



EFFECT OF SINGING VOICE ON LEARNING A NOVEL LANGUAGE

Henrietta Lempert, JuHee Lim, Jing Ye, Sean Xu, and Raghavan Aruthavarajah
University of Toronto

RESEARCH QUESTION

Singing and speaking share neural networks and a common means of sound production. It has even been claimed that speech evolved from song. But can one acquire the grammar of an unfamiliar language through song?

BACKGROUND

Although it has often been claimed that songs can enhance second language (L2) proficiency in adult learners, empirical support for these claims is limited. However, a study by Schon, Boyer, Moreno, et al. (2008) raises the possibility that songs could facilitate acquisition of L2 word order and inflections. They presented native French speakers with a continuous stream of six trisyllabic words (e.g., *mimosi, sysipi, pogysi*) without any acoustic cues to mark the boundaries between words. Learners were able to extract the words from sung sequences but not from spoken sequences.

We use a novel language to examine whether a consistent mapping of linguistic and musical information enhances learning the rules of the language as compared to spoken sentence. The language comes in two versions, a Prefix dialect and a Suffix dialect. In the Prefix dialect, the words are preceded by the prefixes *-ie* or *-o* (e.g., *ohift ievab*); in the Suffix dialect, the words are followed by the suffixes *-ie* or *-o* (e.g., *hifto vabie*).

Participants hear spoken or sung exemplars and are tested for rule-learning with spoken instances of legal vs illegal sentences.

THE RULES OF THE LANGUAGE

Rule 1. Each sentence must contain one *-ie* word (e.g. *iekicey, kiceyie*) and one *-o* word (e.g. *oghop, ghopo*).

Oghop iekicey and *Ghopo kiceyie* are OK (legal); **Oghop oerd* and **Ghopo erdo* are NOT ok (illegal).

Rule 2. The prefix *ie-* and suffix *-ie* cannot occur with an *o*-word; the prefix *o-* and suffix *-o* cannot combine with an *-ie* word.

**Ieghop okicey* and **Ghopie kiceyo* are NOT ok (illegal).

Rule 3. Sentences cannot begin with the words *puser* or *wadim* ("A-words").

Ohift wadim ie tisol, Hifto wadim tisolie; Tisolie hifto puser (all legal)

**Puser oskig ietisolie; *Puser skigo tisolie* (illegal)

Rule 4. An A-word (*puser, wadim*) can only occur after an *-o* word.

**Ohift ietisol wadim; *Hifto tisolie wadim; *Tisolie puser erdo* (illegal).

METHOD

Participants

Introductory psychology students who acquired English by age 5 (57 females, 29 males). Randomly assigned to the Prefix or Suffix Dialect and within dialect, to a singing or speaking condition

Materials and Procedures

- Three study/test blocks; in each block, the same 24 study sentences occur in different order in each block.

- Study Trials.** Participants hear sentences recorded in a female voice at a 10-sec inter-item rate and **repeat each sentence out loud** (overt repetition). In the singing condition, the melodic contour was a redundant cue to the relation between words and the markers: O-words and A-words were grouped by being sung as E3,F3 and/or G3; ie-words were sung as E2, or down a tone, as F2 to G2 (see Figure 1).

FIGURE 1. SINGING CONDITION

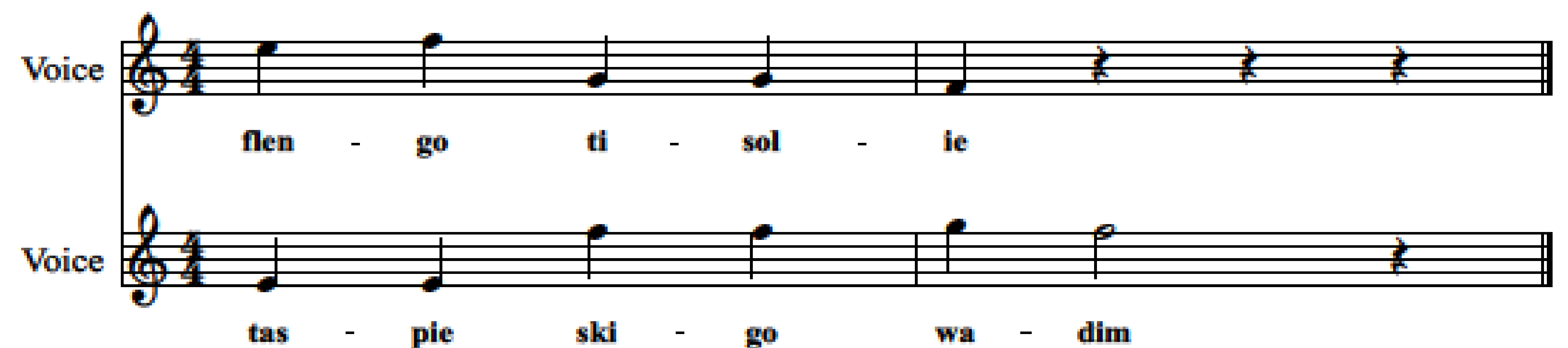
Prefix Song



Suffix Song

Henrietta Lempert

Wendy Xin, Michal Chwalek

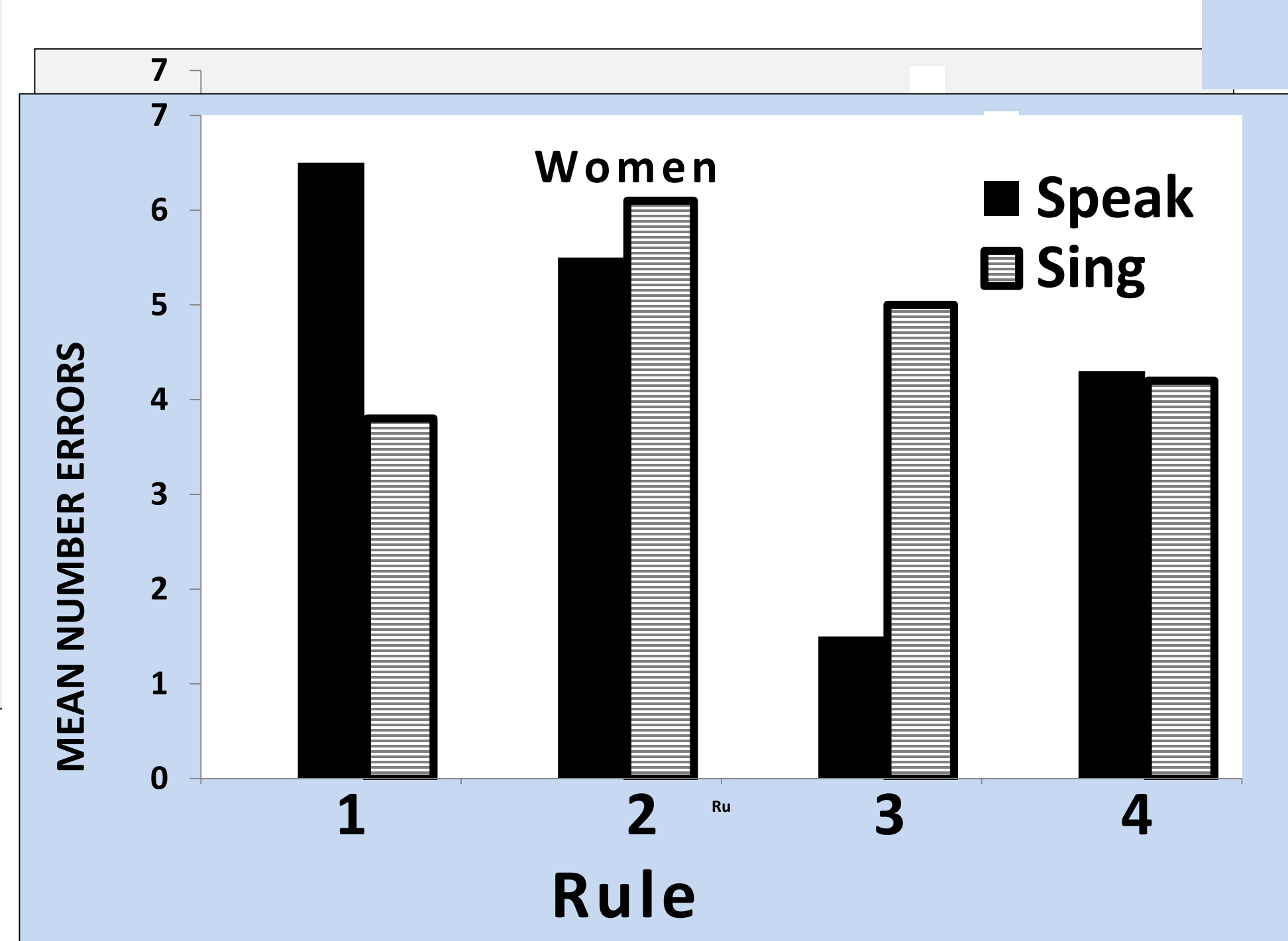


Test Trials

- 32 spoken sentences, 16 correct and 16 incorrect, at 10 sec. intervals
- "Choose YES button if the sentence is correct, NO button if incorrect"
- Scoring = number of incorrect judgments ("errors")



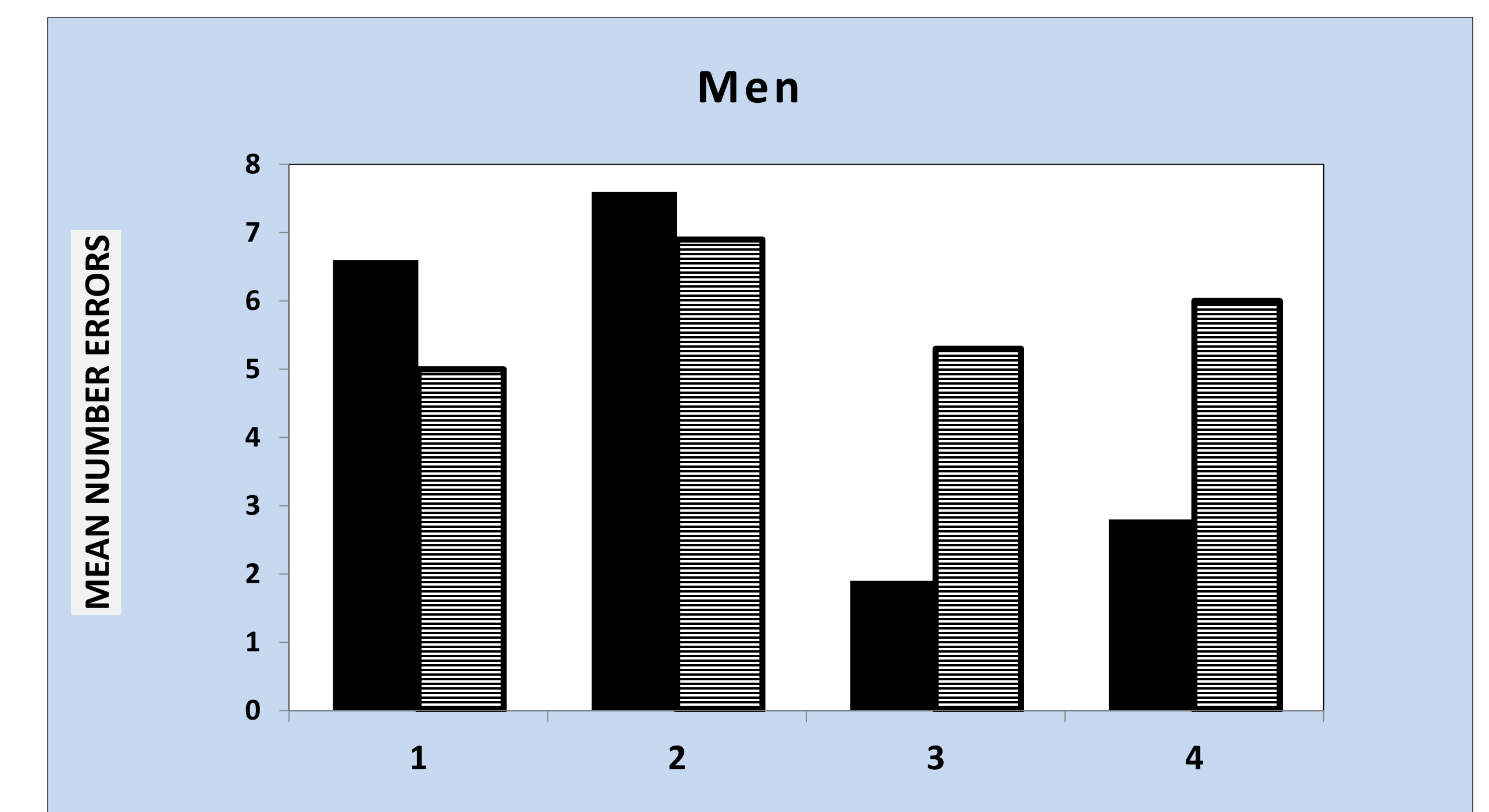
RESULTS



Rule 1. Speak > Sing ($p < .01$)

Rule 3. Sing > Speak ($p < .01$)

Rules 2, 4 Sing = Speak (NS)



Rule 1. Speak > Sing ($p = .05$)

Rule 2. Speak = Sing

Rules 3, 4. Sing > Speak ($p = .048$ to $< .01$)

SUFFIX DIALECT RESULTS

CONCLUSIONS

- Singing enhanced analysis of syllabic structure (Rule 1- Suffix dialect) – May be good for learning L2 inflections.
- Not good for learning word order dependencies.
- May be more effective for female than male learners ---were men embarrassed about singing ??

