



# Deficits in recurrent cortical activity contribute to both perceptual and semantic deficits during object recognition in schizophrenia

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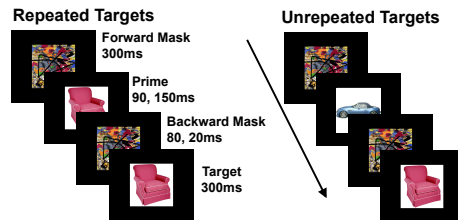


## INTRODUCTION

Schizophrenia patients show both early perceptual (1) and later semantic (2) deficits. It remains unclear when, during processing, such deficits arise: during an initial wave of feed-forward activation, or at a slightly later stage of recurrent cortical activity? We used a combination of event-related brain potentials (ERPs), and rapid masked repetition priming to examine the contributions of feed-forward and recurrent cortical activity to perceptual and semantic stages of object recognition in schizophrenia (3, 4).

## METHODS

- Masked picture priming paradigm with two prime durations (90 and 150 ms), SOA of 170 ms.
- 60 trials per condition
- Go-no go semantic categorization task: press only to food pictures (filler trials).
- ERPs: 29 channel recording (200 Hz, bandpass 0.01-40 Hz)



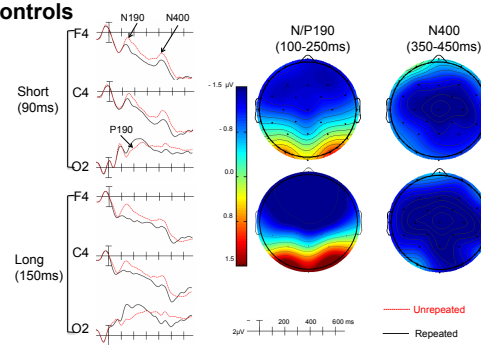
- Primes presented for 90ms: primarily captured the initial wave of feed-forward visual activation.
- Primes presented for 150ms: allowed for more recurrent cortical activity.
- Facilitation (priming) on the N/P190 and N400 evoked by the target provided a measure of perceptual and semantic activation (respectively) of the prime.

## PARTICIPANTS

	Gender (M/F)	Race (C/AA/Other)	Age (Years)	Hollingshead Index	CPZ Equiv. (mg)	Duration of illness (years)	PANSS total	PANSS hallucinations	PANSS delusions	PANSS disorg.	SANS total
Controls	15/9	20/2/2	44.7	3.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Patients	18/6	19/3/2	40.6	3.0	309.6	17.8	50.6	2.5	2.3	1.8	20.5

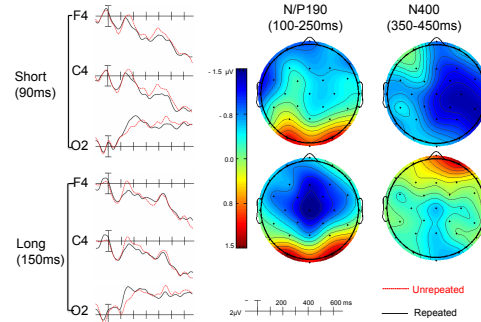
## RESULTS

### Controls



- Larger N/P190 repetition priming effect at the longer than the shorter prime duration.
- Repetition priming effect on the N400 at both the short and long prime durations.

### Patients



- Same degree of N/P190 priming across the two prime durations.
- An N400 effect only at the short prime duration.

## CONCLUSIONS

- The preserved N/P190 and N400 effects in patients at the shorter prime duration suggest that the initial wave of feed-forward visual activation was intact, leading to the activation of a perceptual representation of the prime which facilitated both perceptual and semantic processing of the target.
- Patients' failure to increase their N/P190 priming effect at the longer prime duration suggests that they were unable to further activate the perceptual representation of the prime through recurrent cortical activity.
- Patients' failure to produce any N400 effect at the longer prime duration suggests that they did not directly activate the semantic representation of the prime through recurrent activity.
- Taken together, these findings suggest that, while an initial wave of cortical activity is intact, deficits in recurrent feedback cortical activity may contribute to both perceptual and semantic abnormalities in schizophrenia.

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