



Child loss and psychosis onset: Evidence for traumatic experience as an etiological factor in psychosis

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ABSTRACT

Previous research suggests that trauma may contribute to psychosis onset. In this study, we examine the effect of parental loss of a child on the onset of psychotic experience using data from the National Comorbidity Survey Replication, hypothesizing that child loss will precede the onset of psychosis and will be associated with a later age of onset. We likewise tested this association for six other psychiatric conditions to demonstrate specificity for psychosis. Individuals with a psychotic disorder who had lost a child had a significantly later age of onset, particularly in males, even when controlling for demographic variables and co-occurring substance abuse and psychiatric disorders. Psychosis onset frequently occurred within a year of child loss. No associations were found between child loss and onset of other psychiatric conditions, supporting specificity of the effect on psychosis. The presented findings implicate child loss as an etiological factor in the onset of psychosis, providing converging evidence with previous studies demonstrating associations between more widely studied trauma exposures (abuse, neglect, and assault) and psychosis.

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1. Introduction

Diathesis stress models of schizophrenia posit that traumatic or stressful events may contribute to the onset of psychosis in biologically vulnerable individuals (Corcoran et al., 2003). A history of trauma exposure is known to be highly prevalent in people with severe mental illness, with estimates ranging from 49% to 100% (Grubaugh et al., 2011). Research has primarily focused on traumatic events that occur during childhood (Bendall et al., 2008), with elevated rates of childhood trauma across 51 (predominantly retrospective) studies prompting the conclusion that childhood traumatic events contribute to the diathesis, or vulnerability, that causally facilitates psychosis onset (Read et al., 2005), although the association is attenuated when limited to psychotic disorders (Morgan and Fisher, 2007). Psychosis is likewise known to be associated with elevated rates of adult physical and sexual assault, although it is less clear whether this exposure precedes or follows psychosis onset (Grubaugh et al., 2011).

Population-based studies have been valuable in understanding the relationship between trauma exposure and psychosis. In the National Comorbidity Survey, childhood physical abuse significantly predicted psychosis, and cumulative trauma exposure

increased probability of psychosis, such that the odds ratio for psychosis increased with the number and types of traumatic events experienced (Shevlin et al., 2007). This dose-response relationship was replicated using combined data from the National Comorbidity Survey and British Psychiatric Morbidity Survey, controlling for depression and substance dependence (Shevlin et al., 2008). On the basis of using the British National Survey of Psychiatric Morbidity, lifetime sexual abuse was associated with an increased risk for psychotic disorder, even when controlling for depression (Bebbington et al., 2004). Data from prospective cohorts have largely been consistent with these findings, showing increased risk for psychosis associated with childhood abuse (Spataro et al., 2004; Janssen et al., 2004) and lifetime trauma exposure (Spauwen et al., 2006).

A potential concern with population-based studies is that trauma exposure is generally assessed retrospectively and therefore subject to intracategory variability and recall biases (Dohrenwend, 2006), which may be particularly problematic given that trauma is widely underreported in people with severe mental illness (Mueser et al., 1998). Further, many studies do not control for co-occurring post-traumatic stress disorder (PTSD), which commonly produces symptoms resembling psychosis (Bak et al., 2005; Scott et al., 2007; Braakman et al., 2009). Psychotic-like symptoms have likewise been attributed to substance abuse (Degenhardt and Hall, 2001; Rossler et al., 2007) and, more recently, depression (Varghese et al., 2011), suggesting the need

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to control for multiple psychiatric conditions when assessing psychotic experiences in the general population.

Child loss is a traumatic experience that generally occurs after the typical age of psychosis onset in adolescence or early adulthood (Thompson et al., 2004), and is considered one of the most intensely stressful life events that a person can experience (Middleton et al., 1998; Rubin and Malkinson, 2001). Child loss has been associated in a small sample ($n=32$) with increased psychopathology within 1 and 2 years of the event, particularly major depression (Kristensen et al., 2012), and population-based data suggest that bereaved parents are at an elevated risk of psychiatric hospitalization for affective disorders, schizophrenia, and substance abuse, especially in the first year following the death and among parents over the age of 30 (Li et al., 2005).

In this study, we examined the relationship between child loss and age of psychosis onset, building on prior population-based studies by using a measure of trauma exposure that is less likely to be underreported or subject to recall bias, by examining psychosis onset rather than prevalence, and by controlling for co-occurring conditions. We predicted that child loss would increase vulnerability to psychosis among individuals who had not otherwise developed symptoms and would therefore be associated with a later age of psychosis onset, and that this relationship would be specific to psychosis and not generalize to other disorders. Conversely, if traumatic experience did not contribute to onset, then we would expect child loss to have no bearing on initial age of psychosis. Finally, we predicted a temporal relationship such that psychosis onset would closely follow child loss, suggesting that this traumatic event contributes to the emergence of a first psychotic experience.

2. Method

2.1. Participants

Participants were drawn from the National Comorbidity Survey Replication (NCS-R), a cross-sectional survey of the prevalence and correlates of mental health disorders in the US (Kessler et al., 2006). The NCS-R was carried out between February 2001 and April 2003 with US adults aged 18 years and older residing in households in 48 states; additional inclusion criteria and sampling methods have been described previously (Kessler et al., 2006). The entire sample included 9282 participants. Regression models of child loss and psychosis onset were based on a subset ($n=196$) of participants who reported lifetime experience of a psychosis with initial onset during adolescence or adulthood (age 13–65, inclusive), to exclude cases of childhood onset or psychotic experience related to dementia or other aging-related conditions. Prevalence analysis and additional tests of model specificity (described below) were likewise conducted using the entire data set.

2.2. Measures

Demographic data (gender, age, race, foreign birth) were assessed based on self-reported responses to the NCS-R. Age of psychosis onset was assessed through an NCS-R item, “How old were you the very first time [this/these psychosis symptom(s)] happened to you?” referring to a list of common psychotic symptoms. Age of onset of other psychiatric conditions was assessed using similar NCS-R items. Child loss was likewise assessed through an NCS-R item, “(Not counting miscarriages, still births, or abortions), has any child of yours ever died?”, as was number of currently living children. Co-occurring lifetime psychiatric diagnoses for post-traumatic stress disorder (PTSD), major depressive episode and substance abuse were assessed with the World Mental Health Survey Initiative version of the World Health Organization Composite International Diagnostic Interview (Kessler and Ustun, 2004).

2.3. Statistics

Among the entire sample (excluding those who did not respond to the items of interest), an odds ratio was calculated and a chi-square test used to compare the lifetime incidence of a psychotic experience among those who had and had not lost a child. Further analyses were conducted with a reduced subset of the sample, those who had reported a lifetime experience of psychosis with onset in adolescence or

adulthood. Two-tailed independent samples *t*-tests and chi-square tests were used to compare bereaved and non-bereaved participants on demographics and age of psychosis onset. Linear regression analysis was conducted with child loss as the predictor variable and age of psychosis onset as the response variable, controlling for number of children, demographic variables (age, gender, race, foreign birth), and co-occurring disorders (PTSD, major depression, substance abuse), and testing for moderating effects of sex on child loss. Alpha was set at 0.05 for all statistical tests. Participants who experienced both psychosis and child loss were examined on a case-by-case basis in order to determine the order of child loss and psychosis onset, as our hypothesis presumes that child loss will precede psychosis onset.

The effect of child loss on age of onset for six other psychiatric conditions (PTSD, major depression, substance abuse, generalized anxiety disorder, mania, and social phobia) was then tested among the entire sample using comparable regression models to examine whether the effect of child loss was specific to psychosis onset or applied more generally to psychopathology. No correction was used for multiple comparisons given that we hypothesized null results for these comparisons, and were primarily concerned with avoiding type II error.

3. Results

Among the entire sample of 6458 participants who responded to both the psychosis and child loss items, 409 reported loss of a child and 251 reported a lifetime psychotic experience. There was a statistical trend towards a higher incidence of psychosis among those who had lost a child, $\chi^2(1, n=6458)=3.526, P=0.060$, with 18/409 of those who lost a child also having a psychotic experience, odds ratio=1.52 (CI 0.98–2.36).

Of the sample, 251 subjects met the inclusion criterion of reporting a lifetime psychotic experience and responding to both items of interest. Eight were excluded due to the lack of response on the child loss item, and 55 were excluded due to psychosis onset in childhood (below age 13) or older adulthood (over age 65). Of the remaining 196, 18 had a child who had died and 178 did not. The two groups varied on age, $t(194)=3.35, P=0.001$, and age at psychosis onset, $t(194)=3.13, P=0.002$, but not on any other factors (Table 1).

Child loss significantly predicted age of onset of psychosis in the simple regression model (Table 2). When controlling for demographic factors, number of children, and co-occurring diagnoses in the full model, there was a main effect of child loss and an interaction between child loss and gender (Table 2), such that the effect of bereavement on age of psychosis onset was greater for males than for females. Age, but no other demographic variable, was likewise a significant predictor of age of onset of psychosis symptoms (Table 2). Of note, results were not significantly changed when removing the age range exclusion criterion (13–65 years) and including all participants with lifetime psychotic experience by repeating the model with all the participants who had responded to the variables of interest ($n=6458$).

Temporality of psychosis with respect to child loss was examined on an individual basis (Table 3). Order of events could not be determined for one participant due to missing information. Psychosis onset followed child loss in 58.8% of participants

Table 1

Demographics, psychiatric diagnoses, and substance abuse history of participants with psychosis who did or did not lose a child.

	Child loss	No child loss
<i>n</i>	18	178
Age of psychosis onset*	36.4 (13.7)	27.2 (11.74)
Age*	52.9 (13.8)	40.7 (16.6)
Number of living children*	2.6 (1.5)	1.5 (1.4)
<i>n</i> (%) Female	14 (77.8)	124 (69.7)
<i>n</i> (%) Non-white	5 (27.8)	65 (36.5)
<i>n</i> (%) Foreign birth	2 (11.1)	11 (6.2)
<i>n</i> (%) Lifetime PTSD	3 (16.7)	30 (16.9)
<i>n</i> (%) Lifetime major depression	6 (33.3)	70 (39.3)
<i>n</i> (%) Substance abuse	4 (22.2)	30 (16.9)

Note: * $P < 0.05$.

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