Full spectrum of mental disorders linked with childhood residential mobility

Pearl L.H. Mok a, *, Roger T. Webb a, Louis Appleby a, Carsten Bøcker Pedersen b, c

a Centre for Mental Health and Safety, University of Manchester, Jean McFarlane Building, Oxford Road, Manchester, England, M13 9PL, UK
b Centre for Integrated Register-based Research, CIRRAU, Aarhus University, Aarhus, Denmark
c National Centre for Register-Based Research, Aarhus University, Business and Social Sciences, Aarhus, Fuglesangs Alle 4, 8210 Aarhus V, Denmark

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A B S T R A C T

Although links between childhood residential mobility and subsequently increased risks of psychopathology have been well documented, associations across the full spectrum of psychiatric disorders are unknown. We conducted a population-based study of all 1,439,363 persons born in Denmark during 1971–1997 to investigate relationships between childhood cross-municipality residential moves from year of birth to age 14 years and the development of a range of psychiatric disorders from mid-adolescence to early middle age. We examined: (1) Any substance misuse disorders; specifically alcohol misuse, and cannabis misuse; (2) Any personality disorders; specifically antisocial, and borderline personality disorders; (3) Schizophrenia and related disorders; specifically schizophrenia, and schizoaffective disorder; (4) Any mood disorders; specifically bipolar disorder, and depressive disorder; (5) Any anxiety and somatoform disorders; specifically obsessive compulsive disorder; (6) Any eating disorders; specifically anorexia nervosa. Childhood residential mobility was associated with elevated risks of developing most psychiatric disorders, even after controlling for potential confounders. The associations generally rose with increasing age at moving and were stronger for multiple moves in a year compared to a single move. Links were particularly strong for antisocial personality disorder, any substance misuse disorder, and cannabis misuse in particular, for which the highest increases in risks were observed if relocation occurred during adolescence. Childhood residential change was not linked to subsequent risk of developing an eating disorder. Frequent residential mobility could be a marker for familial adversities. Mental health services and schools need to be vigilant of the psychosocial needs of children, particularly adolescents, who have recently moved homes.

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1. Introduction

It is well established that exposure to familial adversities and environmental instability during upbringing are associated with subsequently increased risks of psychopathology and other negative outcomes (Boynton-Jarrett et al., 2013; Felitti et al., 1998; Green et al., 2010; Kessler et al., 2010). Residential changes during childhood, which could entail familial, school, social and routine disruptions, have been linked to poor mental health, psychological distress (Brown et al., 2012; Jelleyman and Spencer, 2008; Tseliou et al., 2015), suicidal behavior (Potter et al., 2001; Qin et al., 2009), violence (Haynie and South, 2005), poorer educational attainment (Pribesh and Downey, 1999) and early initiation of illicit drug use (DeWit, 1998). In the United States, 14% of children under aged 15 years moved homes during 2014–2015 (United States Census Bureau, 2015). Residential mobility is thus quite common during upbringing. Despite the large body of literature documenting the links between childhood residential moves and risks of subsequent psychopathology, associations with the development of specific psychiatric illnesses across the full spectrum of disorder are currently unknown. Furthermore, no previous studies have examined a broad array of psychiatric diagnostic outcomes in the same cohort to enable direct comparison of these risks. Childhood residential mobility has been linked to a higher prevalence of drug misuse and related problems in adulthood (DeWit, 1998), and...
increased risk of developing depression (Gilman et al., 2003; Susukida et al., 2015). However, these studies, while valuable, were often limited in accuracy regarding exposure measurement, length of follow-up, or statistical power. They were also susceptible to recall bias, or they only examined the total number of moves through childhood, leaving ambiguity as to whether risks of developing disorders vary according to age at exposure to residential mobility.

Using prospective data from the national Danish registers that were free of many of the methodological limitations mentioned above, Paksarian et al. (2015) investigated the links between childhood residential mobility and subsequent risk of schizophrenia and bipolar disorder onset. After adjusting for familial confounders, the study found that residential mobility each year from age 1 to 14 years was associated with raised risk of schizophrenia, while associations with bipolar disorder were weaker and less widespread across the exposure-age spectrum. Similarity, again using the Danish national registers, Webb et al. (in press) found that childhood residential mobility was linked to elevated risk of multiple adverse outcomes occurring from mid-adolescence until early middle age, including attempted suicide, violent offending and premature death. Denmark is the only country in the world to have a complete nationwide longitudinal information on residential location, thus providing a unique opportunity to conduct studies of this kind. We herein extended the work by Paksarian et al. (2015) and Webb et al. (in press), investigating the links between childhood residential mobility and subsequent development of a broad range of psychiatric disorders including:

1. Any substance misuse disorders; specifically alcohol misuse, and cannabis misuse
2. Any personality disorders; specifically antisocial personality disorder, and borderline personality disorder
3. Schizophrenia and related disorders (hereafter ‘broad schizophrenia’); specifically schizophrenia (hereafter ‘narrow schizophrenia’), and schizoaffective disorder
4. Any mood disorders; specifically bipolar disorder, and depressive disorder
5. Any anxiety and somatoform disorders; specifically obsessive-compulsive disorder (OCD)
6. Any eating disorders; specifically anorexia nervosa.

We also examined gender-specific associations.

2. Methods and materials

2.1. Study population

Since 1968 the Civil Registration System has registered all persons living in Denmark (Pedersen et al., 2006). It captures information such as date and place of birth, identity of parents and siblings, and continuously updated information on vital status and place of residence. The unique personal identification number assigned to every resident enables accurate linkage across all national registers. Our study population included all persons born in Denmark to Danish-born parents during 1971–1997, who were residing in the country on their 15th birthday (N = 1,439,363).

2.2. Ethics and consent statements

Approval to conduct this study was granted formally by the Danish Data Protection Agency (file number 2013-41-2265), and data access was agreed by the State Serum Institute and Statistics Denmark (FSE ID 820).

Since this project was based exclusively on registry data it did not need approval from the Danish National Committee on Health Research Ethics. According to the Danish Act on Processing of Personal Data, section 10, this also meant that the investigators were not required to obtain informed consent from persons in the study population.

2.3. Residential mobility

Residential changes were defined as moves between any of the 276 municipalities in Denmark, using boundaries defined before the 2007 municipality reform, which reduced the number of municipalities from 276 to 96. This definition used was the same as in Paksarian et al. (2015). To focus on moves that may have greater psychological impact, change of address within the same municipality was not investigated (Pedersen and Mortensen, 2001a). For each person in the study cohort, we calculated the total number of moves each year from their year of birth through age 14 years.

2.4. Psychiatric disorders

Mental illness histories, for cohort members as well as their parents and siblings, were obtained from the Psychiatric Central Research Register (Mors et al., 2011), which was computerized in 1969 and contains data on all admissions to psychiatric inpatient facilities. Information on all contacts with psychiatric outpatient and emergency care units has also been captured since 1995. During years 1969 through 1993, the diagnostic system used was the Danish modification of the International Classification of Diseases, 8th revision (World Health Organization, 1971), and from 1994, the International Classification of Diseases, 10th revision, Diagnostic Criteria for Research (World Health Organization, 1993). Classifications of the psychiatric disorders investigated are shown in eTable 1 in the online supplement. Onset of each psychiatric disorder was defined as the date of first contact as an inpatient or outpatient, or with psychiatric emergency care. Individuals diagnosed with more than one disorder were included in the analysis of each disorder.

2.5. Other measures

Urbanization of birthplace was classified as central area of the capital city (Copenhagen), suburb of the capital, provincial city, provincial town, or rural (Statistics Denmark, 1997). Information on parental socioeconomic status (SES) was obtained from the Integrated Database for Labour Market Research (Danmarks Statistik, 1991), and was derived from paternal and maternal income, highest educational attainment and employment status, measured in the year of cohort members’ 15th birthdays, as reported previously (Webb et al., 2015).

2.6. Study design and statistical analyses

For each psychiatric disorder examined, cohort members were followed up from their 15th birthday until first treatment of the disorder, death, emigration from Denmark, or December 31st 2013, whichever came first. The cohort was followed up for a total of 20.4 million person-years. Log-linear Poisson regression models were fitted using the SAS 9.2 GENMOD procedure (SAS Institute Inc., 2008) to estimate incidence rate ratios (IRRs). The generic reference category consisted of children who did not move during each age-year of observation. All models were adjusted for age, gender, and calendar year. Additional adjustments were made for: (a) mental disorder in a parent or sibling, urbanicity of place of birth (Pedersen and Mortensen, 2001b), and parental age at time of the
child’s birth (McGrath et al., 2014); (b) parental SES. Age, calendar year, and family psychiatric history were included as time-varying covariates. Gender, parental age, urbanicity, and SES were time-fixed. Likelihood ratio-based 95% confidence intervals were calculated for each IRR point estimate, and likelihood ratio interaction tests were used to formally assess effect modification by cohort members’ gender. Due to the many tests performed, we denote estimates as being statistically significant if \( p < 0.003 \), approximating a Bonferroni correction for multiple testing within each outcome category (Bland and Altman, 1995).

3. Results

Fig. 1 shows the frequencies of cross-municipality residential change from the year of birth to age 14 years for the study population. Residential change occurred most commonly in the one year period after birth and generally became less frequent with increasing age during upbringing. Given that the great majority of those who relocated only moved once in a particular year, residential mobility in a given year was categorized as one versus two or more moves in all subsequent analyses.

IRRs for psychiatric disorders associated with childhood residential change, adjusted for age, sex, calendar year, mental illness in a parent or sibling, parental age, and urbanization of place of birth, are presented in: Fig. 2 – for (a) any substance misuse disorders, (b) alcohol misuse, (c) cannabis misuse, (d) any personality disorders, (e) borderline personality disorder, and (f) antisocial personality disorder; Fig. 3 – for (a) broad schizophrenia, (b) narrow schizophrenia, (c) schizoaffective disorder, (d) any mood disorders, (e) bipolar disorder, and (f) depressive disorder; Fig. 4 – for (a) any anxiety and somatoform disorders, (b) OCD, (c) any eating disorders, and (d) anorexia nervosa.

Childhood residential mobility was associated with elevated risks of developing most psychiatric disorders. For any substance misuse disorders, alcohol misuse, cannabis misuse, any personality disorders, borderline personality disorder, broad and narrow schizophrenia, any mood disorders, depressive disorder, and any anxiety and somatoform disorders, relocation at any age from birth to age 14 years was associated with raised risks of developing these disorders. Increased risks for antisocial personality disorder were also linked with moving at any age except for at age 1. Although the patterns of association for any mood disorders were less clear, moving two or more times in any one year was in general associated with higher risks of developing these disorders compared with just a single move. For both single and multiple moves, risks tended to rise with increasing age of residential change from around age 9 years. In addition, exceptionally large elevation in risks linked with multiple moves at age 13 and 14 years was observed for any substance misuse disorders, and cannabis misuse in particular, and antisocial personality disorder. The risk of developing a psychiatric disorder associated with each age-year of exposure to multiple moves was also almost consistently higher for antisocial personality disorder than for any other psychiatric diagnostic category examined.

Residential mobility in the year of birth, and at ages 9, 10, and 13 years were associated with significantly raised risks of developing schizoaffective disorders, while for bipolar disorder, heightened risks were linked with moving at ages 2, 4, 5, 7, 9, 13 and 14 years, but not at other ages. For OCD, elevated risks were observed for residential changes at ages 13 or 14 years only, while moving homes at any age during development was not linked with heightened risks of developing eating disorders beyond mid-adolescence.

IRRs adjusted for age, sex, and calendar year only, the most basic level of adjustment, were shown in eFigures 1–3 in the online supplement. Comparisons with Figs. 2–4 shows that additional adjustments for familial mental illness, parental age and urbanization further attenuated the IRRs, as well as narrowing the observed risk differentials between single and multiple moves. The degree of attenuation was particularly appreciable for the three substance misuse disorder categories, the three personality disorder categories, broad and narrow schizophrenia, and schizoaffective disorders. IRRs were also similarly attenuated, albeit to a slightly lesser extent, when adjusted for parental SES instead of for familial mental illness, urbanization and parental age. The exceptions were all eating disorders combined and anorexia nervosa specifically, for which SES adjustment did not lead to further attenuation of the IRRs compared with basic adjustments. More detailed results are shown in Table 1, in which we compare IRRs associated with a residential change at age 14 years for the three types of adjustments, as well as for full adjustments where all potential confounders examined were included. These models showed that 49% of the risk for antisocial personality disorder, and around 40% for each of the three substance misuse disorder categories, associated with a residential change at age 14 years could be explained by familial mental illness, urbanization, parental age and SES. Even after adjusting for all potential confounders examined here, residential change at age 14 years was linked with significantly raised risks of developing most psychiatric disorders, with the associations being particularly strong for antisocial personality disorder and cannabis misuse.

Table 1 also shows whether the associations between residential change at age 14 years and risks of psychiatric disorders differed by gender. Using the Bonferroni correction to account for multiple significance testing, any personality disorders was the only diagnostic category showing a significant gender interaction, with the associations being stronger for males than for females.

4. Discussion

4.1. Main findings

In a national cohort of almost 1.5 million people, we found that childhood residential mobility, defined in this study as moves across municipality boundaries, was associated with elevated risks of developing most psychiatric disorders between mid-adolescence.
and early middle age. The associations generally strengthened with increasing age at moving and were greater for multiple moves in a year compared to a single move, and strengths of association observed varied considerably across the diagnostic categories examined. Elevations in risk were particularly marked for antisocial personality disorder, any substance misuse disorders and cannabis misuse in particular, for which higher increases in risks were also observed if relocation occurred during early adolescence. Relocation at any age during development was not linked to onset of any eating disorders per se or anorexia nervosa specifically. Investigation at age 14 years showed that, with the exception of personality disorders, risks for developing psychiatric illnesses were not modified by gender.

4.2. Evidence from existing research

To our knowledge, this is the first study investigating the link between childhood residential mobility and the subsequent risk of developing psychopathology across the full spectrum of mental disorders. Our findings were generally in line with those reported previously (Brown et al., 2012; DeWit, 1998), which showed that frequent childhood geographic relocation was associated with elevated risk of drug misuse in adulthood. Unlike DeWit (1998), however, who reported significant associations with drug misuse primarily amongst males, we found no significant gender interactions with the development of all substance misuse disorders combined and cannabis misuse specifically. Also, unlike Brown et al. (2012), who reported no elevated risk for anxiety disorders, we found that mobility at any age during development was linked with increased risks for anxiety and somatoform disorders in adulthood. For depressive disorders, our results were in line with those from Susukida et al. (2015), who reported that adolescents who moved in the past five years had higher odds of major depressive episode than those who did not. We have additionally shown that increased risks were also linked with residential mobility from birth to age 7 years, and that elevated risks for depression extended into adulthood. This latter finding was in contrast to those from Gilman et al. (2003), who reported a significant association between residential change before age 7 years and onset of depression before age 15 years, but not after. These
discrepancies in findings were likely to be at least partly due to the differences in study design and exposure and outcome definitions used.

4.3. Interpretation

Reasons for the observed associations between childhood residential moves and the subsequent development of psychiatric disorders are likely to be complex and variable between families. We propose several explanations for our findings.

Firstly, increased risk for onset of mental disorders between mid-adolescence and early middle age could be a consequence of serious and enduring difficulties within families, rather than being a direct result of residential mobility. Relocation occurs more commonly amongst single parent and step families and those from lower socioeconomic background (Astone and McLanahan, 1994; Susukida et al., 2015; Tseliou et al., 2015). Frequent relocation thus could be a marker for familial dysfunction and psychosocial adversity, which are known risk factors for adolescence delinquency and adult psychopathology (Boynton-Jarrett et al., 2013; Dong et al., 2005; Green et al., 2010; Kessler et al., 2010). However, while we did not examine breakdown of parental relationship, much of the increased risks for psychiatric disorder remained after parental SES was adjusted for, suggesting that the associations between childhood residential change and the subsequent development of mental disorders could not be fully explained by familial socioeconomic disadvantages.

Secondly, related to the first proposed mechanism, individuals with a severe mental illness are more likely than those without a disorder to be residentially mobile (Lix et al., 2006). The development of psychiatric disorders following residential changes thus could be attributed to intergeneration transmission of psychiatric disorders (Dean et al., 2010; Henin et al., 2005; Mortensen et al., 1999), rather than as a direct consequence of the moves. As in the case of parental SES, adjusting for familial history of mental disorders in our analyses did attenuate the IRRs. However, the associations between childhood residential mobility and risk for mental disorder onset in later life persisted, suggesting that the elevated risks observed cannot wholly be explained by familial transmission of psychopathology.

Thirdly, families may move because of prodromal symptoms, including problematic behaviors, in older children and early life.
adolescents (Gasper et al., 2010). This suggests that prior to the residential moves some children might already be showing signs of psychopathology who then subsequently received a formal diagnosis of their disorder. The residential moves per se might or might not have exacerbated these pre-existing disorders.

Finally, the link between childhood residential move and the subsequent development of psychiatric disorders could indeed be causal. Moving home is a source of stress, to parents as well as their children, especially if the latter are not involved in the decision making process. Residential changes across municipalities in Denmark also almost always involve school transfers. These changes in both neighbourhood and school environments lead to the disruption of routines and social networks, the detrimental impact of which increases as children get older (Herbers et al., 2013; Pribesh and Downey, 1999). Negative behaviors such as drug-taking may provide a quick route via which relocated and marginalised adolescents try to gain acceptance in a new social environment (DeWit, 1998).

Fig. 4. IRRs associated with residential change for: (a) Any anxiety and somatoform disorders; (b) Obsessive compulsive disorder; (c) Any eating disorders; (d) Anorexia nervosa. All estimates adjusted for age, sex, calendar year, mental illness in a parent or sibling, parental age at time of child's birth, and urbanization of place of birth.

Table 1
Incidence rate ratios (and 95% CI) associated with a residential change at age 14 years for different sets of confounder adjustments and p-values for tests of effect modification by gender.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>No of cases</th>
<th>Basic adjustmenta</th>
<th>Second adjustmentb</th>
<th>Third adjustmentc</th>
<th>Full adjustmentd</th>
<th>P-value for gender specific effectse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any substance misuse disorders</td>
<td>24,935</td>
<td>3.40 (3.24–3.56)</td>
<td>2.36 (2.25–2.48)</td>
<td>2.45 (2.33–2.56)</td>
<td>2.05 (1.96–2.15)</td>
<td>0.04</td>
</tr>
<tr>
<td>Alcohol misuse</td>
<td>10,843</td>
<td>2.90 (2.69–3.12)</td>
<td>2.04 (1.89–2.20)</td>
<td>2.13 (1.97–2.30)</td>
<td>1.78 (1.65–1.92)</td>
<td>0.76</td>
</tr>
<tr>
<td>Cannabis misuse</td>
<td>10,415</td>
<td>3.78 (3.53–4.04)</td>
<td>2.55 (2.38–2.73)</td>
<td>2.69 (2.51–2.88)</td>
<td>2.22 (2.07–2.38)</td>
<td>0.009</td>
</tr>
<tr>
<td>Any personality disorders</td>
<td>32,601</td>
<td>2.89 (2.77–3.02)</td>
<td>2.12 (2.03–2.22)</td>
<td>2.21 (2.12–2.31)</td>
<td>1.89 (1.81–1.97)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Borderline personality disorder</td>
<td>9075</td>
<td>3.11 (2.87–3.36)</td>
<td>2.17 (2.01–2.35)</td>
<td>2.36 (2.17–2.55)</td>
<td>1.95 (1.80–2.12)</td>
<td>0.15</td>
</tr>
<tr>
<td>Antisocial personality disorder</td>
<td>1791</td>
<td>5.42 (4.69–6.25)</td>
<td>3.40 (2.92–3.93)</td>
<td>3.47 (2.99–4.01)</td>
<td>2.79 (2.40–3.23)</td>
<td>0.61</td>
</tr>
<tr>
<td>Broad schizophrenia</td>
<td>18,170</td>
<td>2.45 (2.30–2.60)</td>
<td>1.82 (1.71–1.94)</td>
<td>1.88 (1.77–2.00)</td>
<td>1.63 (1.53–1.73)</td>
<td>0.01</td>
</tr>
<tr>
<td>Narrow schizophrenia</td>
<td>10,065</td>
<td>2.49 (2.29–2.70)</td>
<td>1.84 (1.69–2.00)</td>
<td>1.89 (1.74–2.05)</td>
<td>1.64 (1.50–1.78)</td>
<td>0.09</td>
</tr>
<tr>
<td>Schizoaffective disorder</td>
<td>1148</td>
<td>1.66 (1.23–2.20)</td>
<td>1.23 (0.90–1.63)</td>
<td>1.33 (0.98–1.76)</td>
<td>1.14 (0.84–1.52)</td>
<td>0.85</td>
</tr>
<tr>
<td>Any mood disorders</td>
<td>49,052</td>
<td>8.88 (8.18–9.68)</td>
<td>5.50 (4.44–6.57)</td>
<td>5.59 (5.12–6.16)</td>
<td>4.11 (3.54–4.71)</td>
<td>0.32</td>
</tr>
<tr>
<td>Bipolar disorder</td>
<td>5026</td>
<td>1.77 (1.54–2.02)</td>
<td>1.39 (1.21–1.59)</td>
<td>1.55 (1.35–1.77)</td>
<td>1.35 (1.17–1.54)</td>
<td>0.22</td>
</tr>
<tr>
<td>Depressive disorder</td>
<td>44,808</td>
<td>1.89 (1.81–1.97)</td>
<td>1.51 (1.44–1.58)</td>
<td>1.60 (1.53–1.67)</td>
<td>1.42 (1.36–1.48)</td>
<td>0.30</td>
</tr>
<tr>
<td>Any anxiety and somatoform disorders</td>
<td>77,590</td>
<td>2.19 (2.12–2.26)</td>
<td>1.69 (1.63–1.74)</td>
<td>1.76 (1.71–1.82)</td>
<td>1.54 (1.49–1.59)</td>
<td>0.11</td>
</tr>
<tr>
<td>Obsessive compulsive disorder</td>
<td>6515</td>
<td>1.13 (1.14–1.50)</td>
<td>1.14 (0.99–1.30)</td>
<td>1.19 (1.04–1.36)</td>
<td>1.10 (0.96–1.26)</td>
<td>0.37</td>
</tr>
<tr>
<td>Anorexia nervosa</td>
<td>3287</td>
<td>1.12 (0.91–1.37)</td>
<td>1.09 (0.89–1.33)</td>
<td>1.20 (0.98–1.46)</td>
<td>1.16 (0.94–1.41)</td>
<td>0.85</td>
</tr>
</tbody>
</table>

a Basic adjustment: age, sex, calendar year.
b Second adjustment: age, sex, calendar year, history of mental illness in mother, father or sibling, urbanization of place of birth, and parental age at time of child’s birth.
c Third adjustment: age, sex, calendar year, and parental SES.
d Full adjustment: all potential confounders examined.
e Statistically significant at p < .003 (Bonferroni-corrected significance level: .05/16). Bold face represents statistically significance at this level.
4.4. Strengths and limitations

One of our study’s main strengths was the size of the cohort, which enabled examination of exposure to residential moves during each age-year of upbringing, as well as gender-specific associations. By using a prospective design and national registry data, our study was free of recall and attrition biases, which would be particularly salient if residential moves occurred frequently and if the follow-up period was long. By including only individuals with Danish-born parents, we effectively controlled for increased risk of psychiatric disorder linked with inter-country migration (Cantor-Graae and Pedersen, 2013). The most significant limitation of our study is that we do not know the context of residential changes and, although we controlled for a number of potential confounders, others such as parental separation were not investigated. However, Tseliou et al. (2015) reported that parental relationship breakup did not modify the link between childhood residential change and poor mental health ten years on, suggesting that some of the links that we observed may be causal. In addition, most people who experience mental disorders with milder symptoms are not treated for these disorders in psychiatric units, and so many of these cases will not have been recorded in the Psychiatric Central Research Register. Issues with stigma might also be a barrier to seeking treatment. Hence, only cases of psychiatric disorders with a higher degree of severity treated in secondary care settings were investigated in our study. Persons with eating disorders or OCD without comorbidity are also likely to be treated in outpatient rather than inpatient settings. Since information on outpatients was not available until 1995, we may not have captured some of these cases of disorders for those born earlier in our cohort. However, the same may also be said for personality disorders, for which particularly strong associations with residential moves were observed. Thus, if outpatient information was available for earlier periods, we may have observed even larger effect sizes for personality disorders. Furthermore, as our study cohort includes those who were born between 1971 and 1997, and parental SES data were only available from 1981 onwards, we were unable to adjust for parental SES from the time of each cohort member’s birth. Parental SES was instead measured at a fixed time-point, in the year of start of follow-up when cohort members turned age 15 years.

5. Conclusions

Our study indicates that childhood residential mobility is associated with increased risks of developing a broad array of psychiatric disorders on reaching maturity. Our findings showed marked heterogeneity in the observed strengths of association across this spectrum. The greatest elevation in risk was found in behavior-related disorders — antisocial personality disorder and cannabis misuse. Frequent residential mobility could be a marker for familial adversities. Community and mental health services, as well as schools and colleges, need to be vigilant of the psychosocial needs of children, particularly adolescents, who have recently moved homes. Further research is warranted to explore the mechanisms that explain these observed links between childhood residential relocation and the subsequent onset of psychiatric illness.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.jpsychires.2016.03.011.

Author contributions

Dr Pedersen had full access to all the data in the study and takes full responsibility for the integrity of the data and accuracy of the data analysis.

Study concept and design: All authors.

Acquisition, analysis or interpretation of data: All authors.

Drafting of the manuscript: Mok.

Critical revision of the manuscript for important intellectual content: All authors.

Statistical analysis: Pedersen.

Obtained funding: Webb.

Administrative, technical, or material support: Pedersen, Webb.

Study supervision: Pedersen, Webb.

Role of the funding source

The funding source had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Conflicts of interest

None.

References


