Phonological and Lexical Attrition vs. Retention after a Study-Abroad Experience

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Background

Language attrition
- Learners of a second language (L2) frequently experience a loss of skills, or attrition, when they are no longer exposed to the L2. Studies on L2 attrition, however, have found mixed results with some (e.g., Nagasawa, 1999) showing attrition, others showing retention or even improvement (e.g., Murphey, 2003; Wenters, 1999) in the first few months after the end of exposure to the language.
- The majority of L1 and L2 attrition studies has focused on syntactic or lexical attrition (e.g., Schmid, 2002), and lexical properties such as cognate status have not usually been taken into consideration. Furthermore, only a handful of studies have attempted to explain phonological attrition in the L1 (e.g., de Leuw, 2008) or the L2 (e.g., Wenters, 1989). A systematic analysis of spoken language attrition versus retention/Improvement covering phonological as well as lexical factors has yet to be undertaken.

Second language acquisition
- In language acquisition research (e.g., SLM: Flege, 1987) it has been argued that L2-specific sounds (e.g., French /y/) have no close equivalent in English) are acquired more native-like than L2 sounds that are similar to native-language sounds (e.g., French /u/ is similar to English /u/). Alternatively, it may be the case that L2 sound pairs that are similar to L1 phonemes categories (e.g., French /t/ vs. /d/) are easier to distinguish than L2 pairs that map onto a single L1 pheme category, such as French /u/ vs. /y/ (PAM: Best, 1995). It is not clear whether these same patterns hold true for attrition.
- Bilingualism research further suggests that lexical status (i.e., whether a word is a cognate that shares form and meaning or not) influences the processing of words in L1. In speech perception, usually a ‘cognate facilitation effect’ is observed, i.e., cognates are generally processed faster and/or more accurately than noncognates (e.g., de Groot & Keljper, 2000). Whether the influence of lexical status show similar patterns in language attrition, however, is unclear.

The present study
- Phonological attrition vs. retention: In Experiment 1, we investigated attrition versus retention in the perception of L2 French sound contrasts that are acoustically similar to English native-language contrasts versus that map onto a single English phome.
- Lexical attrition vs. retention: In Experiment 2, in addition to phonological attrition, we tested whether cognate status of a word influences lexical attrition versus retention/improvement.

Methods

Materials
- **EXPERIMENT 1:** 60 spoken French word-word pairs, consisting of two tokens of the same French word (e.g., laureau-lausanne: Eng. "lull") & 40 word-nondword pairs consisting of a French word and a nonword created by changing one sound in the word (e.g., laureau-lauree).
- Word-nondword pairs resulted in two types of sound contrast: (1) best: 1995: two-category (TC) contrasts map onto two equivalent phoneme categories in the L1 (e.g., /v/ vs. /w/, whereas the sounds in Category-Goodness (CG) contrasts map onto a single L1 pheme category to varying degrees (e.g., French /u/ & /y/ map onto English /u/).
- Words matched for frequency in French sound contrast, surrounding sounds, length (phonemes, syllables).
- **EXPERIMENT 2:** 60 French words and 60 nondwords created by changing one sound ("critical sound") in each of the French words.
- French critical sounds either had a closer English equivalent (e.g., French /u/ and English /u/) or "tentative" sound, or they had no close equivalent in English (e.g., French /y/ = "new" sound (cf. Flege, 1987).
- Words were French English cognates (e.g., "box") or noncognates (e.g., "volume/Engl. "yay")
- French words were matched for lexical frequency in French, critical sounds and surrounding sounds, length in phonemes and syllables.

Procedure
- Participants were tested twice: Time 1 = 1 month after return from their return from France, Time 2 = approximately 6 months later.
- **EXPERIMENT 1:** Phonological task: A discrimination of spoken sounds embedded in French words and nondwords.
- Participants heard stimulus pair and indicated via key stroke whether they heard the same word twice or different words.
- **EXPERIMENT 2:** Lexical decision of spoken French words and nondwords.
- Participants hear stimulus words and nondwords once at a time and indicate via key stroke whether they thought a word was a French word or not.

Analysis
- d’scores and reaction times were calculated
- For reaction times (RT) only correct responses to sound-nondword pairs (AX) were used. Lexical Decision) were analyzed
- Linear mixed effects regression with random intercepts for subject and item was used to analyze d’scores. Linear mixed effects regression with random intercepts for subject and item was used to analyze reaction times.

Results

**Experiment 1: Phonological improvement in AX-Discrimination**
- **AX discrimination:** d’scores were calculated for AX discrimination.
- **Continuing learners:** Learners improved on the two-category distinction from Time 1 to Time 2. Their ability to distinguish category-goodness differences remained stable from Time 1 to Time 2.
- **Not continuing learners:** Learners improved on the category-goodness distinction from Time 1 to Time 2, while their ability to discriminate two-category distinctions remained stable from Time 1 to Time 2.
- Marginally significant main effect of Time (B = 0.74, SE = 0.43, t = 1.72, p = 0.1), and significant interaction of time x sound contrast x learner status (B = 1.86, SE = 0.84, t = 2.22, p < 0.05).

**Experiment 2: Retention of phonological and lexical skills in Lexical Decision**
- **Lexical Decision:** Learners performed similarly at Time 1 and Time 2: they retained their knowledge rather than showing attrition or improvement.
- **Not continuing learners:** Learners perform better than not continuing learners overall. Continuing and not continuing learners are better at identifying new than similar sounds.
- This is especially true for cognates for not continuing learners, and for noncognates for continuing learners.
- Significant main effect of Time (B = 0.75, SE = 0.42, t = 1.78, p = 0.1), and significant interaction of learner status x sound similarity x cognate status (B = 1.16, SE = 0.59, t = 1.95, p < 0.05).

Conclusion

- No attrition in perceptual tasks: This is consistent with previous research on lexical status suggesting that attrition in production precedes attrition in perception (e.g., Ammerman, 1996). Analysis of productions by the same learners is underway, and will reveal whether this pattern holds for phonological attrition.
- Experiment 1: Not continuing learners were better at the two-category distinction than the category-goodness distinction at Time 2. It is possible that after exposure to the L2 ended, they relied on their L1 phoneme system again, which would predict this pattern (cf. discrimination in native listeners: Best, 1995). This might even be a sign of attrition.
- Continuing learners improved in two categorical distinctions, which makes sense in light of the fact that cognate contrasts such as these are focused on in language classes.
- Experiment 2: Learners performed better at “new” than “similar” sounds in the lexical decision task. This is consistent with previous work (e.g., Flege, 1987) claiming that “new” sounds are acquired more native-like than “similar” sounds. Sound similarity doesn’t seem to affect attrition, however: both were retained equally well.
- While cognate status showed a trend towards modulating the similarity effect ("similar": new distinction bigger for cognates and for not continuing learners, and bigger for noncognates for continuing learners), cognate status did not have an influence on retention from Time 1 to Time 2.
- **Why improvement in AX Discrimination but not Lexical Decision?**
  - Not due to different stimuli, because the words in both tasks contained the same critical sounds and sound contrasts.
  - Lexical decision requires processing at the phonological and the lexical level. This more demanding task may require continued exposure in order for improvements to happen.
  - AX discrimination utilizes metalinguistic judgment, which may not have to rely on continued input from the L2 for improvements to happen.
- Faster reaction times at Time 2 could simply be due to task familiarity, but the fact that continuing learners improved their RTs more than not continuing learners suggests that continued exposure to French lead to faster reaction times.

References