EFFECTS OF ARTICULATORY SUPPRESSION AND IMITATION ON MEMORY FOR NONSPEECH ENVIRONMENTAL SOUNDS

Human Factors, Perception, and Cognition Lab

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BACKGROUND

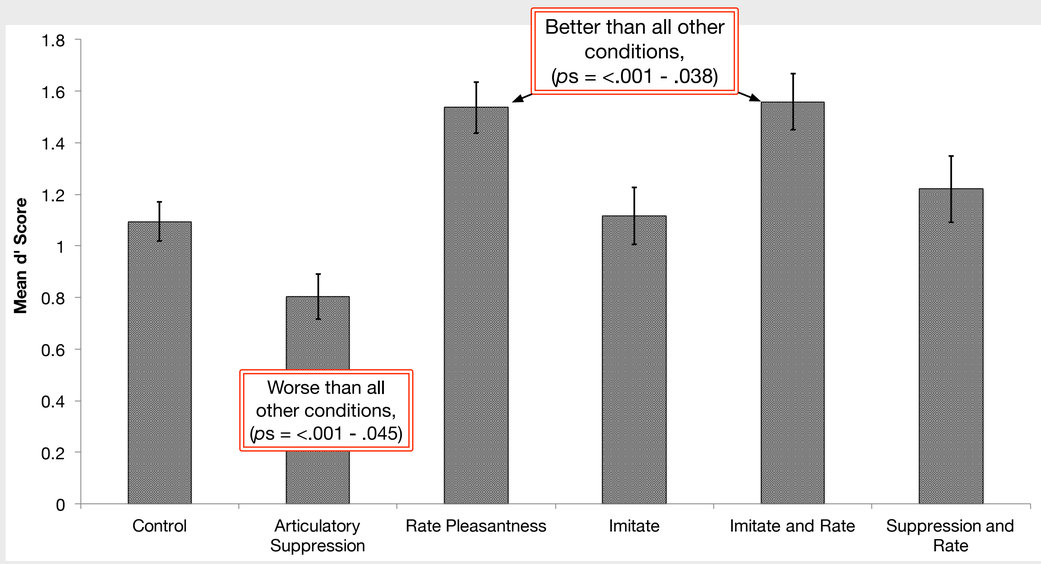
Subvocalization is critical for speech perception (Liberman & Mattingly, 1985) and verbal working memory (Baddeley, 1992). Researchers have rejected the notion that subvocalization also could be the encoding mechanism for nonspeech (e.g., music and environmental) sounds, but cognitive theorists have not clarified how nonspeech sounds are encoded. Articulatory suppression has been shown to harm memory for melodies (Schendel & Palmer, 2007), tones (Li, Cowan, & Saults, 2013), and pitch information (Koelsch et al., 2009). This study examined the effects of covert articulatory suppression and covert imitation on recognition for nonspeech environmental sounds.

METHODS

Participants (*N* = 163) listened to 20 environmental sounds (examples of sounds included a basketball bouncing, crickets, hammering, a lion roaring, a piano, pouring water, shuffling cards, and a whistle) under one of six different encoding conditions in a between subjects design: (1) a control condition that only featured the visual puzzle task during encoding; (2) an articulatory suppression condition for which participants covertly repeated the pitched sequence “do re mi fa so la ti do” during encoding; (3) a covert imitation condition in which participants were instructed to imitate each sound with their “inner voice” following presentation; (4) a rating condition in which participants rated the pleasantness of each sound on a scale from 1-5 immediately after hearing the sound; (5) a condition that required imitation plus rating; and (6) a condition that required articulatory suppression plus rating.

RESULTS

A 1x6 between subjects ANOVA revealed a significant effect of encoding condition, $F(5, 157) = 8.50$, $p < .001$, partial eta squared = .21. Fisher’s LSD post hoc test revealed that performance in the articulatory suppression condition was worse than all other conditions (ps ranged from <.001 to .045). Both conditions that involved rating (the rating condition and the imitation plus rating condition) resulted in better performance than all other conditions (ps ranged from <.001 to .038).



DISCUSSION AND CONCLUSIONS

Articulatory suppression during encoding impaired recognition memory for everyday sounds. Covert imitation of the sounds, however, did not aid memory as compared to the rating condition. In general, conditions that involved rating the pleasantness of sounds during encoding resulted in the best recognition memory, but concurrent articulatory suppression during rating the sounds impaired recognition memory as compared to conditions for which rating was required and articulatory suppression was not. These findings complement existing evidence showing that articulatory suppression interferes with memory for sounds that are not comprised of the phonemes of language. From the perspective of task demands, neither the control nor the articulatory suppression condition required more than passively listening to the sounds, yet articulatory suppression still resulted in worse memory. Imitation with covert articulation did not improve memory as compared to the rating condition, which was comparable in its requirements to actively process each sound. Cognitive theories of memory for nonspeech sounds must account for the negative impact of articulatory suppression on memory for nonspeech sounds.