Adversity, cannabis use and psychotic experiences: evidence of cumulative and synergistic effects
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Background
There is robust evidence that childhood adversity is associated with an increased risk of psychosis. There is, however, little research on intervening factors that might increase or decrease risk following childhood adversity.

Aims
To investigate main effects of, and synergy between, childhood adversity and life events and cannabis use on odds of psychotic experiences.

Method
Data on psychotic experiences and childhood adversity, life events and cannabis use were collected from 1680 individuals as part of the South East London Community Health Study (SELCoH), a population-based household survey.

Results
There was strong evidence that childhood abuse and number of life events combined synergistically to increase odds of psychotic experiences beyond the effects of each individually. There was similar, but weaker, evidence for cannabis use (past year).

Conclusions
Our findings are consistent with the hypothesis that childhood abuse creates an enduring vulnerability to psychosis that is realised in the event of exposure to further stressors and risk factors.

Declaration of interest
None.

Method
The South East London Community Health Study (SELCoH) is a population-based household survey of physical and mental health conducted between 2008 and 2010 in the two London boroughs of Lambeth and Southwark. Overall, the two boroughs are areas with high levels of deprivation and ethnic diversity, with some pockets of relative wealth. Full details of the methods and primary descriptive outcomes are reported in Hatch et al.17,18

Participants
In brief, a random sample of households within the catchment area was identified using the Small User Postcode Address File (PAF; Royal Mail Address Management Unit, Sunderland, www.poweredbypa.com/end-user/products/data-products/paf-raw-data/), which has near complete coverage of private households in the UK.
Introductory letters were sent to all selected households, which were then visited up to four times at different times of the day and week, and when contact was made informed consent was sought from as many eligible members of the household as possible. All members of the household aged 16 years or over were eligible to participate. Ethical approval was received prior to the start of the study from King's College London Research Ethics Committee (CREC/07/08-152) and all participants provided informed consent.

Data collection

Data across a range of domains (including sociodemographic characteristics, socioeconomic status, physical and mental health, adversity and life events in childhood and adulthood and substance use) were collected using a computer-assisted interview schedule, which was piloted to establish reliability, validity and feasibility prior to the start of the main survey.

Psychotic experiences

The Psychosis Screening Questionnaire (PSQ)\textsuperscript{19} was used to elicit information on psychotic experiences. The PSQ is an interviewer-administered questionnaire that assesses psychotic experiences in the preceding year and comprises five sections covering hypomania, thought disorder, paranoia, strange experiences and hallucinations. Each section has an initial probe, followed by secondary questions that are designed to establish the psychotic quality of experiences. The PSQ has been validated in two national surveys in the UK.\textsuperscript{20,21} As we were specifically interested in psychotic experiences, items on hypomania were discarded. Following previous studies,\textsuperscript{22} in the analyses presented here, we primarily compared those who endorsed one or more secondary question in the remaining four domains on the PSQ with those who did not. Analyses were repeated for paranoia and hallucinations separately.

Childhood exposures and life events

Information on exposure to physical and sexual abuse and nine life events (see Table 3) ever and in the past year was elicited using single-item questions (for example for physical abuse: ‘When growing up, did anyone who marks?’ For sexual abuse: ‘When growing up, did anyone who...’).\textsuperscript{23} Symptom criteria for a common mental disorder (adjusted OR = 4.99, 95% CI 3.75–6.62) (Table 1). In light of increasing evidence that symptoms of common mental disorder mediate or lie on a path from a public health perspective.\textsuperscript{24} Analyses of main and synergistic effects, completed using Stata Version 11, accounted for clustering by household and were weighted for non-response within households using the relevant survey commands in Stata (see Hatch et al\textsuperscript{7} for further details on weights).

Results

Psychotic experiences

In total, 2070 private households were contacted, of which 1075 (51.9%) had at least one member who agreed to participate. Of the 2359 eligible individuals within these households, 1698 (71.9%) agreed to be interviewed (mean number of participants per household 2.7, s.d. = 1.2). The sample was broadly representative of the catchment area population on basic demographic and socioeconomic characteristics (online Table DS1). Data from the PSQ was missing for 10 participants and 8 who reported having a current or past diagnosis of psychosis were excluded from the analyses presented here, giving a sample of 1680 (mean age 39, s.d. = 16.9, men n = 734, 44%). The 1-year weighted prevalence of psychotic experiences, defined as a positive response to a secondary probe on the PSQ, was 17.9% (95% CI 16.0–19.9, n = 315), which was similar to what we found previously in a smaller study\textsuperscript{22} within the same catchment area (18.8%, online Table DS2).

The most commonly reported experience was paranoia (n = 237, 13.2%).

Markers of social disadvantage and isolation

In line with previous studies, reporting a psychotic experience was associated with a range of demographic and socioeconomic variables, including younger age, ethnicity other than White British and low educational achievement (Table 1, see online Table DS3 for a more detailed version). Across a number of markers, those who reported a psychotic experience were more disadvantaged and isolated (i.e. more likely to be: unemployed, in rented housing, in receipt of benefits, in debt, in lower social class groups and single; Table 1 and online Table DS3). Further, those who endorsed a psychotic experience (v. those who did not) were almost five times more likely to meet CIS-R threshold criteria for a common mental disorder (adjusted OR = 4.99, 95% CI 3.75–6.62) (Table 1). In light of increasing evidence that symptoms of common mental disorder mediate or lie on a path
from stress to psychosis, we did not treat common mental disorders as potential confounders in our analyses. In subsequent planned analyses, we will test mediation via common mental disorder in this sample.

**Main effects**

**Childhood**

We found strong evidence that the odds of reporting a psychotic experience were higher in those who, during childhood, had: (a) been physically abused (adjusted OR = 2.17); and (b) been sexually abused (adjusted OR = 2.13; Table 2). The majority of those who reported sexual abuse also reported physical abuse (n = 46, 58%). When both physical and sexual abuse were considered together, there was evidence that the association with psychotic experiences was highest for those exposed to both (adjusted OR = 3.24; Table 2).

**Lifetime and past year exposure to life events**

In our sample, lifetime exposure to at least one of the nine life events enquired about was almost ubiquitous (89%, n = 1478) and 25% (n = 422) reported exposure to at least one event in the preceding year. We found strong evidence that almost all the included life events, both lifetime and in the past year, were associated with between around a two- and fourfold increased likelihood of endorsing psychotic experiences (Table 3). Notably, for most events unadjusted and adjusted odds ratios were higher for reported exposure in the past year compared with ever, suggesting in general a greater impact the more proximal the life events. Further, the strongest effects in the past year were for ‘been in a serious accident’, ‘witnessed violence’, ‘been attacked’ and ‘injured with a weapon’. What is notable is that each of these events has a quality of threat or intrusiveness (i.e. intrusion into the personal space and integrity of the individual).

Further, to examine the potential cumulative impact of lifetime exposure to life events, we created a simple index by summing the number of events participants reported (range 0–9; for the analyses, we combined those with five or more events (n = 236, 14%) into a single category). In doing this, we found very strong evidence of a linear relationship between number of events and odds of psychotic experiences, a pattern suggestive of a cumulative impact (Fig. 1(a)). When we narrowed the focus to events that had occurred in the preceding year and created a similar index (range 0–5; for this analyses we combined those with three or more events (n = 32, 1.9%) into a single category), this pattern was stronger still (Fig. 1(b)).

**Cannabis use**

Those who reported a psychotic experience were more likely to have used cannabis in the preceding year (adjusted OR = 2.47). There was, however, no evidence of an association between cannabis use prior to the preceding year and psychotic experiences (adjusted OR = 1.26) (Table 1).

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**Table 1 Any psychotic experience(s) by demographic and social characteristics, common mental disorder and cannabis use**

| Any psychotic experience(s) (n = 315) | Total n (%) | Yes, n (%) | Unadjusted OR | Adjusted OR (95% CI) |
|-------------------------------------|-------------|------------|---------------|---------------------|
| **Gender**                          |             |            |               |                     |
| Male                                | 734 (33.4)  | 147 (19.1) | 1.00          | 1.00                |
| Female                              | 946 (66.6)  | 168 (17.2) | 0.88          | 0.88 (0.69–1.13)    |
| **Age, years**                      |             |            |               |                     |
| 16–29                               | 572 (28.7)  | 126 (21.9) | 1.45          | 1.39 (1.06–1.81)    |
| 30 and above                        | 1108 (71.2) | 189 (16.2) | 1.00          | 1.00                |
| **Ethnicity**                       |             |            |               |                     |
| White British                       | 1043 (63.7) | 169 (14.8) | 1.00          | 1.00                |
| Other                               | 636 (36.3)  | 145 (23.1) | 1.72          | 1.67 (1.27–2.19)    |
| **Education**                       |             |            |               |                     |
| No qualifications                   | 223 (16.7)  | 51 (21.1)  | 1.00          | 1.00                |
| GCSEs                               | 327 (20.1)  | 66 (18.3)  | 0.84          | 0.70 (0.45–1.09)    |
| A-levels                            | 420 (23.6)  | 98 (23.3)  | 1.12          | 0.91 (0.59–1.40)    |
| University                          | 691 (39.7)  | 94 (12.8)  | 0.55          | 0.52 (0.34–0.78)    |
| **Social class**                    |             |            |               |                     |
| I and II                            | 505 (28.4)  | 66 (12.6)  | 1.00          | 1.00                |
| IIINM and IIIM                      | 275 (15.3)  | 50 (17.1)  | 1.43          | 1.22 (0.79–1.89)    |
| IV and V                            | 164 (10.0)  | 28 (16.8)  | 1.39          | 1.23 (0.74–2.05)    |
| Unclassified: unemployed            | 162 (9.1)   | 53 (32.1)  | 3.28          | 2.93 (1.87–4.58)    |
| Unclassified: other                 | 538 (37.2)  | 110 (20.5) | 1.60          | 1.44 (1.00–4.58)    |
| **Cannabis use**                    |             |            |               |                     |
| Never used                          | 855 (55.2)  | 141 (15.6) | 1.00          | 1.00                |
| Used, not in past year              | 525 (29.6)  | 87 (16.2)  | 1.05          | 1.26 (0.92–1.75)    |
| Used in past year                   | 300 (15.1)  | 87 (29.6)  | 2.28          | 2.47 (1.73–3.53)    |
| **Any common mental disorder**      |             |            |               |                     |
| No                                  | 1231 (72.9) | 145 (10.9) | 1.00          | 1.00                |
| Yes                                 | 444 (27.2)  | 168 (36.5) | 4.70          | 4.99 (3.75–6.62)    |
| **Common mental disorder**          |             |            |               |                     |
| No                                  | 1233 (73.0) | 146 (11.0) | 1.00          | 1.00                |
| Mixed anxiety and depression        | 127 (7.7)   | 45 (33.6)  | 4.11          | 4.43 (2.89–6.81)    |
| Depression                          | 188 (11.8)  | 76 (40.3)  | 5.49          | 5.84 (4.04–8.46)    |
| Anxiety related                     | 127 (7.5)   | 46 (36.2)  | 4.00          | 4.23 (2.80–6.41)    |

a. All percentages are weighted. Results in bold signify P < 0.05.
b. Adjusted for age, gender, ethnicity (as appropriate).
c. Registrar General’s Classification Social class: I professional, II managerial/technical, IIINM skilled (non-manual), IIIM skilled (manual), IV semi-skilled, V unskilled.
d. Includes two people with obsessive-compulsive disorder.
Adversity, cannabis use and psychotic experiences

We next examined whether there was evidence for synergistic effects of abuse and (a) life events and (b) cannabis use on odds of psychotic experiences. For these analyses, we combined exposure to either physical or sexual abuse into a dichotomous variable of exposed to either form of abuse or not and modelled life events as ordinal variables (ever and past year) using our indices described earlier.

### Table 2 Any psychotic experience(s) by childhood exposures

| When growing up ... | Total n (%) | Yes, n (%) | Unadjusted OR | Adjusted OR 1️⃣ (95% CI) | Adjusted OR 2️⃣ (95% CI) |
|---------------------|-------------|------------|---------------|--------------------------|--------------------------|
| Hit hard (physical abuse) |             |            |               |                          |                          |
| No                  | 1268 (77.3) | 187 (14.2) | 1.00          | 1.00                     | 1.00                     |
| Yes                 | 402 (22.7)  | 127 (30.6) | 2.66          | 2.50 (1.89–3.29)         | 2.17 (1.62–2.89)         |
| Sexual abuse        |             |            |               |                          |                          |
| No                  | 1584 (94.8) | 283 (17.0) | 1.00          | 1.00                     | 1.00                     |
| Yes                 | 79 (5.2)    | 26 (31.2)  | 2.22          | 2.47 (1.47–4.16)         | 2.13 (1.28–3.56)         |

| Hit hard or sexual abuse |             |            |               |                          |                          |
| No                  | 1229 (75.1) | 176 (13.8) | 1.00          | 1.00                     | 1.00                     |
| Sexual abuse only    | 33 (2.2)    | 7 (20.6)   | 1.62          | 1.84 (0.75–4.53)         | 1.79 (0.78–4.11)         |
| Hit hard only        | 354 (19.7)  | 107 (29.3) | 2.59          | 2.40 (1.79–3.20)         | 2.13 (1.57–2.89)         |
| Both                | 46 (5.0)    | 19 (39.1)  | 4.01          | 4.12 (2.15–7.89)         | 3.24 (1.64–6.25)         |

| a. All percentages are weighted. Results in bold signify P < 0.05. |
| b. Adjusted for age, gender and ethnicity. |
| c. Adjusted for age, gender, ethnicity, education, social class and cannabis use. |

### Table 3 Any psychotic experience(s) by lifetime and past year exposure to life events

| Separated from partner | Total n (%) | Yes, n (%) | Unadjusted OR | Adjusted OR 1️⃣ (95% CI) | Adjusted OR 2️⃣ (95% CI) |
|------------------------|-------------|------------|---------------|--------------------------|--------------------------|
| No                     | 1061 (62.7) | 168 (14.8) | 1.00          | 1.00                     | 1.00                     |
| Ever                   | 527 (32.3)  | 121 (23.4) | 1.56          | 1.74 (1.29–2.34)         | 1.57 (1.14–2.15)         |
| Past year              | 73 (4.0)    | 25 (37.1)  | 3.38          | 3.06 (1.85–5.04)         | 2.36 (1.36–3.99)         |

| Loved one died |             |            |               |                          |                          |
| No            | 814 (45.0)  | 127 (15.6) | 1.00          | 1.00                     | 1.00                     |
| Ever          | 700 (45.4)  | 144 (19.0) | 1.33          | 1.46 (1.10–1.95)         | 1.46 (1.08–1.97)         |
| Past year     | 156 (9.7)   | 43 (26.8)  | 2.08          | 2.07 (1.34–3.20)         | 2.02 (1.26–3.24)         |

| No money for rent |             |            |               |                          |                          |
| No              | 1561 (93.6) | 274 (16.9) | 1.00          | 1.00                     | 1.00                     |
| Ever            | 97 (5.7)    | 36 (33.7)  | 2.50          | 2.64 (1.64–4.26)         | 1.92 (1.16–3.16)         |
| Past year       | 13 (0.6)    | 4 (30.0)   | 2.11          | 1.83 (0.52–6.46)         | 0.95 (0.23–3.97)         |

| Been in serious accident | Total n (%) | Yes, n (%) | Unadjusted OR | Adjusted OR 1️⃣ (95% CI) | Adjusted OR 2️⃣ (95% CI) |
|--------------------------|-------------|------------|---------------|--------------------------|--------------------------|
| No                       | 1290 (78.2) | 213 (15.8) | 1.00          | 1.00                     | 1.00                     |
| Ever                     | 353 (20.2)  | 90 (25.9)  | 1.67          | 1.68 (1.25–2.27)         | 1.61 (1.18–2.19)         |
| Past year                | 28 (16.5)   | 11 (46.5)  | 4.64          | 4.75 (1.98–11.35)        | 4.07 (1.72–9.64)         |

| Witnessed violence |             |            |               |                          |                          |
| No                | 921 (58.4)  | 110 (11.6) | 1.00          | 1.00                     | 1.00                     |
| Ever              | 453 (34.2)  | 149 (25.0) | 2.55          | 2.52 (1.88–3.38)         | 2.20 (1.62–2.99)         |
| Past year         | 146 (7.4)   | 55 (35.7)  | 4.24          | 3.92 (2.61–5.89)         | 3.31 (2.18–5.06)         |

| Victim of crime |             |            |               |                          |                          |
| No              | 1033 (62.5) | 160 (15.3) | 1.00          | 1.00                     | 1.00                     |
| Ever            | 563 (33.6)  | 132 (23.5) | 1.59          | 1.76 (1.34–2.33)         | 1.59 (1.19–2.13)         |
| Past year       | 73 (3.9)    | 22 (29.3)  | 2.04          | 1.94 (1.08–3.48)         | 1.55 (0.87–2.76)         |

| Attacked |             |            |               |                          |                          |
| No       | 1172 (71.6) | 164 (13.9) | 1.00          | 1.00                     | 1.00                     |
| Ever     | 456 (25.1)  | 123 (26.8) | 2.51          | 2.59 (1.94–3.4)          | 2.32 (1.72–3.11)         |
| Past year| 61 (3.1)    | 26 (41.8)  | 4.68          | 4.52 (2.63–7.77)         | 3.53 (2.05–6.09)         |

| Injured with weapon |             |            |               |                          |                          |
| No                  | 1475 (89.2) | 237 (15.6) | 1.00          | 1.00                     | 1.00                     |
| Ever                | 179 (10.0)  | 70 (36.8)  | 3.15          | 3.28 (2.28–4.71)         | 2.59 (1.77–3.78)         |
| Past year           | 77 (8.0)    | 7 (40.9)   | 3.74          | 3.21 (1.13–9.10)         | 2.46 (0.86–6.98)         |

| Been in war zone |             |            |               |                          |                          |
| No               | 1460 (86.2) | 275 (18.2) | 1.00          | 1.00                     | 1.00                     |
| Ever             | 204 (13.1)  | 38 (17.2)  | 0.82          | 0.85 (0.56–1.30)         | 0.69 (0.43–1.08)         |
| Past year        | 6 (0.3)     | 3 (47.6)   | 4.10          | 2.72 (0.61–12.16)        | 1.88 (0.38–9.31)         |

a. All percentages are weighted. Results in bold signify P < 0.05. |
b. Adjusted for age, gender and ethnicity. |
c. Adjusted for age, gender, ethnicity, education, social class and cannabis use.
To begin with, abuse was strongly associated, in a linear regression, with an increased number of life events (number of events, ever: unadjusted $\beta = 1.24$, 95% CI 1.07–1.42; number of events, past year: unadjusted $\beta = 0.33$, 95% CI 0.23–0.42) and, in a logistic regression, with cannabis use ever (unadjusted OR = 1.35, 95% CI 1.04–1.75) and in the year prior to interview (unadjusted OR = 2.10, 95% CI 1.55–2.85).

When we considered abuse and life events, first using our index of life events (ever), there was strong evidence of synergy. The effect for abuse alone was 1.18, a statistically non-significant effect at $P = 0.05$, and for life events ever (modelled as an ordinal exposure) it was 1.33, indicating an increase in odds of psychotic experiences of around 30% for each additional life event. The combined effect (adjusted OR = 1.72), however, was greater than the sum of these individual effects: ICR = 0.21, 95% CI 0.05–0.38, $P = 0.01$ (Fig. 2(a)). An ICR of 0.21 indicates that the odds ratio for psychotic experiences in those exposed to abuse is 0.21 higher with each additional life event than if there was no synergy between abuse and life events.

When we repeated these analyses using our index of life events (past year), evidence of synergy was stronger still, with effects of 2.16 for abuse and 1.65 for life events (past year), and a combined effect of 3.37 and an ICR of 0.56 (95% CI 0.08–1.05, $P = 0.022$) (Fig. 2(b)).

For abuse and cannabis use in the past year, there was suggestive evidence that both combined synergistically to increase odds of psychotic experiences (Fig. 3). The adjusted odds ratio for those exposed to abuse and who used cannabis in the year before assessment was 5.54, compared with odds ratios of 2.04 for those exposed to abuse only and 2.11 (ICR 2.40, 95% CI 1.21–4.97, $P = 0.07$) for those who had used cannabis in the preceding year only. There was no evidence that abuse and cannabis use prior to (but not during) the preceding year combined synergistically to increase risk (ICR = 0.69, 95% CI 0.87 to 2.25, $P = 0.38$). All the main and synergistic effects reported here were evident for both paranoia and hallucinations, with no evidence of specificity (data not shown; available from the authors on request).
to potential information bias, it is possible that presence of characteristics. We cannot rule out the possibility of selection bias arising from those with psychotic experiences being less likely to participate. This is unlikely to have been a major issue. Furthermore, Knudsen et al. have shown that non-participation, although affecting prevalence and other population descriptors, has a limited impact on analytic, hypothesis testing. With regard to potential information bias, it is possible that presence of psychotic experiences lead to differential recall of events. However, none of those with psychotic experiences included in the analyses had received a diagnosis of a serious mental disorder, which suggests a higher rate of recall of events arising from an effort to explain the occurrence of disorder (i.e. effort after meaning) is unlikely to have influenced our findings. In addition, none of the interviewers were aware of any study hypotheses concerning psychotic experiences.

More significantly, the cross-sectional nature of our data inevitably limits the inferences that can be drawn regarding causation. We cannot, for example, rule out the possibility that some life events post-dated the onset of psychotic experiences and that some (for example separation from a partner) may have been a consequence of even low-level psychotic experiences, such as paranoia. This, however, is less likely to be the case for more distal life events and for childhood exposures. In the end, studies that can more robustly delineate the temporal sequence of exposure and outcome are required. Cross-sectional data such as that presented here, nonetheless, provide important pointers to the factors and mechanisms that may underlie the development of psychopathology.

There are further caveats to be noted concerning our assessments of psychotic experiences and of our primary exposures. For example, there are a number of limitations to the PSQ (and indeed other screening instruments) as a measure of psychotic experiences, and these have been well discussed in the past. It is likely, for example, that the PSQ, in not taking account of the context within which respondents endorse specific items, will overestimate the prevalence of psychotic experiences (e.g. some individuals may indeed be subject to deliberate efforts by others to harm them). Nevertheless, the consistency with which psychotic experiences, elicited using the PSQ, are associated with the same variables as for clinically significant psychosis strengthens the proposition that the PSQ does validly elicit unusual low-level psychotic experiences that represent perhaps the softest expression of an extended psychosis phenotype. In a similar vein, the information collected on our primary exposures was limited and did not include details on, for example, timing, duration and severity of adversities and events, nor were we able to determine the frequency, amount and type of cannabis use. This increases the likelihood of error. However, the effect of such misclassification would generally be to minimise differences between groups, such that reported effects are then likely underestimates.

Methodological limitations

A number of potential limitations arise from the study design. Large-scale surveys inevitably have high levels of non-participation and necessarily involve collecting information retrospectively using instruments that can be administered relatively quickly by trained lay interviewers. Participation in SELCoH was in line with that in similar national surveys (for example the UK Adult Psychiatric Morbidity Survey and the sample was broadly representative of the local population on core demographic characteristics. We cannot rule out the possibility of selection bias arising from those with psychotic experiences being less likely to participate. However, the high prevalence of psychotic experiences that we found, and the broad representativeness of our sample suggests this is unlikely to have been a major issue. Furthermore, Knudsen et al. have shown that non-participation, although affecting prevalence and other population descriptors, has a limited impact on analytic, hypothesis testing. With regard to potential information bias, it is possible that presence of
Adversity, cannabis use and psychotic experiences

The above limitations notwithstanding, the data and analyses reported here add further to the literature on psychotic experiences and the impact of environmental exposures. Most notably, our findings provide initial evidence that childhood adversity (i.e. abuse) and both life events and recent cannabis use may combine synergistically to increase the likelihood of psychotic experiences. Only a small number of previous studies have examined how environmental factors combine over time in relation to psychosis (for example Morgan et al13 and Clarke et al36). Bebbington et al36 for example, using data from the 2007 UK Adult Psychiatric Morbidity Survey (sample n = 7298; with psychosis n = 38), found some evidence that sexual abuse in childhood interacted with revictimisation (i.e. sexual abuse) in adulthood to increase risk for psychosis (defined as probable psychotic disorder). Lataster et al31 using data on composite measures of adversity from the Early Developmental Stages of Psychosis study (sample n = 1722) of adolescents and young adults aged 14–24 years, found some evidence that early (i.e. baseline) adversity and a high level of recent (i.e. between baseline and around 4- to 8-year follow-up) adversity interacted on an additive scale to increase risk of low-level psychotic experiences at follow-up. Similarly, tentative evidence of synergistic effects of childhood adversity (variously measured) and cannabis use on broad psychosis phenotypes has been reported.12,37–39 the evidence on this, however, is not entirely consistent.40 Our findings are in line with, and add to, these emerging data in suggesting that the impact of both life events, particularly recent events, and cannabis use on likelihood of psychotic experiences depends, to a degree, on prior exposure to physical and sexual abuse. This is consistent with the hypothesis that childhood adversity creates, in some, a vulnerability for psychotic experiences that is realised in the event of exposure to further risk factors. Further, the evidence that childhood abuse is associated with a higher likelihood of exposure to these subsequent risk factors suggests that, for many, early adversity and abuse set in train a trajectory of repeated exposure to adversity and other factors that, over time, compound risk and push some along pathways to psychotic experiences and (more rarely) disorder – what we have elsewhere termed a sociodevelopmental pathway to psychosis.41

Our findings specifically in relation to life events further add to this. They suggest that life events have a cumulative impact on psychotic experiences and (more speculatively) that proximal events lead to a spike in risk that diminishes (but not entirely) over time. A similar interpretation is suggested by the finding that only cannabis use in the past year is associated with an increased likelihood of psychotic experiences. Of course, there is a need for caution in drawing too firm conclusions given the caveats noted above concerning uncertainty about the direction of effects. The data are nonetheless consistent with the hypothesis that childhood adversity creates, in some, a vulnerability for psychotic experiences that is realised in the event of exposure to further risk factors. Further, the evidence that childhood abuse is associated with a higher likelihood of exposure to these subsequent risk factors suggests that, for many, early adversity and abuse set in train a trajectory of repeated exposure to adversity and other factors that, over time, compound risk and push some along pathways to psychotic experiences and (more rarely) disorder – what we have elsewhere termed a sociodevelopmental pathway to psychosis.41

Next steps

In so far as adverse social experiences tend to cluster in individuals, families and neighbourhoods and persist over time, it is essential to move on from identifying specific social and environmental risk factors for psychosis to examine the impact of multiple exposures, how they interact and the mechanisms through which they exert their effects.42 In doing this, we are currently constrained by limitations to available data and the intrinsic difficulties of disentangling cause and effect when the very outcome of interest involves the social worlds of participants. These constraints notwithstanding, our findings provide initial support for the hypothesis that adversity and abuse in childhood create a vulnerability to psychotic experiences that becomes manifest as a consequence of further repeated exposure to other factors over time. This has potential implications for prevention and intervention (for example in identifying high-risk groups and intervening to promote resilience) and this in turn further supports the need for more studies using a range of designs and samples across the psychosis spectrum that examine possible (sociodevelopmental) pathways to psychosis through exposure to repeated adversity and other risk factors over the life course.
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