are these clothes washed?

The language-familiarity effect in talker identification by bilinguals

Sara C. Dougherty & Tyler K. Perrachione

Department of Speech, Language, & Hearing Sciences, Boston University

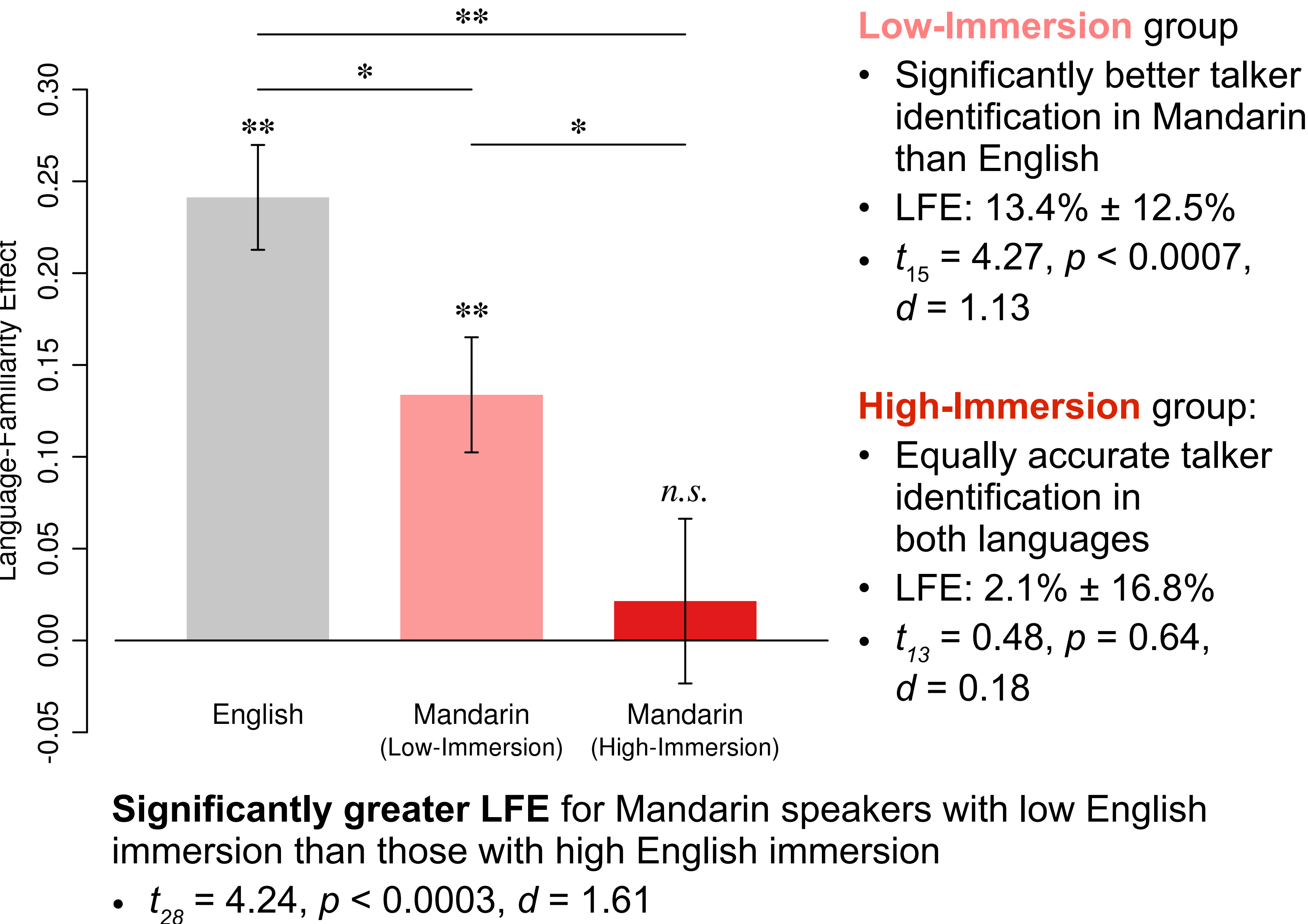


Results: Immersion

Based on participant responses to an extensive language background survey, the Mandarin-speaking participants were further divided into two groups:

- The **Low-Immersion Mandarin** group (N = 16), who reported **currently speaking Mandarin** the majority of the time in their daily lives.
- The **High-Immersion Mandarin** group (N = 14), who reported **currently speaking English** the majority of the time in their daily lives.

The magnitude of the LFE in talker identification by highly-proficient bilinguals is related to the extent to which these individuals currently use their native and second languages.



Results: Age of Acquisition

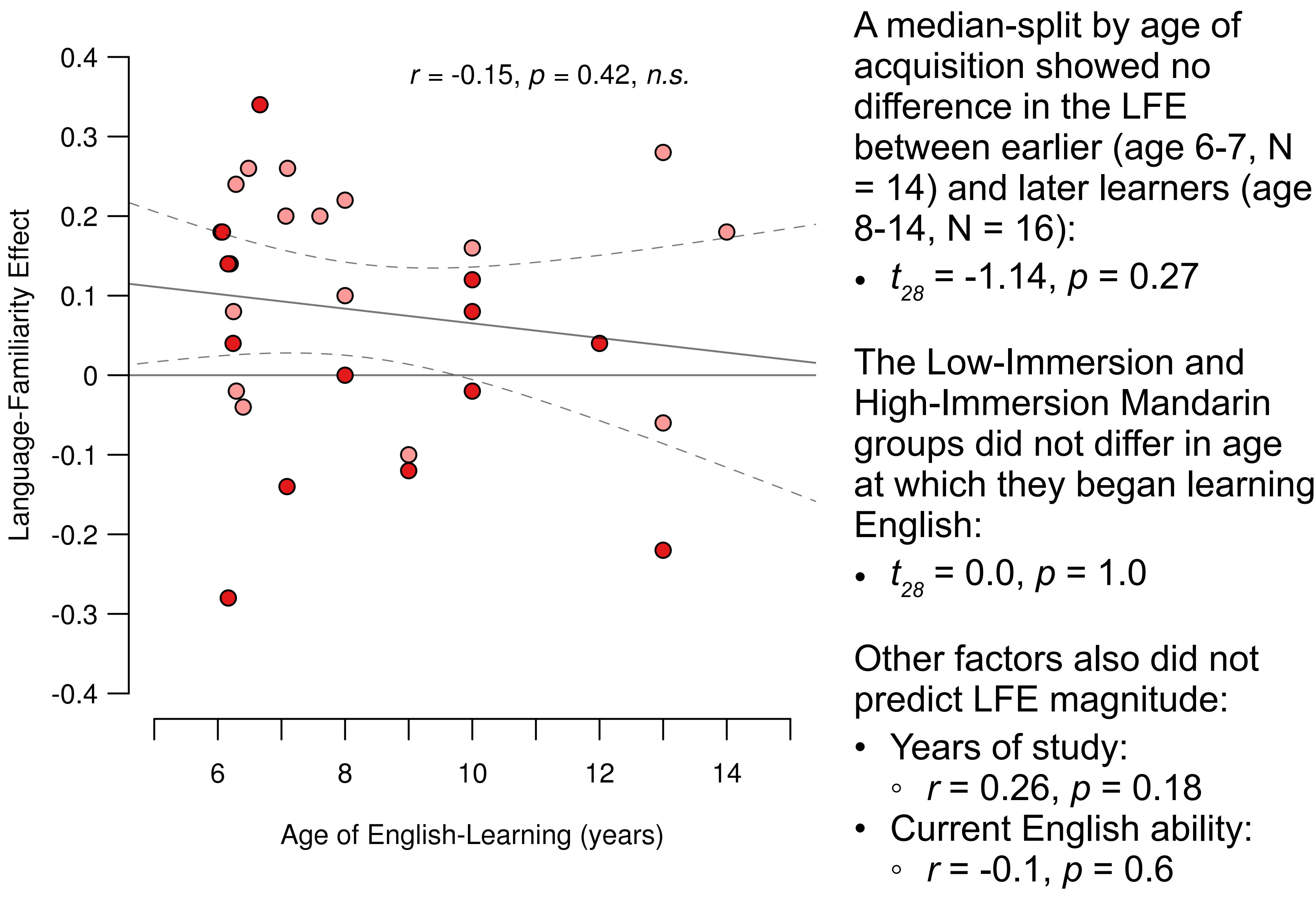
Previous reports have demonstrated that **early bilinguals** (who learned both languages before age 5) have a significantly reduced language-familiarity effect compared to **late bilinguals** (who learned one of their languages after age 5).
(Bregman & Creel, 2014)

All Mandarin-English bilinguals in this study began learning English after age 5

- Mean age of acquisition = 8.3 ± 2.6 years; range = 6-14 years old)

We found no significant relationship between age at which Mandarin speakers began learning English and the magnitude of their LFE.

- $r = -0.15, p = 0.42$



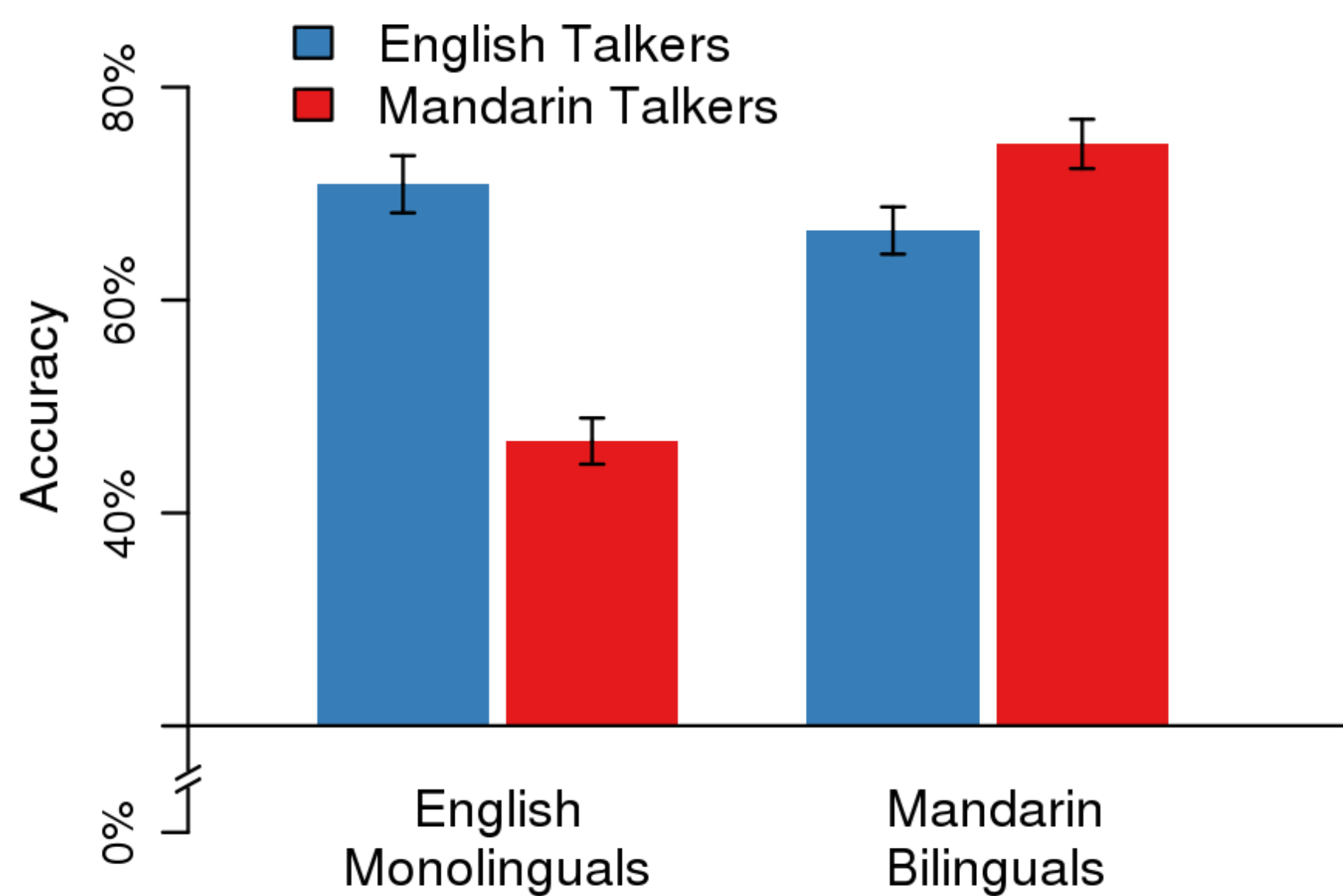
Results: Language-Familiarity Effect

Both groups exhibited the LFE:

- English monolinguals
 - $t_{15} = 8.45, p < 0.001$
- Mandarin-English bilinguals
 - $t_{29} = 2.88, p < 0.01$

Stronger LFE for monolinguals:

- English monolinguals:
 - $d = 2.55$; Mean $\Delta = 24.1\%$
- Mandarin-English bilinguals
 - $d = 0.67$; Mean $\Delta = 8.1\%$



Conclusions

Our findings are consistent with the original views of Goggin and colleagues (1991) and recent work of Orena and colleagues (2015) that the amount of experience that listeners have with a community of speakers is related to their ability to accurately identify voices from that community.

The persistence of a LFE in bilinguals is not only a function of their later acquisition (Bregman & Creel, 2014), but also varies with respect to the quality and quantity of bilinguals' second-language experiences.

These observations are consistent with the findings of Perrachione and Wong (2007), who showed that, with practice, the LFE could be trained away in Mandarin-English bilinguals, but not English monolinguals.

The ability of highly proficient bilinguals to accurately identify voices in their second language is a function of how immersed they are in real-world use of that language.

Even bilinguals who began learning their second language later in life may be able to overcome the LFE in talker identification with sufficient usage of the second language.

References

Bregman & Creel (2014). *Cognition*, 130, 85-95.
Fu, Zhu, & Wang (2011). *J. Acoust. Soc. Am.*, 129, 267-273.
Goggin et al. (1991). *Mem. Cogn.*, 19, 448-458.
IEEE (1969). *IEEE T. Acoust. Speech*, 17, 225-246.
Johnson et al. (2011). *Devel. Sci.*, 14, 1002-1011.
Orena, Theodore, & Polka (2015). *Cognition*, 143, 36-40.
Perrachione, Del Tufo, & Gabrieli (2011). *Science*, 333, 595.
Perrachione & Wong (2007). *Neuropsychologia*, 45, 1899-1910.
Xie & Myers (2015). *J. Acoust. Soc. Am.*, 137, 419-432.

Acknowledgments

We thank Terri Scott, Deirdre McLaughlin, and Ja Young Choi for their assistance. This project was supported by the NIDCD of the National Institutes of Health under award number R03DC014045.