TRANSFER EFFECTS IN IMPLICIT SEQUENCE LEARNING

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Background

Some forms of implicit learning have been shown to be robust in individuals with serious psychological or neurological disorders (Reber, 1989). The Alternating Serial Reaction Time (ASRT) task has been used to measure implicit sequence learning in individuals with disorders such as schizophrenia (Swartz et al, 2003) and dyslexia (Howard et al., 2006; Vicari, 2006) as well as for characterizing the cognitive abilities of various age groups (Howard & Howard, 1997; Howard & Howard, 2001; Howard et al., 2004). For these populations it is often useful to employ pre- / post-test designs to evaluate interventions or longitudinal change. While many studies have demonstrated implicit learning in the serial reaction time task, little is known about how the acquired knowledge affects learning a new sequence structure. This study explored transfer of implicit sequence learning to a different sequence pattern in the ASRT task. It was revealed that prior learning of both structured and random sequences interfered with learning a new sequence regularity.

Method

- Two-day procedure (similar times on consecutive days)
  - o 4-element task
  - o 6 possible sequences (1r2r3r4r, 1r2r4r3r,…)
  - o 5 epochs per day
  - o 20 blocks per epoch
  - o 88 trials per block (8 practice, 10 cycles of 8 events)

- Three groups (Same, Different, Random)
  - o Same: Same pattern on Days 1 and 2
  - o Different: Pattern on Day 1, reverse pattern on Day 2
  - o Random: Random sequence on Day 1, pattern on Day 2

Participants

| Participants (Means & SDs)	Same	Different	Random
Gender	7F, 5M	6F, 6M	8F, 4M
Age	18.75 (1.14)	19.08 (1.00)	19.58 (1.16)
Education Level	12.58 (1.16)	12.67 (0.78)	13.25 (1.36)
WAIS-III Digit Span	18.25 (3.98)	18.75 (3.31)	19.42 (3.94)
WMS-III Letter Number Sequencing	11.42 (2.43)	11.17 (2.21)	11.50 (3.21)
Operation Span	0.73 (0.11)	0.73 (0.13)	0.71 (0.13)

No significant differences found between groups

Alternating Serial Reaction Time Task
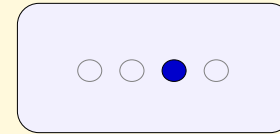
Pattern trials alternate with Random trials

Example sequence: 1r2r3r4r

Learning Measures (Trial-type effect):
- Faster response to high vs. low frequency trials
- Higher accuracy for high vs. low frequency trials

Response

Results
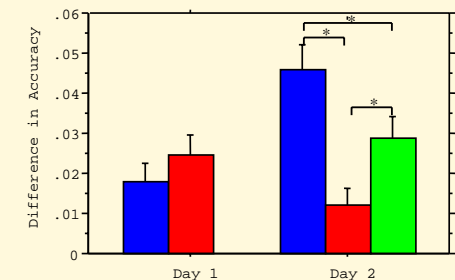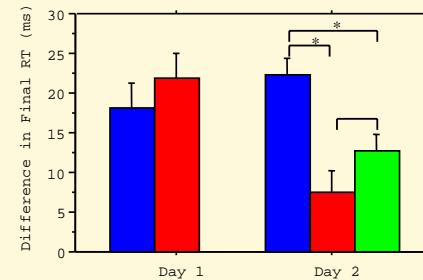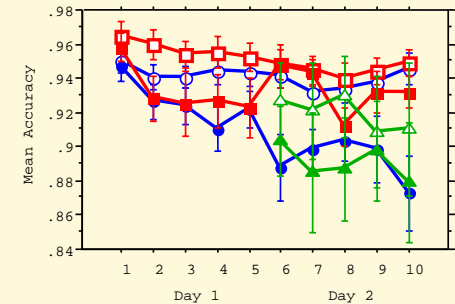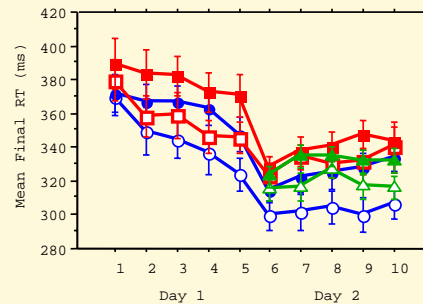
Conclusions

- **Prior learning of both structured and random sequences interferes with learning a new sequence regularity**
  - o Learning a structured sequence reduces learning a subsequent sequence (Different Group Day 2 vs. Day 1)
  - o Learning a random sequence reduces learning a subsequent structure sequence (Random Group Day 2 vs. Same/Different Groups Day 1 on RT measure only)
- These effects should be considered in pre- / post-test designs

Future Direction

- What is the role of motor sequencing
- What is the role of sequential effects in random sequences?