



# Memory and Metamemory Deficits in First-Episode Schizophrenia: Effects of Psychosis on Value-Directed Remembering

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## Introduction

- Memory deficits in schizophrenia are well established<sup>1-3</sup> but less is known about how psychosis affects metacognitive processes such as metamemory, which refers to awareness of and control over one's memory
- We investigated metamemory ability in individuals with schizophrenia using the value-directed remembering task<sup>4-7</sup> which assesses the degree to which participants use value cues to guide their learning of a list of items
- Successful performance on this task requires awareness that there are more items on the list than are likely to be remembered, necessitating direction of memory resources to the higher-value items

## Methods

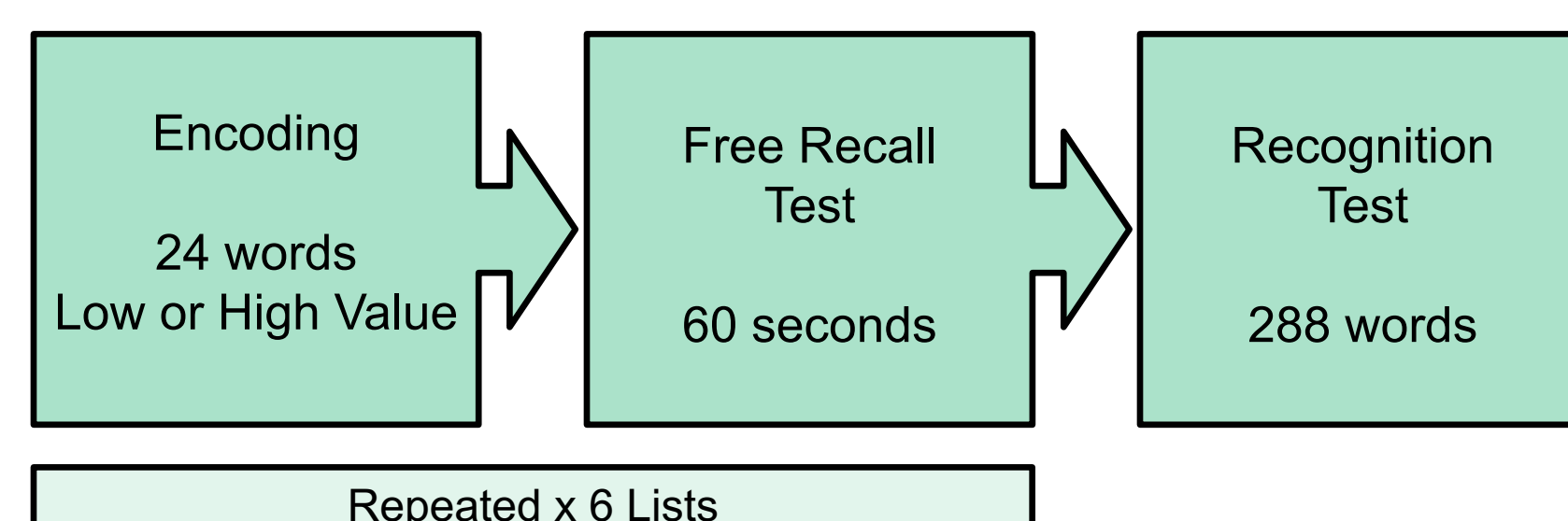
- Participants were 20 patients undergoing treatment following a recent first episode of schizophrenia and 15 demographically comparable healthy controls
- Participants viewed six lists of 24 words where each word was paired with either a low value (1-3 points) or a high value (10-12 points), and were instructed to maximize their score on free recall tests given after each list
- Following the final free recall test, participants were given a recognition test that consisted of the 144 previously viewed items and 144 lures, and were asked to mark each item as "old" or "new"
- For items marked as "old," participants were asked to make "remember" versus "know" judgments<sup>8-9</sup>

### Demographic Characteristics of Participants

	SZ	HC	t or $\chi^2$	p
Age (years)	21.9 (2.5)	22.5 (3.0)	$t = -.74$	.47
Gender (% Female)	15.0	26.7	$\chi^2 = .73$	.39
Parental Education (years)	14.4 (2.9)	13.5 (2.8)	$t = .95$	.35
Race/Ethnicity			$\chi^2 = 2.98$	.56
% Hispanic or Latino	35.0	46.7		
% Asian	15.0	26.7		
% Black	15.0	13.3		
% White	25.0	13.3		
% Other	10.0	0.0		

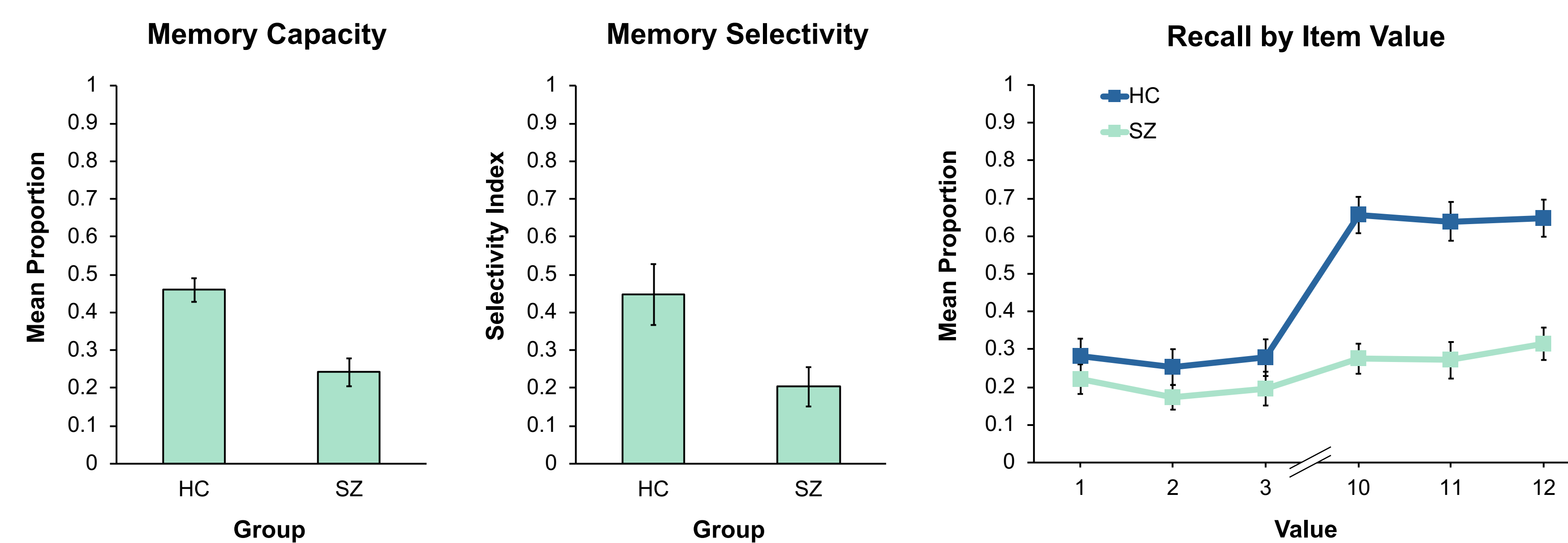
Values presented as mean (SD) or number (%). SZ, schizophrenia; HC, healthy controls.

### Task Schematic



## Results

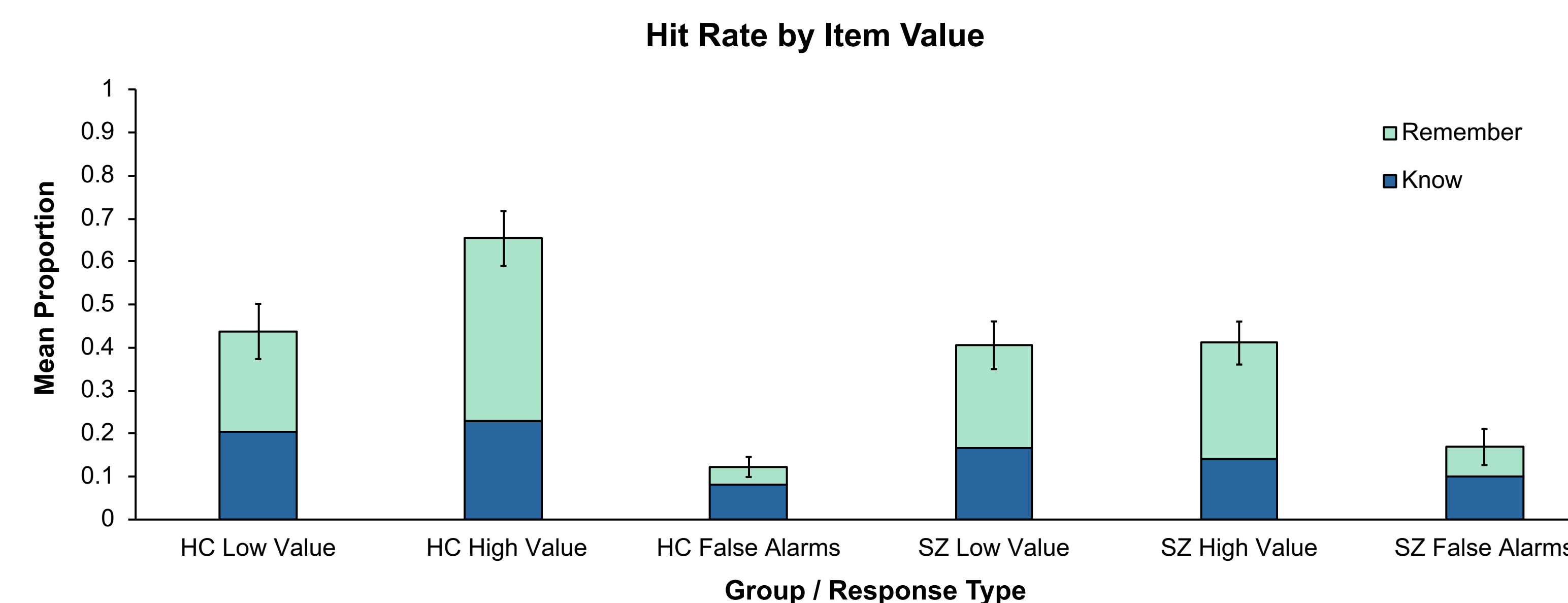
### Free Recall Test Performance



Error bars show  $\pm 1$  SE. HC, healthy controls; SZ, schizophrenia.

- The value-directed remembering task yields measures of *memory capacity*, or the number of items recalled, as well as *memory selectivity*, or the ability to recall high-value items given one's memory capacity, calculated as (actual score – chance score) / (ideal score – chance score)
- Individuals with schizophrenia showed reduced memory capacity,  $t = 4.31$ ,  $p < .001$
- Individuals with schizophrenia also showed reduced memory selectivity,  $t = 2.66$ ,  $p = .012$
- Group (healthy control, schizophrenia) interacted with item value (low, high),  $F = 19.60$ ,  $p < .001$

### Recognition Test Performance



Error bars show  $\pm 1$  SE. HC, healthy controls; SZ, schizophrenia.

- We investigated effects of value on recognition memory by looking at hit rate (items correctly identified as "old") by item value for items that were not previously recalled
- Group (healthy control, schizophrenia) interacted with item value (low, high),  $F = 13.58$ ,  $p = .001$
- There was also a group x value interaction for items marked "remember,"  $F = 6.12$ ,  $p = .019$
- False alarm rate did not differ across groups,  $t = 0.90$ ,  $p = .375$

## Conclusions

- Individuals with schizophrenia showed both memory and metamemory deficits on the value-directed remembering task
- Impaired ability to preferentially encode higher-value items in patients may reflect diminished recruitment of frontal lobe resources required for successful metamemory awareness and control
- Lack of value effects on recognition memory in patients may reflect impaired hippocampal functioning

## References

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