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The effect of being left home alone at age 3 years on schizotypy and antisocial behavior at ages 17 and 23 years

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ABSTRACT

Objective: Negative home environments are associated with both schizophrenia-spectrum disorders and crime, but whether this is due to the social or cognitive sequelae of such environments is unclear. This study investigates the effect of early home environments on adult mental health.

Method: Using data from the Mauritius Child Health Project, a multiple time-point prospective study where all children born in 1969 in two towns (Quatre Bornes and Vacaos) were recruited at age 3 years (N = 1794), a group of children left home alone at age 3 (n = 34) were compared to children cared for by siblings/relatives (n = 222), or by mothers (n = 1498) on antisocial behavior and schizotypal personality at ages 11, 17, and 23 years.

Results: Home alone children showed higher scores on psychotic behavior and conduct disorder at age 17, and also schizotypal personality and crime at 23 years compared to the other groups. No negative behavioral or cognitive effects were observed at age 11. Findings were not accounted for by social adversity or ethnicity and appear to be 'sleeper effects' in that they do not emerge until later adolescence and into adulthood.

Conclusions: Findings appear to be the first to show the negative effects of dual-parental daytime absence on adult schizotypy and crime, a finding that cannot be accounted for by verbal and spatial cognitive impairments. Results suggest an early common psychosocial denominator to the two comorbid conditions of antisocial behavior and schizotypy.

1. Introduction

Schizophrenia has often been thought to be a risk-factor for violence and criminal behavior, with patients being on average 7 times more likely to commit homicide than controls (Eronen et al., 1996). Conversely, incarcerated homicide offenders have also been found to have higher rates of schizophrenia than offenders of other crimes (Arseneault et al., 2003; Fazel et al., 2009a), with a large meta-analytic review of 9 international studies suggesting an overall large effect between schizophrenia and violence, $d = 0.81$ (Brennan and Alden, 2006). Patients with psychosis have 20%–33% chance of being victims of violent crime compared to the general population (de Vries et al., 2018). Although the relationship between schizophrenia and crime is well established over the last three decades (Raine, 2006), what is less researched are the factors common to *both* schizophrenia and crime, which are necessary to help us understand the etiology of these disabling conditions. Structural abnormalities in the prefrontal cortex, temporal cortex, and the amygdala-hippocampal complex have been hypothesized to be related to criminals and patients with schizophrenia (Cannon and Raine, 2006); and relatedly, in community adults with antisocial behavior and schizotypy (Lam et al., 2015). Comorbid substance abuse characterizes violence in patients with schizophrenia (Brennan and Alden, 2006; Fazel et al., 2009b) and schizophrenia-spectrum disorders such as schizotypal personality disorder (Toftdahl et al., 2016). Furthermore, cognitive impairments in executive functioning have been found to predispose to later crime, schizophrenia (Brower and Price, 2001; Minzenberg et al., 2009), and schizotypal personality disorder (Seeber and Cadenhead, 2005; Trotman et al., 2006).

One plausible etiological process common to both schizophrenia-spectrum disorders including schizotypal personality and antisocial criminal behavior is a negative home environment. This is consistent with studies on the effects of early childhood institutional deprivation on later mental health problems, such as the English and Romanian Adoptees study (Rutter, 1998). A comprehensive review of more than

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130 studies on early childhood trauma and adult psychosis demonstrated a dose-response relationship, whereby increased abuse predicts an increase in psychotic symptoms (Read et al., 2005). Population-based studies sampling individuals yet to have contact with mental health services also support a possible causal link between childhood trauma and later psychotic symptoms (Kelleher et al., 2008), and considerable evidence for childhood maltreatment predisposing to later antisocial behavior has also been reported (Caspi et al., 2002). Notably, poor parental supervision is one of the strongest predictors of later conduct disorder and crime (Farrington, 2010). Disruption to the parent-child relationship may therefore be an early developmental risk-factor for both schizophrenia-spectrum disorders and crime.

An important methodological issue in arguing that disruption to the child-parent relationship results in later psychopathology is that early social adversity (e.g., living in poor housing, uneducated parents, parental mental illness, overcrowded house, no electricity) has been consistently associated with poor cognitive functioning (Hackman et al., 2010). Consequently, the relationship between parent-child attachment and both crime and schizotypal personality may be a confound of cognitive dysfunction. Similarly, social deprivation is also associated with poor nutrition, which in turn is associated with both antisocial behavior and schizotypal personality (Neugebauer et al., 1999; Venables and Raine, 2012). This is a particularly difficult methodological issue to overcome given that social relations cannot be experimentally manipulated independent of the cognitive and nutritional sequelae of early deprivation, but maybe observed in a prospective cohort study like this one.

This study reports on the effects of being left home alone early in life on the individual's antisocial and psychotic behaviors in late adolescence and adulthood using a prospective cohort longitudinal study, the Mauritius Child Health Project ($N = 1794$). We capitalize on the unique multiple time-point design of the project. First, home alone children were compared to children cared for by their siblings/relatives and those cared for by their mothers on cognitive functioning at 3 and 11 years. Second, groups were compared on measures of antisocial and schizotypal personality at 11, 17, and 23 years. Third, to test whether relationships were specific to externalizing behaviors, groups were compared on measures of anxiety, withdrawal, depression (internalizing behavior) and alcohol use. Fourth, we controlled for ethnicity and social adversity, an index composed of 14 indicators, to examine whether group differences on antisocial behavior and schizotypal traits were sustained.

2. Method

2.1. Participants

Participants were drawn from the Mauritius Child Health Project cohort of 1794 children, of which 51.8% were male (Raine et al., 2010). Children born in 1969 in two towns (Quatre Bornes and Vacaos) were recruited at age 3 years. The ethnic makeup of this self-identified birth cohort was: 68.3% Indian (Hindu, Tamil, Muslim), 25.7% Creole, 1.8% Chinese, and 3.8% other (English or French decent). Females made up 48.2% of the sample. Parental verbal informed consent was initially obtained and in later waves of the study, directly from the subjects themselves. The work was carried out in accordance with the ethical standards of the Declaration of Helsinki (1964) for the early phases and the revised version in 2008, the relevant national and institutional committees on human experimentation, and in accordance with the Belmont Report (1979) in later phases.

2.2. Home care status at age 3 years

The child's guardianship was first assessed by a social worker who visited the home when the child was aged 3. Based on this assessment, an invitation was extended to the mothers or carers to attend a subsequent interview in the laboratory, where the adult who brought the child into the laboratory was reassessed. They were asked, “Do you work?” Where the answer was ‘no’ this was followed by the question, “Do you look after the child then?” If they said they worked, they were asked, “Who looks after the child when you are at work?” Responses were coded to create a care grouping as follows: cared for by their mother ($n = 1498$, male = 52.3%), cared for by siblings/relatives ($n = 222$, male = 48.2%), or left home alone ($n = 34$, male = 64.7%) in cases where both the social worker's and researcher's observations converged to ‘no guardian present’. Primary analyses were conducted on this 3-grouping construct, with exploratory analyses based on 4 groups to further examine group differences between Sibling-care and Relative-care (i.e., Sibling-care [n = 63], Relative-care [n = 159], Mother-care [n = 1498], and Home Alone [n = 34)]).

2.3. Outcome measures at 11, 17, and 23 years

Data available for each variable by home care membership is reported in eTable 1 online.

Schizotypy and antisocial behavior at age 11 years. Parents rated their child's behavior on the Child Behavior Checklist (CBCL) (Achenbach et al., 1987). Six subscales assessing aggression, delinquency, schizoid traits, anxiety, depression, and withdrawal were used. All measures were translated and back-translated and checked for accuracy. Full details of translation, reliability and validity are provided elsewhere (Raine et al., 1998). Data were available on 1176 individuals.

Schizotypy, Psychotic Behavior, and Conduct Disorder at Age 17. The Schedule for Attitudes and Experiences (SAE) is a self-report schizotypy measure with subscales measuring cognitive-perceptual, interpersonal deficits, and disorganized features (Venables, 1989, 1996; Venables and Raine, 2015). Data were available on 771 individuals.

The Revised Behavior Problem Checklist (RBPC) was completed by parents, teachers/employers and assesses six subscales: conduct disorder, psychotic behavior, socialized aggression, attention problems, and anxiety-withdrawal, and motor excess (Quay and Peterson, 1987). Data were available on 608 individuals.

Schizotypy, Crime, Depression, and Alcohol Use at 23 Years. The Schizotypal Personality Questionnaire (SPQ) is a widely used standard self-report measure of cognitive-perceptual, interpersonal, and disorganized features of schizotypy with excellent reliability and validity (Raine, 1991). Data were complete on 1201 individuals. Scores on schizotypal personality are comparable in Mauritius to those in the U.S. The top 10% of the Mauritius sample scored 42 points or above on the SPQ, consistent with previous studies of U.S. populations finding that the top 10% of the sample scored 41 points or above (Raine, 1991, 2006).

Self-report crime was measured using a structured interview assessing 41 criminal offenses over the last five years (e.g., theft, driving and traffic offenses, drug crime, alcohol and property related). Scale reliability (α) was 0.84. Full details are provided elsewhere (Gao et al., 2009; Raine et al., 2003). Data were available on 1253 individuals. In Mauritius, 32.1% self-reported one or more crimes at age 23 years while 5.2% had one or more official crime records, a level somewhat lower than U.S. rates (52.8% and 6.2% respectively (Gilman et al., 2014).

Alcohol use was assessed using the Michigan Alcohol and Substance Use Test (MAST) Participants reported separately on alcohol usage of their father, mother, and themselves. Reliability and validity data are provided elsewhere (Selzer, 1971). Data were complete on 1112 individuals.

Depression was assessed using the 21-item self-report Beck Depression Inventory (BDI) (Beck et al., 1961). Data were available on 1268 individuals.

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