



# Remembering the link: Free-recall performance in individuals at risk for schizophrenia



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## INTRODUCTION

- **Schizophrenia** is a mental disorder that affects approximately 1% of people worldwide<sup>1</sup>.
- Cognitive changes, specifically **impairments of episodic memory**, are widespread in schizophrenia<sup>2</sup>, as well as in first-degree relatives<sup>3</sup>, who are at risk for developing the disorder (i.e. 10-16%)<sup>4</sup>.
- Other risk factors include having a first-degree relative with **schizoaffective (SZA) and/or bipolar disorder (BP)**<sup>5</sup> (i.e. high-risk) and having **ADHD and/or anxiety disorders** (i.e. mid-risk)<sup>6,7</sup>.
- Disruptions in **context-processing** may mediate these episodic memory changes<sup>8</sup> (barch's review paper).
- Prior studies have decomposed recall performance in schizophrenia patients and schizotypal individuals<sup>9,10,11</sup>.
- To investigate the status of context processing and episodic memory impairments in high-risk individuals, we employed a free-recall task and decomposed free recall performance into measures of first recall probability, serial position functions, and inter-item response times.

## HYPOTHESES

- ❖ We hypothesized that the high-risk group would demonstrate greater context deficits on the free recall task than the mid- and low-risk groups.
- ❖ Specifically, we hypothesized that recall deficits would be highest for the high-risk group, followed by the mid-risk and low-risk groups in a stepwise fashion.
- ❖ We expected lower first recall probability, depressed serial position functions, and longer interresponse times for the high-risk group.

## METHODS

|| **Participants** Children and adolescents (N = 58; age range: 9-16) at varying risk factors for schizophrenia completed a 5-trial, free-recall task.

Risk Group	N	Age	Characteristics
High risk	16	13.7	Neurotic first-degree relatives of people with a DSM-V diagnosis of schizophrenia, SZ, or BP.
Mid risk	22	13.9	Non-relatives with ADHD and/or an anxiety disorder.
Low risk	20	13.5	Non-relatives with ADHD, anxiety, or family history with schizophrenia, SZ, or BP.

|| **Test Procedure**



|| **Measures**

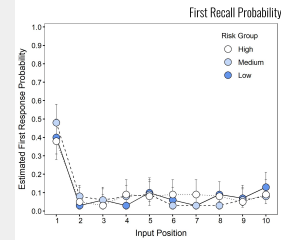
- **First Recall Probability (FRP)**: likelihood of initiating retrieval with the first list item.
- **Serial Position Function**: describes recall patterns (primacy & recency effects).
- **Interresponse Times (IRTs)**: demonstrates response latency. Longer IRTs typically indicate impaired use of context to limit search time.

## RESULTS

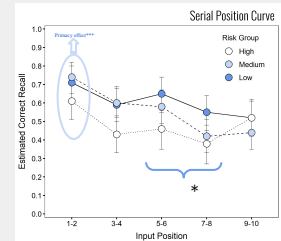


• Participants in different risk-groups significantly differed in the model-estimated probabilities for correct recall,  $\chi^2(2) = 6.60, p = .036$ . Pairwise comparisons demonstrated that high-risk participants recalled fewer words than low-risk participants,  $t(55.1) = -2.55, p = .035$  while the mid-risk participants did not significantly differ from other groups ( $ps > .05$ ).

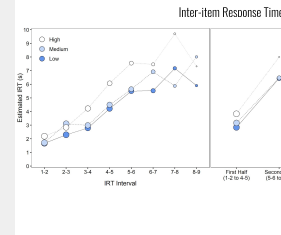
## RESULTS



- Significant effect of input position,  $\chi^2(9) = 256.67, p < .001$ , showing all participants most often initiated recall from the first position.
- No significant Risk Group x Input Position interaction,  $\chi^2(18) = 21.24, p = .267$ , suggesting that differences in recall are not due to differences in recall initiation.



- Significant effect of Input Position,  $\chi^2(4) = 69.28, p < .001$ , showing primacy effects for all risk groups.
- Significant Risk Group x Input Position interaction,  $\chi^2(8) = 17.55, p = .025$ , displaying that largest group differences were between the high- and low-risk groups in the intermediate positions.



- Significant effect of IRT Intervals,  $\chi^2(7) = 166.05, p < .001$ , showing all participants got progressively slower throughout the recall period.
- No significant Risk Group x IRT Interval interaction,  $\chi^2(14) = 9.41, p = .80$ , indicating participants in different risk groups did not differ on context use to limit search time.

## DISCUSSION

- These results demonstrate context processing deficits in high risk, first-degree relatives.
- **First recall probabilities** indicate that high-risk participants do not initiate recall differently than mid- and low-risk participants.
- Differences in **serial position curves** suggest that context processing deficits seen in high-risk individuals are more prominent towards the middle of the recall period.
- Participants from all risk groups showed progressively slower IRTs across recall period, suggesting that participants did not differ in their use of context to limit search time.
- However, it is plausible that our final sample was not powered enough to detect an effect in FRPs and IRTs.
- Future research could utilize tasks that require less contextual processing to further extend on our findings.

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