

Effect of listeners' linguistic experience on generalization of adaptation

Dae-yong Lee¹ and Melissa Baese-Berk²

¹Hanyang Institute for Phonetics and Cognitive Sciences of Language, Hanyang University

²Department of Linguistics, University of Oregon

Listeners often have difficulty understanding non-native speech. While understanding non-native speech may initially be challenging for listeners, listeners may become better at understanding non-native speech after short training sessions (i.e., adaptation; [1,2]) and better understand a novel non-native speaker from the same language background (i.e., generalization; [2,3]). Most studies on generalization of adaptation focus on how speaker characteristics affect generalization of adaptation [1,4]. Studies that examine the effect of speaker characteristics on generalization of adaptation tend to control for listeners' linguistic experience by recruiting listeners who do not have extended linguistic experience with target languages [3,4].

However, listeners' linguistic experience with non-native speakers is likely to affect generalization of adaptation. Specifically, short training sessions in the lab facilitate adaptation to non-native speech [1,2,3] and generalization to a novel speaker [1,3]. Further, sleep between training sessions facilitates generalization of adaptation to a novel speaker [5]. These results suggest that extended linguistic experience with non-native speakers may affect generalization of adaptation. However, it is less understood how listeners' linguistic experience with non-native speakers affects generalization of adaptation.

Thus, the current study examines whether extended linguistic experience with non-native English speakers affects generalization of adaptation to a novel speaker. Specifically, the current study asks whether listeners' experience with non-native English speakers facilitates generalization and whether different types of experiences have different effects on generalization. With regards to the effect of linguistic experience with non-native English speakers on generalization, it is possible that linguistic experience facilitates generalization to a novel non-native speaker. That is, if short training sessions in the lab and sleep between training sessions help generalization, extended experience with non-native speakers may facilitate generalization. On the other hand, linguistic experience may disrupt generalization. Specifically, listeners who have a lifetime of experience with non-native speakers may have a less malleable representation of non-native speech than listeners who do not have linguistic experience with non-native speakers. With regards to the effect of types of linguistic experience with non-native English speakers, two outcomes are possible. It is possible that linguistic experience with multiple non-native accents is more helpful for generalization than experience with a single non-native accent. Previous studies suggest that exposure to multiple non-native English speakers helps listeners learn the common characteristics of non-native speech and facilitates generalization to a novel speaker [6]. Similarly, it is possible that extended linguistic experience with multiple non-native accents facilitates generalization. Another possibility is that exposure to a single non-native accent and multiple non-native accents have similar effects on generalization of adaptation. That is, extended experience with a single non-native accent may provide enough variability to learn the characteristics of non-native speakers.

75 native English speakers between 18 and 40 years old participated in this study. Participants completed a language experience questionnaire to determine the participants' linguistic experience. Based on the participants' linguistic experience, participants were assigned to one of three linguistic experience conditions: 1) Multiple-accent Exposure, 2) Single-accent Exposure, and 3) No Exposure conditions. Participants were assigned to Multiple-accent Exposure condition if participants had frequent interaction with family members that were non-native English speakers and with non-native English speakers in elementary and high school. Participants were assigned to the Single-accent Exposure condition if participants interacted frequently with family members that were non-native English speakers (i.e., Spanish learners of English) and did not frequently interact with non-native

English speakers other than Spanish learners of English in elementary and high school. Participants were assigned to the No Exposure condition if participants did not have family members that were non-native English speakers, had limited or no interaction with non-native English speakers in elementary and high school, and did not have frequent interaction with non-native English speakers over the past year. Participants in the three conditions were asked to listen to English sentences read by Korean learners of English and transcribe what they heard (i.e., intelligibility task). The task consisted of a training session and a post-test. Participants' performance (i.e., percent correct) in the training session and post-test was scored to measure adaptation to non-native English speakers and generalization to a novel non-native English speaker, respectively.

Figure 1 shows participants' performance in the training session of the intelligibility task. As shown in Figure 1, participants in the No Exposure, Single-accent Exposure, and Multiple-accent Exposure conditions show improvements in intelligibility across the training session, suggesting that participants adapted to the non-native English speakers in the training session. Figure 2 shows participants' performance in the post-test of the intelligibility task. As shown in Figure 2, participants in the Single-accent Exposure (box in the middle) and Multiple-accent Exposure (box on the right) conditions as a group demonstrate lower intelligibility scores than participants in the No Exposure condition (box on the left). Further, participants in the Single-accent Exposure and Multiple-accent Exposure conditions demonstrate similar intelligibility scores. These results suggest that extended experience with non-native English speakers may disrupt generalization to a novel non-native English speaker and extended linguistic experience may be harmful for generalization regardless of the type of linguistic experience. Specifically, listeners' representation of non-native speakers may be less malleable for listeners who have extended linguistic experience with non-native English speakers than listeners who have limited experience with non-native English speakers.

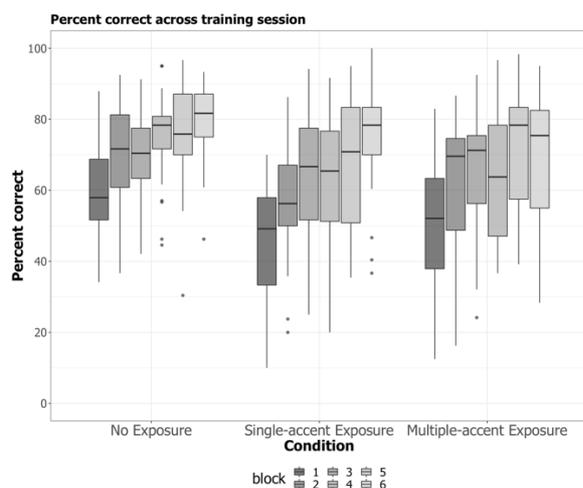


Figure 1. Box plot showing the percent correct on the training session of the intelligibility task as a function of condition and block.

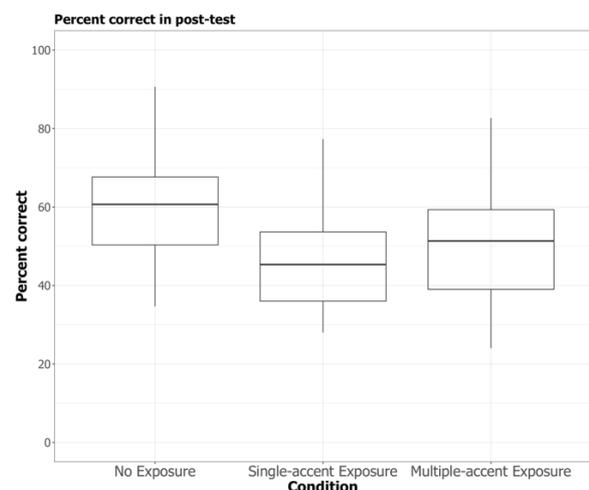


Figure 2. Box plot showing the percent correct on the post-test of the intelligibility task as a function of condition.

References

- [1] Bradlow, A. R., & Bent, T. (2008). Perceptual adaptation to non-native speech. *Cognition*, 106(2), 707–729.
- [2] Clarke, C. M., & Garrett, M. F. (2004). Rapid adaptation to foreign-accented English. *The Journal of the Acoustical Society of America*, 116(6), 3647–3658.
- [3] Sidaras, S. K., Alexander, J. E., & Nygaard, L. C. (2009). Perceptual learning of systematic variation in Spanish-accented speech. *The Journal of the Acoustical Society of America*, 125(5), 3306–3316.
- [4] Baese-Berk, M. M., Bradlow, A. R., & Wright, B. A. (2013). Accent-independent adaptation to foreign accented speech. *The Journal of the Acoustical Society of America*, 133(3), EL174–EL180.
- [5] Xie, X., Earle, F. S., & Myers, E. B. (2018). Sleep facilitates generalisation of accent adaptation to a new talker. *Language, Cognition and Neuroscience*, 33(2), 196–210.
- [6] Laturus, R. (2020). Comparative Acoustic Analyses of L2 English: The Search for Systematic Variation. *Phonetica*, 77(6), 441–479.