



Letter to the Editor

Cat ownership in childhood and development of schizophrenia



Dear editor,

Studies indicate that having a cat in the household during childhood might have a connection to the development of schizophrenia. This connection could be explained by *Toxoplasma gondii* which the cat may carry. We identified four studies exploring the connection between cat ownership in childhood and the later development of psychosis (Supplement Table 1). The results of the studies have been contradictory.

Participants in the study were members of the Northern Finland Birth Cohort 1966 (NFBC 1966). Cat ownership in childhood was obtained retrospectively using a questionnaire that was filled out by the participants at the 31-year-old follow up (N = 5713). Additionally, as part of the 31-year-old follow up survey, four schizotypal trait scales were completed by 4866 participants, the scales were: revised Physical Anhedonia Scale (PAS, 61 items), Perceptual Aberration Scale (PER, 35 items), revised Social Anhedonia Scale (SAS, 40 items) and Schizoidia Scale (SCHD, seven items) (Miettunen et al., 2010).

Data on the development of schizophrenia was collected from the nationwide inpatient and outpatient registers. Finnish Care for Health Care Register covers all hospitals, outpatient clinics of hospitals and health centers in Finland. With the help of the special identification code used in Finland, we were able to connect register data to the NFBC 1966 data set. The study is under review in the local ethical committee. After a complete description of the study, written informed consent was obtained from all study participants.

We explored the connection between having a cat in childhood and later development of schizophrenia and schizotypal traits in a birth cohort, while taking into account a number of confounders. The aim was to find out if there is an association between having a cat in the household during childhood and the later development of schizophrenia and schizotypal traits.

Of the participants 49% owned cat in childhood (Supplement Table 2). Higher rates of cat ownership were associated with female sex, rural place of residence at birth, mother's lower education, unwantedness of the child and maternal depression during pregnancy. The overall attrition rate was 33% of all invited members of the NFBC 1966. Of the 166 invited patients with schizophrenia 111, (67%) did not participate.

One percent of the participants had a clinical diagnosis of schizophrenia. The cumulative incidence of schizophrenia was 0.9% for those who had had a cat in their household during childhood. The respective figure was 1.0% (p = 0.80) for those who had not had a cat in their household. Of the schizotypal scales, SAS, PER and SCHD associated positively with cat ownership. After adjusting for potential confounding variables, Social Anhedonia Scale (SAS) remained positively associated with cat ownership in childhood (p = 0.026) (Table 1). There was no interaction between sex and cat ownership. In separate analyses of the

urban born participants and the rural born participants, the only (adjusted) finding was association between SAS and cat ownership in childhood in the rural environment (p = 0.010).

Previous studies exploring cat ownership in childhood and schizophrenia has found a connection between them (Torrey et al., 2012; Yuksel et al., 2010; Torrey et al., 2015). One study has also found a connection between cat bites under the age of 13 and higher levels of schizotypy scores in the adulthood (Kolpakova and Bedwell, 2013). Our negative finding does not support these studies. However, our sample size was fairly small, and part of the cohort is from the Arctic area where the prevalence of *Toxoplasma gondii* is low (Parkinson et al., 2014). Nevertheless, we observed a positive association to Social Anhedonia which refers to vulnerability to schizophrenia. There exists one earlier study exploring the association between cat ownership and the risk of developing psychotic experiences (PEs) in early and late adolescence (Solmi et al., 2017). In the prospective Avon Longitudinal Study of Parents and Children (ALSPAC) study no connection between cat ownership and PEs were found.

This is the first study ever to find a connection between cat ownership in childhood and adult schizotypal traits. We were able to use multiple schizotypal traits. Of the four examined scales one showed an association with cat ownership in the childhood: the social anhedonia scale. Social Anhedonia is one of the basic features of people with schizophrenia (Chapman et al., 1976; Gooding et al., 2005).

The association between cat ownership and mental disorders might be due to *Toxoplasma gondii* infection, because cats are definite hosts of *Toxoplasma gondii*. Larger samples are needed to clarify whether there is a connection between cat ownership and schizophrenia and whether it is caused by exposure to *Toxoplasma gondii* or not.

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Conflict of interest

Authors had no conflict of interest.

CRediT authorship contribution statement

Johanna Palomäki: Writing - original draft, Writing - review & editing. **Jari Koskela:** Formal analysis, Methodology. **Jaana Suvisaari:** Writing - review & editing. **Robert Yolken:** Writing - review & editing. **Fuller Torrey:** Writing - review & editing. **Juha Veijola:** Supervision, Writing - original draft, Writing - review & editing.

Table 1

Mean and Standard deviation (SD) of the four schizotypal scales in participants with and without cat at home under the age of 7 years. And comparison of the means between the two groups.^a

	Cat at home when under age of 7				p-Value ^b	Adjusted p-Value ^c
	No		Yes			
	Mean	SD	Mean	SD		
Physical anhedonia scale	15.2	7.3	14.8	6.9	0.099	0.177
Social anhedonia scale	9.3	5.5	9.6	5.6	0.023	0.026
Perceptual aberration scale	2.2	3.1	2.5	3.3	<0.001	0.088
Schizoid scale	2.5	1.4	2.6	1.4	0.003	0.124

^a Statistically significant findings ($p < 0.05$) are in bold in the table. For statistical methods, please see Supplement text.

^b Mann-Whitney U test.

^c Linear regression was adjusted with gender, place of residence, mother's education and desirability of pregnancy. Logarithmic transformation was used for all other scales than Schizoid scale.

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Johanna Palomäki*

Jari Koskela

Department of Psychiatry, Research Unit of Clinical Neuroscience,
University of Oulu, Finland

*Corresponding author.

E-mail address: johanna.palomaki@student.oulu.fi.

Jaana Suvisaari

THL, Helsinki, Finland

Robert Yolken

Stanley Medical Research Institute, Kensington, MD, USA

Fuller Torrey

Laboratory of Developmental Neurovirology, Johns Hopkins University
Medical Center, Baltimore, MD, USA

Juha Veijola

Department of Psychiatry, Research Unit of Clinical Neuroscience,
University of Oulu, Finland

Department of Psychiatry, Oulu University Hospital, Finland
Medical Research Center Oulu, Oulu University Hospital and University of
Oulu, Finland

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