Transfer Effects in Chinese Vocabulary Learning

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Experiment

Chinese represents an excellent opportunity to look at transfer effects in vocabulary learning because of the complexity of the Hanzi (Chinese characters) in addition to the Romanized orthographic representations of the pronunciation (Pinyin). Unlike a Romance language, with only one written representation that maps directly to phonetics, the additional complexity of Chinese allows us to consider giving a written foreign prompt (Hanzi) and requesting a written foreign response (Pinyin).

The following experiment used paired-associate drill practice (tests with feedback if incorrect) to train Chinese over the course of a 40 minute learning session followed by (two days later) a transfer and assessment session composed of 192 trials. Given that the following experiment also used Chinese sound files in pairs in addition to English, Hanzi, and Pinyin, there were 6 ways the program presented drills: Pinyin->English, sound->English, Hanzi->English, English ->Pinyin, sound->Pinyin, and Hanzi->Pinyin.

During the first session these 6 types (for 24 items) were sequenced together according to the prescriptions of a model based practice scheduling algorithm (Pavlik, in press). The algorithm introduces new items as spacing widens for repetitions of old items during learning. New items were introduced together in the order of the 6 types above, so they began with Pinyin->English, and then introduced the other types as prior items spacing increased.

A first manipulation compared two ways to interleave trials during the learning session. In this manipulation, drill trials were either mixed or block in groups of 60, by response type (Pinyin or English). The hypothesis was that mixing would slow responses since people would need to determine the response language for each response. In contrast, because the model had only a weak concept of response learning, if transfer occurred between types (For instance, if Hanzi->Pinyin practice improves Pinyin->English responding, as we might expect if a Hanzi->Pinyin trial also causes English recall), the model would not be able to capture this, so performance using the algorithm should be artificially high (caused by transfer) in the mixed condition.

A second manipulation occurred during the assessment session. In half 1 of this session a trial type was randomly selected for each of the 24 items and 4 trials of this type were given for each item across 4 blocks of 24 trials. Then, in half 2, this was repeated, so that each item got 4 more drills with another random trial type (which may have been the same as the first). The hypothesis was that transfer would be detected in half 2 of the assessment session. This was assessed by comparing half 1 performance for a trial type with half 2 performance on that same trial type conditional on what trial type preceded half 2 performance on half 1 for each item. If these differences are positive it suggests transfer of some sort, especially since we would expect forgetting because the retention interval is actually longer for the second half of the assessment session compared to the first.

Results

Performance was better for mixing during learning ($p<.06$). Speed was significantly slower for correct responses during mixing in the learning session; however, there was a significant crossover interaction showing that subjects learning in mixed conditions were faster during the mixed assessment session.

Second session transfer results are shown in Figure 1. The figure shows the difference between half 1 and half 2 of the assessment session for each trial type as a function of the type of practice that preceded the practice in half 2. Thus, the strongest effects in Figure 1 are along the diagonal. This means that when half 1 practice is the same as half 2, half 2 does better. More interesting is that a number of other points are high, for instance, Hanzi->Pinyin seems to do much better in half 2 for a number of different half 1 conditions.

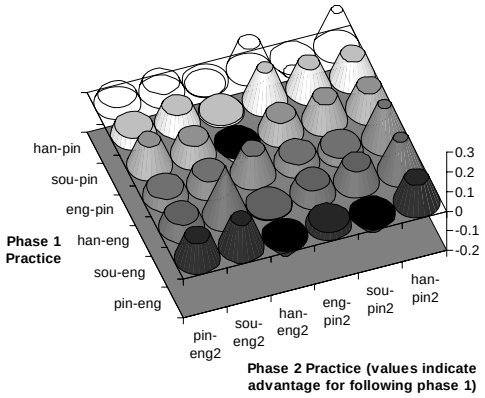

Figure 1: Transfer effects.

Acknowledgments

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References

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