

# Neural noise caused by executive dysfunction accounts for lexical-semantic deficits in first-episode psychosis

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**Conference presentation / Izlaganje na skupu**

<https://doi.org/10.5281/zenodo.4681225>

*Permanent link / Trajna poveznica:* <https://urn.nsk.hr/urn:nbn:hr:131:948847>

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*Download date / Datum preuzimanja:* **2024-07-17**

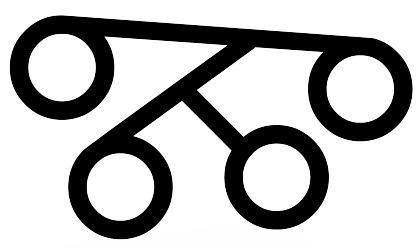


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# NEURAL NOISE CAUSED BY EXECUTIVE DYSFUNCTION ACCOUNTS FOR LEXICAL-SEMANTIC DEFICITS IN FIRST-EPISEODE PSYCHOSIS

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## INTRODUCTION

- ORGANIZATION OF KNOWLEDGE REFLECTED IN THE SEMANTIC MEMORY FOLLOWS A NATURAL TAXONOMY: CONCEPTS ARE STRUCTURED IN SYMMETRIC HYPONYMY AND HYPERNYMY (CATEGORY) RELATIONS, AND IN SCHIZOPHRENIA LANGUAGE PROCESSING INDICATES AN OVERINCLUSIVENESS IN SUCH RELATIONS (BREBION ET AL. 2010)
- RESULTS OF CATEGORIZATION STUDIES SHOW A BROADENING OF CATEGORY BOUNDARIES IN SCHIZOPHRENIA LANGUAGE PROCESSING (BREBION ET AL. 2010), WHILE SOME STUDIES CONCLUDE THERE IS A BROADENING OF AUTOMATIC ACTIVATION IN SEMANTIC MEMORY WHICH IS FURTHER VERIFIED BY NUMEROUS PRIMING STUDIES (KREHER ET AL. 2008)

- THIS STUDY TAKES INTO ACCOUNT FINDINGS OF BERBERIAN ET AL. (2016) WHO SUGGEST THAT THE DEFICITS ARE A RESULT OF A FAILURE TO DISTINGUISH THE TARGET SIGNAL FROM THE COMPETING NOISE
- IT IS A FOLLOW-UP OF GABRIĆ ET AL. (UNDER REVIEW) WHO PROPOSE A DYSFUNCTION OF AUTOMATED CONNECTIONS BECAUSE OF A STRONGER NEURAL NOISE IN FIRST-EPISEODE PSYCHOSIS (FEP) PATIENTS
- ALTHOUGH THESE STUDIES ARE BASED ON LANGUAGE PRODUCTION, SIMILAR RESULTS ARE EXPECTED IN LANGUAGE RECEPTION

## AIMS

THE AIM OF THIS STUDY WAS TO EXAMINE RECEPTION OF HIERARCHICAL RELATIONS OF HYPONYMY AND HYPERNYMY IN FEP, AS THEY OFFER A VIEW OF THE PRESERVATION OF CATEGORY BOUNDARIES.

**H1** THE PATIENT GROUP WOULD HAVE LESS CORRECT ANSWERS COMPARED TO THE CONTROL GROUP, BECAUSE OF A STRONGER NEURAL NOISE THAN THE CONTROL GROUP,

**H2** THE PATIENT GROUP WOULD CHOOSE SIGNIFICANTLY MORE PRAGMATICALLY RELATED DISTRACTORS, AS THEY WOULD BE ACTIVATED BUT NOT INHIBITED, BUT NOT OTHER DISTRACTORS AS THEY WOULD NOT BE ACTIVATED AT ALL.

## PATIENTS

- 17 CROATIAN SPEAKING FIRST-EPISEODE PSYCHOSIS (FEP) PATIENTS FROM THE UNIVERSITY PSYCHIATRIC HOSPITAL VRAPČE, SCHOOL OF MEDICINE, UNIVERSITY OF ZAGREB DIAGNOSED WITH AN ACUTE SCHIZOPHRENIA-LIKE PSYCHOTIC DISORDER OR ACUTE POLYMORPHIC PSYCHOTIC DISORDER WITH SYMPTOMS OF SCHIZOPHRENIA
- THE CONTROL GROUP: 17 HEALTHY SUBJECTS, MATCHED WITH PATIENTS BY AGE, SEX AND HANDEDNESS
- AVERAGE TIME AFTER THE FIRST PSYCHOTIC EPISODE WAS 1,18 (SD=1,63) MONTHS
- AVERAGE DAILY DOSE OF ANTIPSYCHOTICS EXPRESSED IN CHLORPROMAZINE EQUIVALENTS WAS 42,16 MG (SD=215,11)

## METHODS

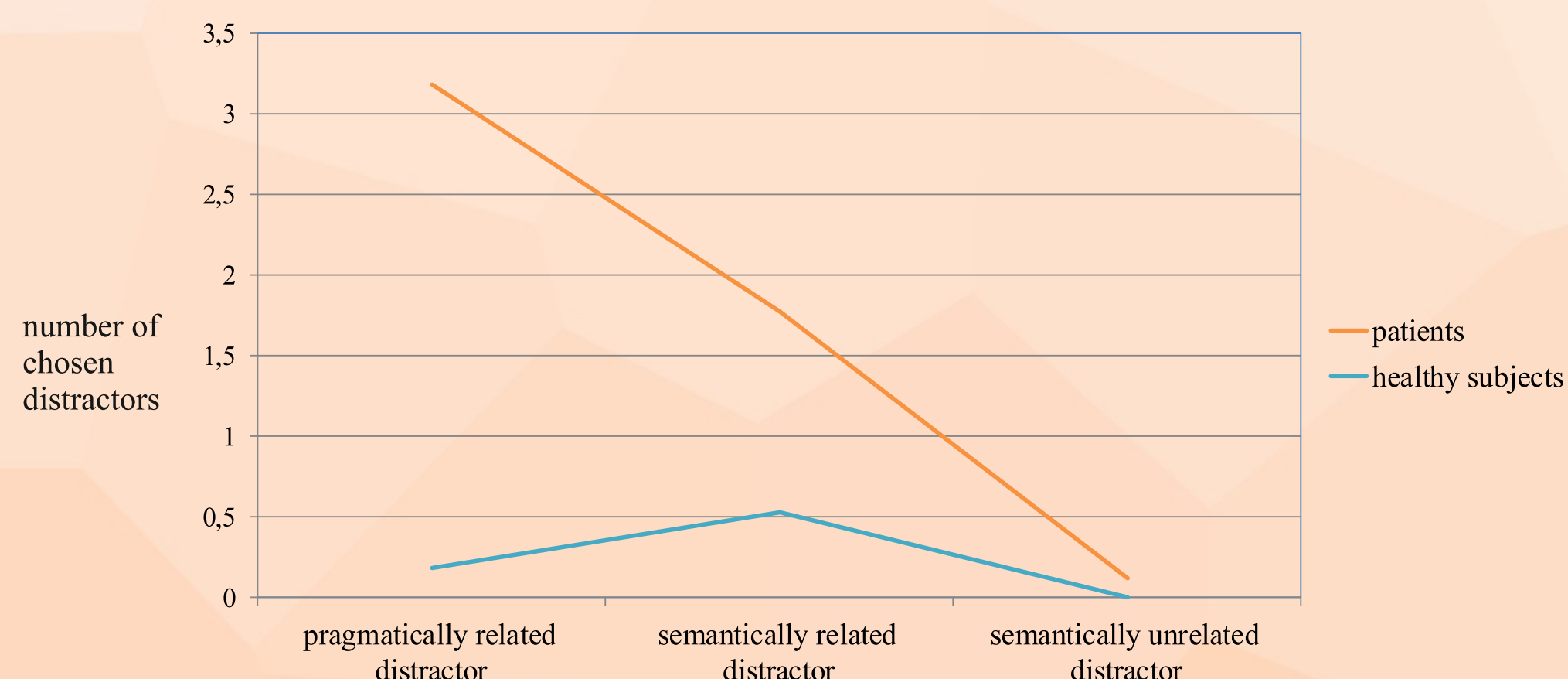
- THE CATEGORY RECEPTION TEST WAS COMPOSED OF 50 TRIALS FROM 10 DIFFERENT CATEGORIES
- DISTRACTORS WERE A PRAGMATICALLY RELATED DISTRACTOR, A SEMANTICALLY RELATED AND AN UNRELATED DISTRACTOR
- THE TARGET WORD IS A HYPONYM IN RELATION TO THE GIVEN CATEGORY
- THE TARGET WORDS AND DISTRACTORS ARE ALL CONSISTENTLY UNIFORMED HIGHLY FREQUENT AND CONCRETE WORDS

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## RESULTS AND DISCUSSION

- BOTH THE CONTROL AND PATIENT GROUPS ACHIEVED HIGH ACCURACY
- AVERAGE CORRECT RESPONSE FOR THE CONTROL GROUP WAS 49,29 (SD=1,21), WHILE THE PATIENTS' GROUP SCORED 45 CORRECT ANSWERS ON AVERAGE (SD=7,13)



- ON AVERAGE, PATIENTS CHOSE 3,18 (SD=5,11) PRAGMATICALLY RELATED, 1,77 (SD=2,49) SEMANTICALLY RELATED AND 0,12 (SD=0,33) UNRELATED DISTRACTORS
- ON AVERAGE, THE CONTROL GROUP CHOSE 0,18 (SD=0,53) PRAGMATICALLY RELATED, 0,53 (SD=0,94) SEMANTICALLY RELATED AND NONE OF THE PARTICIPANTS CHOSE AN UNRELATED DISTRACTOR
- ALTHOUGH THE MANN-WHITNEY U-TEST SHOWED THAT PATIENTS ANSWERS WERE SIGNIFICANTLY LESS ACCURATE IN COMPARISON WITH THE CONTROLS, NEVERTHELESS PATIENTS HAD AN AVERAGE OF 45 CORRECT ANSWERS OUT OF 50 TASKS. SUCH RESULTS OPEN A DISCUSSION ABOUT THE PRESERVATION OF THE SEMANTIC MEMORY

## CONCLUSIONS

- RESULTS SUPPORT THE HYPOTHESIS THAT LEXICAL-SEMANTIC DEFICITS CAN BE ATTRIBUTED TO STRONGER NEURAL NOISE AS THE PATIENT GROUP WAS UNABLE TO INHIBIT PRAGMATICALLY RELATED DISTRACTORS, BUT HAD NO NEED TO INHIBIT OTHER DISTRACTORS AS THEY WEREN'T ACTIVATED
- IN ADDITION, OUR RESULTS SUGGEST THAT STRONGER NEURAL NOISE IN FEP CAUSES AN OUTWARD SHIFT OF LEXICAL-SEMANTIC CATEGORY BOUNDARIES

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