

The effect of foreign bias on processing L2 English speech

Thomas St. Pierre & Jean-Pierre Koenig (University at Buffalo)

tastpier@buffalo.edu

The increased difficulty of processing accented speech influences language attitudes, with increased difficulty leading to more negative attitudes towards speakers (Dragojevic & Giles, 2016; Lev-Ari & Keysar, 2010). This experiment investigated the converse, namely whether negative associations towards foreigners affect language processing, specifically the learning of incorrect labels by an L2 speaker (e.g., calling a crayon 'marker').

Forty-seven participants were recruited in four towns in Northern Maine (less than 2000 inhabitants total), which are almost 100% white with minimal contact with L2 speakers of English. Each participant completed two tasks, a mouse-tracking task measuring sensitivity to incorrect labels from an L2 speaker of English (L1 Arabic), and an Implicit Association Test (IAT) measuring the degree to which participants associate negative words with foreign names.

In the mouse-tracking task, participants were asked to click on one of two pictures (e.g., 'marble') on a computer screen while their mouse trajectory was tracked (see Figure 1). In the NoError condition, the non-target picture on the screen (e.g., a crayon) did not phonologically overlap with the target noun (*marble*), so participants were expected to quickly locate the target object. In the Error condition, participants previously heard the crayon mislabeled (**marker*); this crucially overlapped phonologically with the target noun. If participants had learned the incorrect label, there would be more difficulty locating the target noun compared to the NoError condition.

In the IAT, participants were asked to categorize names, either stereotypically foreign (e.g., Muhammad) or American (e.g., John), as well as positive/negative valence words (e.g. happiness/agonny). In one critical block, the same button was used to categorize foreign names and positive words, and then reversed in another critical block (foreign names were paired with negative words). The difference in mean response times, represented as a D score (as outlined in Greenwald et al., 2003), was calculated for each participant. Participants below the median IAT score (0.949) were categorized as 'less biased', and those above the median as 'more biased.'

Overall listeners learned incorrect labels and treated them as phonological competitors. First, listeners clicked on the incorrect picture significantly more often in the Error condition compared to the NoError condition ($\beta = 6.15$, $SE = 2.19$, $p < .01$), suggesting that they had learned the incorrect label and were sometimes confusing it with the target (Figure 2). In addition, participants on average deviated significantly farther from the direct path to the target in the Error vs. the NoError condition ($\beta = -92.95$, $SE = 40.45$, $t = -2.30$), suggesting that participants were more attracted to the non-target object when it had been previously labelled (incorrectly) with a term phonologically overlapping with the target noun (Figure 3).

Crucially, implicit bias scores also influenced participants' mouse movements towards the non-target object (Figure 4), as the 3-way interaction between Error, IAT score, and Block order suggests ($\beta = -143$, $SE = 68$, $t = -2.11$). Those in the less biased group (below median score) showed an increase in competition between the target and incorrectly labeled competitor as the experiment progressed, and a decrease when the non-target objects were labelled correctly, while those in the more biased group showed no change across blocks.

This result suggests that less biased participants became overall more attuned to the speaker's speech over time, becoming increasingly more sensitive to non-native ambiguities (in the Error condition), and better able to disambiguate in cases where there was no phonological overlap (in the NoError condition). No such change in performance was seen in the more biased group, suggesting that listeners' attitudes towards foreigners play a role in how cooperative they are in interactions with foreigners, i.e., how much they adapt to the speaker.



Figure 1: An example experimental array. Starting with the cursor in the bottom center of the screen, listeners heard a target word (e.g., “marble”) after previously hearing the other object called “crayon” or “marker,” and had to click on the target as fast as possible while still being accurate.

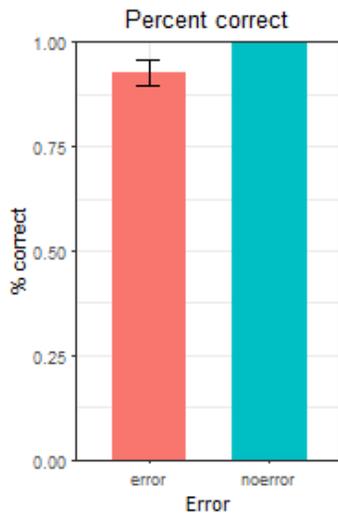


Figure 2: Percentage of correct responses in Error and No Error conditions

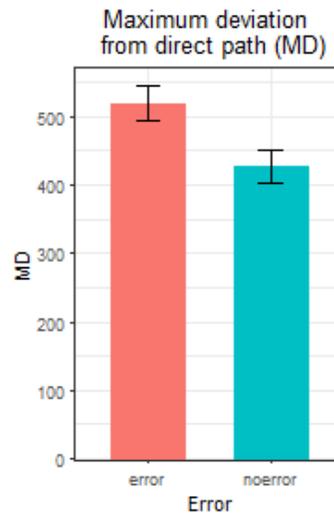


Figure 3: The maximum distance (MD) between the actual mouse trajectory compared to the direct path to target (a straight line from starting point to the target picture)

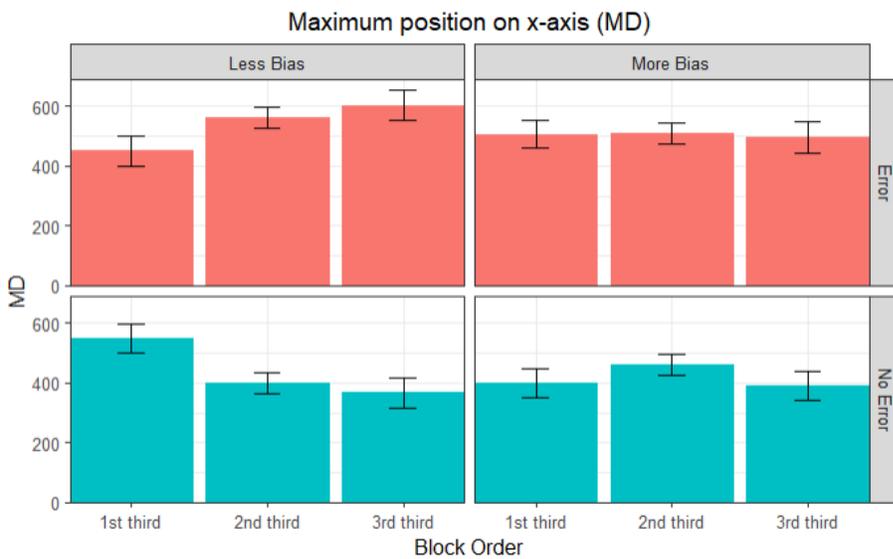


Figure 4: The maximum distance from direct path by IAT score and block order in experiment

Dragojevic, M., & Giles, H. (2016). I don't like you because you're hard to understand: The role of processing fluency in the language attitudes process. *Human Communication Research* 42(3), 396-420.

Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the implicit association test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology* 85(2), 197-216.

Lev-Ari, S., & Keysar, B. (2010). Why don't we believe non-native speakers? The influence of accent on credibility. *Journal of Experimental Social Psychology* 46, 1093-1096.