Subjects trained in a standard data entry task, which involved typing numbers (e.g., 5421) using their right hands. At an initial test (6 months after training), subjects completed the standard task, followed by a left-hand variant (typing with their left hands) that involved the same perceptual, but different motoric processes as the standard task. At a second test (8 months after training), subjects completed the standard task, followed by a code variant (translating letters into digits, then typing the digits with their right hands), which involved different perceptual, but the same motoric processes as the standard task. For each of the three tasks, half the trials were trained numbers (old) and half were new. Repetition priming (faster response times to old than new numbers) was found for each task. Repetition priming for the standard task reflects retention of trained numbers; for the left-hand variant reflects transfer of perceptual processes; and for the code variant reflects transfer of motoric processes. There was thus evidence for both specificity and generalizability of training data entry perceptual and motoric processes over very long retention intervals.

METHOD

Training

2 sessions (3 months apart)
3 blocks, 100 trials per block, each session
Standard
Stimulus: 2154
Response: 2154 (right hand)

Test 1 (6 months after training)
Standard (50 new and 50 old)
Stimulus: 2154
Response: 2154 (right hand)

Left-hand (50 new and 50 old)
Stimulus: 2154
Response: 2154 (left hand)

Test 2 (8 months after training)
Standard (50 new and 50 old)
Stimulus: 2154
Response: 2154 (right hand)

Code (50 new and 50 old)
Stimulus: bade
Response: 2154 (right hand)

Design

Within-subject variables:
Task (standard, left-hand) or (standard, code)
Trial type (new, old)

Dependent variable:
Execution time (average time to type the second, third, and fourth digits)

RESULTS: Execution Time at Test 1

Figure 1: There were significant main effects of both session and block of training.
Note: All error bars in the figures are between-subjects standard errors of the mean.

RESULTS: Execution Time at Test 2

Figure 2: There were significant main effects of task and trial type and a significant interaction between task and trial type. In separate analyses of each task, there was significant repetition priming (old faster than new) for the left-hand task, but not for the standard task.

RESULTS: Execution Time at Test 3

Figure 3: There were significant main effects of task and trial type and a significant interaction between task and trial type. In separate analyses of each task, there was significant repetition priming (old faster than new) for both tasks, but repetition priming was larger for the code than for the standard task.

REFERENCES


CONCLUSIONS

The observed repetition priming in the standard task at Test 2 (advantage for old relative to new stimuli) provides evidence both for specificity of training and for retention of the trained stimuli over the very long retention interval of 8 months.

The observed repetition priming on the left-hand and code tasks at Tests 1 and 2 (which was significantly larger than that for the standard task) provides evidence for generalizability of training from the standard task to other conditions. For the left-hand task there was transfer of perceptual processes despite changes in motoric processes, and for the code task there was transfer of motoric processes despite changes in perceptual processes.

In previous work with other tasks and measures (Healy, Schneider, & Barshi, 2015), either specificity or generalizability was found, but not both. Nevertheless, there was evidence here for both specificity and generalizability of training for both perceptual and motoric processes of data entry even over very long delays.

AUTHOR NOTE

This work was supported in part by NASA Grant NNX14AB75A to the University of Colorado. Thanks to Mary Chapman for help with data tabulation.