



# IMPLICIT SPATIAL CONTEXT LEARNING DEPENDS ON TARGET LOCATION IN OLDER ADULTS



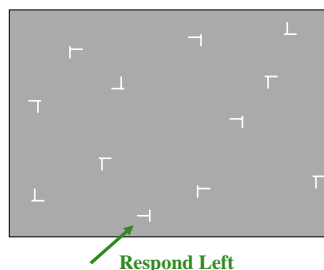
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## Abstract

Chun and Jiang (1998) have shown that when people search displays in which the repeated global configurations of items cue the location of a search target (repeated configuration displays), reaction time improves with practice compared to novel configuration displays that do not repeat. Learning is inferred from the faster responding on the repeated versus novel trials. People are unable to recognize the repeated configurations in a post-test, thus the contextual knowledge is thought to be implicit.

Howard, Howard, Dennis, Yankovich and Vaidya (2004) showed that this learning is preserved in healthy aging, consistent with the notion that medial temporal lobe function, which is thought to underlie this task (Chun & Phelps, 1999; Manns & Squire, 2001), is relatively spared in healthy aging. The finding that such spatial context learning is impaired in people with Mild Cognitive Impairment (Negash et al, 2006) provides additional evidence for medial temporal lobe involvement. The present study examined whether the location of the target has an effect on learning and whether this effect is different for young and healthy old adults.

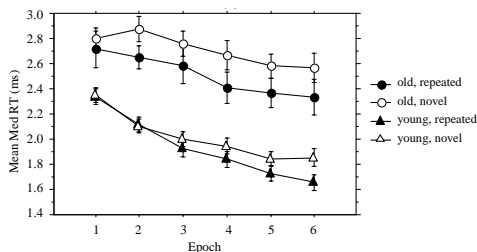
## Contextual Cueing Task



- Visual array of 12 items
  - 11 distractors (L's--orientation varies)
  - 1 target (horizontal T)
- Respond to orientation of target T tail
- Auditory feedback
- 24 trials over 30 blocks over 6 epochs
  - 12 repeated configurations
  - 12 novel configurations
- On repeated trials
  - Configuration predicts **location** of T
  - NOT direction of T
- Implicit learning: Compare repeated vs. novel array

## Traditional Analysis

- Learning = Difference between repeated and novel trials.



- On reaction time, repeated and novel trials diverge across epochs for both groups.
- Repeated configurations are faster than novel for both groups.

## Conclusions

Results replicate Howard et al. (2004) and show that while older adults respond more slowly than young, both groups reveal perceptual learning. Learning was implicit for both groups in that people were unable to recognize the repeated configurations in a post-test.

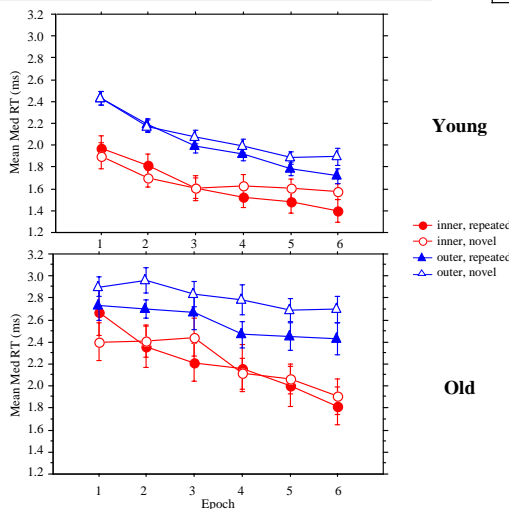
In addition, target location influenced reaction time for both groups in that responses were faster for central than peripheral targets. Furthermore, the older people revealed a greater advantage of the repeated displays for peripheral than central targets whereas younger adults did not. This suggests that older adults rely on the contextual information to locate peripheral targets more than central targets consistent with their narrower useful field of view.

Findings suggest that implicit spatial context learning is intact in healthy aging and are consistent with evidence that medial temporal lobe function is relatively spared in healthy aging (Hedden & Gabrieli, 2006). Furthermore, the results reveal qualitative age-related differences in what is learned, in that older adults' learning varied with position in the visual field whereas young adults' did not.

## New TARGET LOCATION Analyses

1	2	3	4	5	6	7	8
ULF	ULF	ULM	ULM	URM	URM	URF	URF
9	10	11	12	13	14	15	16
ULF	ULF	ULM	ULM	URM	URM	URF	URF
17	18	19	20	21	22	23	24
LM	LM	LC	LC	RC	RC	RM	RM
25	26	27	28	29	30	31	32
LM	LM	LC	LC	RC	RC	RM	RM
33	34	35	36	37	38	39	40
BLF	BLF	BLM	BLM	BRM	BRM	BRF	BRF
41	42	43	44	45	46	47	48
BLF	BLF	BLM	BLM	BRM	BRM	BRF	BRF

1	2	3	4	5	6	7	8
ULF	ULF	ULM	ULM	URM	URM	URF	URF
9	10	11	12	13	14	15	16
ULF	ULF	ULM	ULM	URM	URM	URF	URF
17	18	19	20	21	22	23	24
LM	LM	LC	LC	RC	RC	RM	RM
25	26	27	28	29	30	31	32
LM	LM	LC	LC	RC	RC	RM	RM
33	34	35	36	37	38	39	40
BLF	BLF	BLM	BLM	BRM	BRM	BRF	BRF
41	42	43	44	45	46	47	48
BLF	BLF	BLM	BLM	BRM	BRM	BRF	BRF



## Participants

	Young	Old
Gender	19F / 7M	8F / 4M
Age (in years)	19.65 (18-22)	68.50 (65-74)
Education (in years)	13.58 (12-16)	16.17 (12-20)
Self-Rated Health*	4.48 (2-5)	4.25 (3-5)
Letter-Number Sequencing	11.73 (6-16)	8.83 (6-13)

\* Responses ranged from 1 (poor) to 5 (excellent). Means (and ranges) reported.

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