Stereotype Activation Affects Implicit Sequence Learning in Old and Young Adults

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Background

Recent research on the effects of aging on memory and learning indicates that age-related deficits occur, predominantly on explicit tasks. One factor known to moderate explicit memory and learning is the activation of stereotypes. For example, Hess, Hinson, & Statham (2004) showed that older, but not younger, adults who were subliminally shown negative primes about aging (e.g. dependent, confused, slow) performed at a lower level than those receiving positive primes (e.g. sage, learned, wise) on a free recall task.

The effects of stereotype activation on implicit memory and learning are unknown. The current study examined whether stereotype priming influences implicit sequence learning in old and young adults.

Method

Participants:

- 33 young volunteers   mean age: 20.6 (*SD*: 0.93)
- 32 old volunteers   mean age: 73.4 (*SD*: 6.9)
- similar in education, vocabulary, and self-rated health

Independent Between-Subjects Variables :

- Age
- Valence of primes: positive or negative

Tasks:

- **Stereotype priming:** Subjects were first primed with either positive or negative stereotypes about aging using the "subliminal" lexical decision task from Hess et al. (2004).   They then completed sequence learning and word free recall tasks, in counterbalanced order, with the stereotype priming being repeated between the tasks. . . .

- **Sequence learning:** a 3-element alternating serial response time (ASRT) task (adapted from Howard & Howard, 1997) followed by tests (a questionnaire and a card sorting task) to verify that the learning was implicit.

- **Free recall:** an explicit word recall test From Hess et al. (2004)—data not reported here

Measure of Implicit Sequence Learning:

- *triplet-type effect:* Difference in performance between last trial of predictable (high frequency) and unpredictable (low frequency) triplets.

ASRT Task
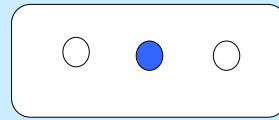
- ❖ Three spatially arranged locations
- ❖ On each trial, one of the circles fills in.
- ❖ Pattern trials alternate with random trials
  - *e.g., 1-r-2-r-3-r*
- ❖ 1 block = 128 trials (6-item sequence repeated 12 times; 8 random warm-up trials)
- ❖ 10 blocks

Stereotype Priming Task

- Determination of "subliminal" duration for word primes:
  A word-identification task (Hess, 2004) determined the slowest speed at which participants viewing a word on a computer screen were unable to identify it. Stereotype priming test was set faster than this speed.

- Stereotype priming via lexical decision task:
  - 3 sets of 30 trials
             each with16 age-related words and 14 non-words.
  - Age-related words either had positive or negative valence
          -Negative: e.g., *dependent, confused, slow*
          -Positive: e.g., *sage, learned, wise*
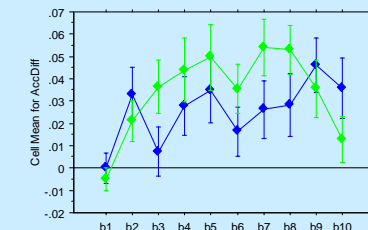 - Key press for word vs. non-word.

Implicit Learning

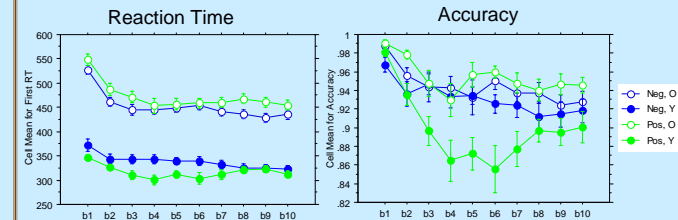Triplet-Type Effects on Accuracy Measure
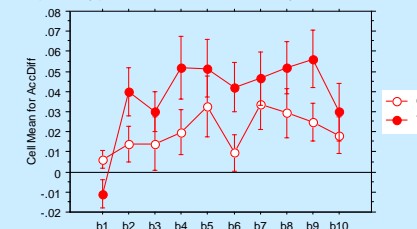
AGE
- young group learned more than old (p=0.0058)

VALENCE
- positive groups learned more than than negative groups but only through block 8 (p=0.0394)
- effect of valence was independent of age (p=0.5827)

Block

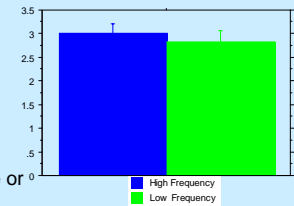## Overall Performance

Reaction Time   Accuracy

- Older people: overall RT and accuracy did not vary with valence
- Younger people: negative primes led to overall slower and more accurate responding than positive primes

No Explicit Awareness

- Card Sort Task
  - 27 cards of 3 consecutive trials
  - Sort: most often, often, and least often
  - Average number of cards sorted between High and Low frequency in the most often category do not differ overall or when broken down by age or valence group
- Verbal Questionnaire
  - No subject reported noticing the actual pattern

Conclusions

- Stereotype priming
  - Affects overall speed and accuracy, especially for young people (similar to Bargh et al., 1996 where priming with elderly words slowed the walking speed of young volunteers).
  - Valence effects short-lived
  - Impairs implicit sequence learning, but is not age specific
  - Learning effects related to overall performance differences?
- Implies that the ability to pick up subtle regularities in the environment may be influenced by activation of stereotypes
- More research is needed to see if the stereotypes do not need to be self-relevant to have an effect in implicit tasks of learning and memory