Thematic Cueing for Story Recall in Mild Cognitive Impairment

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Introduction

Healthy older adults are better able to remember the details of stories that are inherently organized and contain a central theme. In addition, their story recall benefits from memory cues[1]. Individuals with mild cognitive impairment (MCI), a risk state for Alzheimer's disease[2,3], exhibit reduced recall of stories[4]. A decline in verbal episodic memory is considered a hallmark of MCI. The objective of this study was to investigate the role of thematic cues in the story memory of individuals with MCI compared to healthy older adults.

Methods

Participants

Participants were initially screened via telephone with a medical history interview, the Clinical Dementia Rating scale (CDR)[5] and the Telephone Interview of Cognitive Status (TICS)[6]. Exclusion criteria included head trauma with brain lesion; current or recent substance abuse; medical, neurological, or psychiatric causes of cognitive dysfunction; or history of cerebrovascular accidents. The participants were 35 healthy older adult controls and 35 individuals with MCI. These groups were individually matched for age (± 4 years), education (± 2 years), and gender.

Table 1: Baseline Demographic information

	Healthy Older Adults Mean	(SD)	MCI Mean	(SD)	p-value
Gender	13M/22F		13M/22F		
Age	69.69	(9.32)	70.23	(9.71)	.81
Yrs. of ed.	16.20	(2.69)	16.20	(2.51)	1.0
Shipley VIQ	63.11	(9.61)	59.66	(7.24)	.08
GDS	4.97	(3.44)	7.06	(4.23)	.10
MMSE	28.89	(1.25)	27.35	(1.82)	<.05

Inclusion criteria for the MCI participants were consistent with Petersen and colleague's criteria[3] for Mild Cognitive Impairment, including: a) subjective memory impairment corroborated by a knowledgeable informant; b) a score that is 1.5 *SD* below the mean on at least one of the following scores from the Rey Auditory Verbal Learning Test (RAVLT)[7]: list learning, immediate recall, or delayed recall; (c) not meeting *Diagnostic and Statistical Manual of Mental Disorders* (*DSM–IV*) criteria for dementia[8]; (d) preserved general cognitive functions (MMSE cutoff score of 24); (e) no significant impact of the memory deficit on the participant's daily activities, as confirmed by a total CDR score equal to 0.5; and (f) absence of severe depression (Geriatric Depression Scale[9] score ≤ 17). Case consensus was used to establish the final diagnosis utilizing neuropsychological test data. The control participants met all inclusion criteria, denied any history of cognitive changes, had a CDR score of 0, a GDS score ≤ 17, and an MMSE score of ≥ 26.

Procedures

Each participant was administered two stories, including one story from the WMS-R Logical Memory subtest[10] and an alternate form of the story[11]. Two learning trials for each story were administered. A thematic cue was presented prior to the first trial of one story, while the other story was not cued at learning. The cues were as follows: "This story is about a man who is driving a truck on the highway, and he skids into a ditch," and "This story is about a woman riding a horse in the forest, and she hits a tree branch," respectively. The order of the presentation of the stories and the cues were counterbalanced. After a 10-minute delay, a free recall trial was administered, followed by a cued recall trial using the same cues.

Results

2 (Diagnostic Group) x 2 (Cue Condition) Analyses of Variance, with repeated measures on the last factor, were conducted for each learning and recall trial. There was a main effect of Diagnostic Group, with healthy older adults recalling more story details than the MCI participants on Learning Trial 1, $F(1, 68) = 14.83$, $p = <.001$, $\eta^2 = 0.179$; Learning Trial 2, $F(1, 68) = 17.20$, $p = <.001$, $\eta^2 = 0.202$; Delayed Free Recall, $F(1, 68) = 10.92$, $p < .003$, $\eta^2 = 0.138$; and Delayed Cued Recall, $F(1, 68) = 11.47$, $p < .002$, $\eta^2 = 0.144$. There was a significant main effect of the Cue Condition only on the first learning trial $F(1, 68) = 5.86$, $p < .03$, with learning being better with the thematic cue.

On subsequent trials, the effect of the cue was not significant, all Fs < 0.59, all ps > .19. There were no significant interaction effects, all Fs < 2.56, all ps > 0.11.

Table 2: Story Recall Scores

	Healthy Older Adults No Cue Mean (SD)	Healthy Older Adults Cue Mean (SD)	MCI No Cue Mean (SD)	MCI Cue Mean (SD)	*within subjects* p-value	*between subjects* p-value
Learning Trial 1	12.25 *(4.37)*	13.97 *(3.64)*	9.14 *(4.94)*	9.74 *(4.79)*	.02	<.001
Learning Trial 2	18.11 *(3.66)*	19.09 *(4.08)*	14.31 *(5.50)*	13.97 *(5.69)*	.45	<.001
Delayed Free Recall	16.43 *(4.82)*	17.09 *(4.71)*	12.86 *(6.37)*	12.63 *(5.75)*	.65	<.001
Delayed Cued Recall	16.69 *(4.95)*	17.49 *(4.95)*	13.06 *(6.07)*	12.77 *(5.75)*	.55	<.001

Discussion

As expected, we found that participants with MCI had poorer learning and recall of stories than healthy older adults. We also found that the initial learning of the stories was better when both groups were given a cue consisting of the theme of the to-be-presented stories. Most interesting, healthy older adults and participants with MCI exhibited a similar performance pattern, with only initial recall improving with the provision of the cue, while their performances across the other trials did not improve. This suggests that changes in story memory in MCI are quantitative rather than qualitative.

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