

A Population-Based Analysis of Interpersonal Trauma, Psychosis, and Suicide: Evidence, pathways, and implications

Item Type	Journal article
Authors	Boyda, David;McFeeters, Danielle;Katie, Dhingra;Kelleher, Ian
Citation	Boyda, D., McFeeters, D., Dhingra, K. and Kelleher, I. (2020) A Population-Based Analysis of Interpersonal Trauma, Psychosis, and Suicide : Evidence, pathways, and implications. Journal of Interpersonal Violence (In Press)
DOI	10.1177/0886260520912591
Publisher	SAGE
Journal	Journal of Interpersonal Violence
Download date	2026-05-19 04:03:31
License	https://creativecommons.org/licenses/by-nc-nd/4.0/
Link to Item	http://hdl.handle.net/2436/623173

1
2
3 **A Population-Based Analysis of Interpersonal Trauma, Psychosis, and**
4
5
6 **Suicide: Evidence, pathways, and implications.**
7
8
9

10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Abstract

Background: Subthreshold psychotic experiences are known to confer a risk for suicidality. Yet, despite evidence of a strong aetiological trauma-psychosis pathway, the coalesced effect of such concurrences on suicide risk is largely discounted. **Objective:** Our aims were to examine the impact of different manifestations of lifespan trauma and psychotic-like experiences (PE) on the risk of suicidal thoughts and attempts using an exploratory person-centred approach. **Method:** Data from the Adult Psychiatric Morbidity Survey ($N=7,403$) was analysed. Psychotic-like experiences were assessed using the Psychosis Screening Questionnaire (PSQ) alongside items probing childhood and adult trauma, in addition to twelve-month suicide thoughts and attempt. **Results:** A manual 3-step latent class analysis elicited four distinct profiles, namely a socially disconnected/high PE, a sexual victimisation/moderate PE, a lifespan trauma/low PE and a baseline class. The socially disconnected class, characterised by a moderate likelihood of social disconnection, a high probability of various PE endorsements, yet a low likelihood of other significant trauma, showed the greatest risk of twelve-month suicide ideation ($OR=13.0$, $95\%CI=8.539 - 19.021$) and attempt ($OR=24.2$, $95\%CI=10.349 - 56.860$). **Conclusions:** Neither multiple nor recurrent traumatic experiences invariably result in the emergence of PEs. Instead, a sense of social disconnection may be either resultant of PEs, or alone sufficient to cultivate such symptom presentations, even in the absence of prior traumas. Moreover, just as traumatic encounters increase the risk of suicidality, so too might seemingly more innocuous adversities such as poor-quality social relationships further elevate the risk, particularly when proximal and coupled with the simultaneity of PEs.

Keywords: Interpersonal trauma, Psychosis, Suicide, Latent class analysis

1. Introduction

Suicide is a leading cause of preventable death, accounting for more than 800,000 fatalities each year (World Health Organisation, 2017). Early global estimates indicate the presence of a schizophrenia diagnosis in around 14% of suicide deaths (Bertolote et al., 2004) while the combined lifetime risk of death by suicide is estimated to be 6% among schizophrenic populations (Hor & Taylor, 2010; Nordentoft et al., 2013). Research also shows that approximately 30-40% of individuals with psychotic spectrum disorders have thoughts of ending their lives, 20-30% attempt to end their life, and a further 5-10% die by suicide (Fialko et al., 2006; Palmer et al., 2005; Radomsky et al., 1995). Moreover, a history of suicide attempt which predates first episode psychosis significantly increases the risk of future suicidality (Sanchez-Gistau et al., 2013). Incidentally, mortality rates are also likely to be underestimated due to the current inability to capture suicides which occur prior to initial contact with mental health services (Nordentoft et al., 2015). That being said, in spite of recent studies evidencing a downward trend in suicide specific mortality among this population (Gatov et al., 2017; Laursen et al., 2018; Tanskanen et al., 2018), contemporary meta-analyses and reviews continue to illustrate a considerable and pervasive disproportion in the number of suicide-related deaths relative to the general population (Hjorthøj et al., 2017; Nordentoft et al., 2013; Piotrowski et al., 2017; Walker et al., 2015). By extension, in lieu of formal diagnosis, sub-threshold psychotic experiences (PEs) have been consistently associated with an elevated risk of suicidal thoughts, behaviours and even death by suicide across both cross-sectional and prospective studies (Yates et al., 2019).

Existing studies in the psychosis and suicide domain have focused predominately on the role of co-morbid psychological conditions (e.g. anxiety or depressive disorders) in intensifying suicide risk (Björkenstam et al., 2014; Honings et al., 2016; Kelleher, Corcoran,

1
2
3 Keeley, Wigman, Devlin, Ramsay, Wasserman, Carli, Sarchiapone, Hoven, et al., 2013;
4
5 Kelleher, Devlin, et al., 2014; Kelleher et al., 2012), particularly in relation to subthreshold
6
7 psychotic symptoms which are believed to be transdiagnostic in nature (van Os &
8
9 Reininghaus, 2016). Yet, psychotic experiences have been shown to be a robust predictor of
10
11 the subsequent development of suicidal thoughts and behaviours in a series of longitudinal
12
13 studies (Kelleher, Cederlöf, et al., 2014; Kelleher, Corcoran, Keeley, Wigman, Devlin,
14
15 Ramsay, Wasserman, Carli, Sarchiapone, & Hoven, 2013; Sullivan et al., 2015). Moreover,
16
17 the risk of suicidal behaviour has been found to increase in line with the number of psychotic
18
19 symptoms endorsed (Dutta et al., 2010; Nishida et al., 2010; Saha et al., 2011) irrespective of
20
21 accompanying mental disorders (Honings et al., 2016). Nonetheless, a limitation of this
22
23 existing research surrounding psychotic experiences and suicide has been the failure to fully
24
25 account for different combinations of putative factors (e.g., interpersonal trauma) that may
26
27 interact with psychotic experiences to influence suicide outcomes.
28
29
30
31
32

33 Likewise, a growing number of prospective studies examining the role of social and
34
35 environment factors within the developmental trajectory of psychosis have found that early
36
37 childhood trauma is a common precursor to the onset of psychotic experiences (Croft et al.,
38
39 2019; Varese et al., 2012). Research also suggests that traumatic experiences during
40
41 childhood are often highly interrelated, rarely occurring in isolation (Finkelhor et al., 2007),
42
43 are frequently associated with revictimization and co-morbid psychopathologies in adulthood
44
45 (Burns et al., 2016). In addition, the relationship between trauma and psychosis
46
47 symptomology has been shown to be mediated by various intervening environmental factors
48
49 such as loneliness and perceived social disconnection (Boyda et al., 2015, 2014). Indeed,
50
51 literature shows that social disconnection and loneliness has an analogous risk for mortality
52
53 as other well-established mortality factors (physical activity, obesity, substance abuse,
54
55
56
57
58
59
60

1
2
3 responsible sexual behaviour, mental health, environmental quality, immunization, and
4
5 access to health care) (Holt-Lunstad et al., 2010).
6

7
8 Furthermore, a recent meta-analysis found loneliness was more strongly associated
9
10 with psychotic experiences in non-clinical samples compared to clinical samples (Chau et al.,
11
12 2019), indicating that irrespective of the methods of assessment, a sense of social
13
14 disconnection is considered a significant aversive experience which is linked to a wide array
15
16 of accompanying negative public health consequences (Cacioppo & Cacioppo, 2014;
17
18 Hakulinen et al., 2018; Leigh-Hunt et al., 2017).
19
20
21
22
23

24 Yet, as with the aforementioned literature in psychosis and suicide literature,
25
26 important co-occurring relationships are largely overlooked within studies examining the
27
28 trauma-psychosis pathway. As a result, there is a disconnect between evidence of a (1)
29
30 potential aetiological pathway in psychosis-suicide studies, and (2) psychopathological co-
31
32 occurrences in trauma-psychosis studies. Given the abundance of research linking (1) trauma
33
34 and psychosis, and (2) psychosis and suicide; the next logical step is to implement statistical
35
36 models which seek to adjoin these intersecting research areas.
37
38
39

40 Traditional variable centred approaches are likely to lead to an underestimation of risk
41
42 since they are limited in the ability to capture the influence of co-occurring relationships
43
44 within groups (Darby, 2007). To depict the possible interrelatedness of such experiences,
45
46 corresponding analytic procedures must be employed so that research can refine the
47
48 heterogeneity between those who experience diverse variations of trauma and psychosis.
49
50 Thus, Latent Class Analysis (LCA) is useful to identify inherent subgroups of individuals
51
52 within a larger heterogeneous population based on shared endorsements. It addresses several
53
54 of the methodological challenges that can arise in traditional subgroup analyses, including
55
56 low statistical power, high Type 1 error, and limitations in examining higher-order
57
58
59
60

1
2
3 interactions. In this way, it is well suited to capture the multidimensional nature of trauma
4
5 and its relationships with co-occurring factors (Logan et al., 2011).
6
7

8 With this in mind, we adopted an exploratory person-centred approach to investigate
9
10 the interrelationships between a range of traumas and psychotic experiences on the risk of
11
12 suicidal thoughts and attempt. The aim was to uncover distinct typologies reflecting varying
13
14 degrees of childhood and/or adult trauma with or without PE and ascertain whether any of
15
16 these had a discernibly greater risk of suicidal thoughts and attempts.
17
18
19
20

21 **2. Method**

22 **2.1 Participants and Procedure**

23
24
25
26
27
28
29
30
31 The Adult Psychiatric Morbidity Survey 2007 (APMS 2007) was carried out between
32
33 October 2006 and December 2007 by the National Centre for Social Research (NatCen) in
34
35 conjunction with the University of Leicester. The survey was commissioned by the NHS
36
37 Information Centre for Health and Social Care and employed a multistage stratified
38
39 probability sampling design. The survey consisted of a phase one and a phase two (clinical)
40
41 interview. Individuals aged 16 years and over living in private households were identified for
42
43 interview using the small user postcode address file (PAF). In instances where there was
44
45 more than one person aged 16 years or over, one adult was chosen randomly in order to
46
47 ensure that all eligible members of any household had the same chance of being selected.
48
49
50
51 From 13,171 eligible households, 7,403 individuals undertook phase one interviews, which
52
53 consisted of a series of demographic questions and the assessment of a range of common
54
55 mental disorders, alcohol and drug use, and general health using standardised instruments. Of
56
57 this group, 849 respondents were found to be eligible for a phase two clinical interview based
58
59
60

1
2
3 on disorder-specific probability calculations, of which 74% (N=630) took part in the clinical
4 interviews. To ensure that the results were representative of the population living in private
5 households in England, the data was weighted to account for non-response, gender, age, and
6 region.
7
8
9
10
11
12

13 14 15 **2.2 Measures**

16
17 The analytic model adjusted for a variety of socio-demographic and clinical correlates of
18 suicidality and PEs.
19
20
21
22

23 24 *2.2.1 Demographic factors*

25
26
27
28
29 Demographic factors included respondent sex, age band, marital status, educational
30 attainment (0=No qualifications, 1=Any qualification) and ethnic origin (Caucasian, Black,
31 South Asian, Mixed or other). A proxy measure of socioeconomic status was formed from
32 responses to two items, specifically the receipt of job seekers allowance and/or housing
33 benefit, with a positive endorsement of one or both items used to signify low SES.
34
35
36
37
38
39
40
41
42

43 Clinical variables included GP contact relating to a mental, nervous or emotional complaint
44 within the past year (0=No, 1=Yes), in addition to the presence or absence of a drug
45 dependency within their lifetime (0=No, 1=Yes).
46
47
48
49
50
51

52 53 *2.2.2 Adverse Childhood Experiences*

54 Items were extracted which were indicative of physical and sexual abuse, neglect and
55 household dysfunction in childhood.
56
57
58
59
60

1
2
3 Childhood physical abuse was assessed by the item “*Severely beaten by parent/step-*
4 *parent/carer before the age of 16?*” (0=No, 1=Yes).
5
6
7
8
9

10 Experiences of childhood sexual abuse (0=No, 1=Yes) were derived from responses to two
11 items, specifically “*touched in a sexual way without consent before the age of 16*” and
12 “*sexual intercourse without consent before the age of 16*”, with an endorsement of either item
13 denoting a positive occurrence.
14
15
16
17
18
19

20
21 Verification of one or both of the following experiences namely “*Spent any time in any kind*
22 *of institution up to the age of 16*” or “*Ever taken into Local Authority Care as a child up to*
23 *the age of 16*” was used to constitute incidents of childhood neglect (0=No, 1=Yes).
24
25
26
27
28
29

30 Exposure to household violence in childhood was captured by a positive response to the item,
31 ever experienced “*violence in the home?*” (0=No, 1=Yes) in conjunction with an endorsement
32 of the “*more than months and before 16*” response option for the subsidiary item “*when*
33 *violence in the home last occurred?*”
34
35
36
37
38
39

40
41
42 A measure of parental separation in childhood was formed from a negative endorsement of
43 the item “*Lived with both natural parents until the age of 16?*” together with a positive
44 endorsement of the “*Parental separation or divorce*” response option for the subsidiary
45 question “*Reason you did not live continuously with both natural parents at home until the*
46 *age of 16.*”
47
48
49
50
51
52

53 54 55 56 2.2.3 Adverse adult experiences 57 58 59 60

1
2
3 Adult sexual abuse (0=No, 1=Yes) was assessed from response to two items, specifically
4 “*touched in a sexual way without consent after the age of 16*” and “*sexual intercourse*
5
6 *without consent after the age of 16*”, with a confirmation of either item indicating the
7
8 presence of adult sexual abuse experiences.
9
10

11
12
13
14
15 Intimate partner violence (0=No, 1=Yes) was measured through responses to ten domestic
16
17 violence items. Initially, the items were grouped into three categories specifically exclusion
18
19 (2 items), threats of violence (3 items) and physical assault (5 items). Endorsement of a
20
21 minimum of one item in each category was used to indicate a positive response to that
22
23 category. Next, a binary measure of IPV experiences was computed whereby endorsement of
24
25 all three categories of IPV was taken to indicate prior experiences of domestic abuse.
26
27
28
29

30
31 Social disconnectedness was generated from seven items taken from the social support
32
33 section. Responses to each item ranged between 1=not true to 3=certainly true. Example
34
35 items include “Family & friends make me feel loved” and “Family & friends would see that I
36
37 am taken care of if I needed to be.” A composite total score was created and then
38
39 dichotomised into a binary social disconnectedness variable (0=No, 1=Yes), whereby the
40
41 bottom 10% of scores taken to indicate a positive endorsement of lower quality and
42
43 availability of social support.
44
45
46
47
48

49 *2.2.4 Psychotic experiences*

50
51
52
53

54 The Psychosis Screening Questionnaire (PSQ; Bebbington & Nayani, 1995) was used to
55
56 capture four types of psychotic-like experiences (0=not endorsed, 1=endorsed) in the year
57
58 preceding the survey. The PSQ screens for the presence of mania, thought insertion, paranoia,
59
60

1
2
3
4 strange experiences and hallucinations through a core item and two supplementary items for
5
6 each group of PEs. For the current study, items pertaining to mania were excluded. The core
7
8 hallucination question “*Over the past year, have there been times when you heard or saw*
9
10 *things that other people could not*” was utilised as this encompassed both auditory and visual
11
12 experiences. For the remaining three groups of PEs, subsidiary items were analysed as these
13
14 have been found to more accurately reflect true psychotic-like experiences. The three core
15
16 and selected subsidiary questions were as follows (analysis questions in italics):
17
18
19
20
21

22 Thought insertion: “Over the past year, have you ever felt that your thoughts were directly
23
24 interfered with or controlled by some outside force or person? *Did it come about in a way*
25
26 *that many people would find hard to believe?*”
27
28
29
30

31 Paranoia: “Over the past year, have there been times when you felt that people were against
32
33 you? *Have you felt that a group of people was plotting to cause you serious harm?*
34
35
36
37

38 Strange experiences “Over the past year, have there been times when you felt that something
39
40 strange was going on? *Was it so strange that other people would find it very hard to*
41
42 *believe?*”
43
44
45
46

47 *2.2.5 Suicidality*

48
49
50

51 Suicidality was captured using items from the revised clinical interview schedule (CISR)
52
53 covering recent thoughts of suicide “*Have you seriously thought about suicide within the last*
54
55 *year*” and suicide attempts in the last 12 months: e.g. “*Have you attempted suicide in the last*
56
57 *year*” (0=No, 1=Yes).
58
59
60

3. Analytic Plan

A manual 3-step latent class analysis (LCA; Asparouhov & Muthén, 2014) was conducted to identify homogenous groupings of individuals who endorsed similar patterns of interpersonal trauma and PEs. The estimation procedure also examined each of the subgroups in relation to a range of predictors and distal outcomes. The manual 3-step approach is advantageous over the more commonly used 'Classify-analyse' approach since it takes account of classification uncertainty rate (Asparouhov et al., 2014). Also, the manual 3-step approach does not derive classes from the 'Most Likely Class Membership' variable which is commonly used in post-hoc multinomial logistic regressions. Recent research shows this practice produces substantially biased parameter estimates and standard errors, therefore should be avoided (Heron et al., 2015; Lanza et al., 2013). A series of 2-6 class models were estimated and several fit indices were used to determine the optimal model fit. In addition to parsimony consideration, the Akaike Information Criteria (AIC: Akaike, 1987), the Bayesian Information Criterion (BIC: Schwarz, 1978) and the sample size adjusted BIC (SSABIC: Sclove, 1987), was used to ascertain model fit. Better fitting models are indicated by lower values of the AIC, BIC and the SSABIC. The Lo-Mendell-Rubin adjusted likelihood ratio test (LRT: Lo, 2001) was applied to compare models. When a non-significant value ($p = > 0.05$) is reached, this indicates that the model with one less class should be accepted. Predictors of class membership were assessed using the auxiliary command (R3STEP) and included a range of socio-demographic variables (**Table 3**). Categorical distal outcomes were assessed using the DCAT auxiliary command which examines the relationship between the latent predictor (i.e., the classes) and the manifest outcomes, i.e., suicide thoughts and attempts (**Table 4**) (Asparouhov & Muthén, 2014; Lanza et al., 2013). All analyses were

1
2
3 conducted using Mplus version 8.3 (Muthén & Muthén, 2017) using sample weights and
4
5 robust maximum likelihood (Yuan & Bentler, 2008).
6
7
8
9
10

11 12 13 **4. Results** 14 15

16
17 The sample was majority white British (85.3%) with a mean age of 46 years. Females were in
18 the majority (51.4%). Almost 13% reported attending a family doctor (GP) for mental,
19 nervous or emotional problems in the last 12months, 12% were dependent on a Government
20 welfare program, 3.4% of the sample endorsed dependency on one or more forms of illegal
21 drugs use and 24% reported having attained a degree level qualification. **Table 1** shows all
22 variables of interest.
23
24
25
26
27
28
29
30
31
32

33 **Table 1.** ***** ABOUT HERE *****
34
35
36
37

38 **Table 2** shows the fit statistics for the latent class analysis. Although the LRMT was non-
39 significant, the 4-class solution was determined to be the optimal solution due to the lower
40 BIC values in comparison to class 3. Classes 5 and 6 were rejected due to higher BIC, and
41 non-significant LRMT. Entropy for this model was 0.86. Within each class, the average
42 probability of belonging to that class ranged from 0.70 to 0.95, indicating adequate
43 classification accuracy (values of 1.00 indicate certainty with respect to classification).
44
45
46
47
48
49
50
51
52
53

54 The profile plot and endorsement probabilities for the four-class solution are shown in **Fig.1**.

55 The Y-axis refers to the probability of having endorsed yes to the category of events.

56 Probabilities were classified as follows: low (<.20), moderate (0.21 – 0.50) and high (> 0.51
57
58
59
60

1
2
3 – 1.0). Interpretation of the 4-class was as follows: Class 1 (Socially disconnected - high PEs;
4 $n=213$, 2.9%) was the smallest class who endorsed low levels of lifespan trauma, but the
5
6 moderate probability of social disconnection combined with the highest endorsement of PEs.
7
8 Class 2 (Sexual victimisation; $n=312$, 4.2%) reflected individuals with a high probability of
9
10 sexual abuse in both childhood and adulthood, coupled with the moderate endorsement of
11
12 IPV experiences and low endorsement of PEs, with the exception of strange experiences.
13
14 Class 3 (Lifespan adversity; $n=338$, 4.6%) reflected individuals who endorsed the moderate
15
16 to high levels of both childhood and adult adversity coupled with low levels of PEs. Class 4
17
18 (baseline class; $n=6538$, 88.3%) reflected individuals with low probabilities of all lifespan
19
20 adversity and moderate endorsement of strange experiences (PEs).
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Table 2. *****ABOUT HERE *****

Figure 1. Profile plot of lifespan trauma and psychotic experiences ***** HERE *****

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46

1
2
3 The observed results of demographic predictors of class membership indicated there was a
4 positive and significant relationship between drug dependency ($\beta = 1.12, P < 0.001$), being
5 separated ($\beta = 0.87, P < 0.001$) and the socially isolated class. However, a significant but
6 negative relationship was observed between 12-month help-seeking and this class ($\beta = -0.67,$
7 $P < 0.001$). There was a significant but negative relationship observed between 16-24-year band
8 and the sexual victimisation class ($\beta = -0.78, P < 0.05$). However, a positive and significant
9 relationship was observed between being female ($\beta = 1.51, P < 0.001$) being drug dependent (β
10 $= 1.51, P < 0.001$), no qualifications ($\beta = -0.75, P < 0.001$), being separated ($\beta = 1.18, P < 0.001$)
11 was also observed with this class. Finally, the observed results showed significant but
12 negative relationships in the 35-44, 45-54-year bands and the lifespan adversity class ($\beta = -$
13 $0.21, P < 0.01, \beta = -0.23, P < 0.001$), and drug dependency ($\beta = 2.13, P < 0.001$). There was also
14 a significant but negative relationship with being widowed ($\beta = -0.85, P < 0.001$) and the
15 lifespan adversity class. Results are shown in **Table 3**.

16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35 **Table 3.** **** ABOUT HERE *****
36
37
38
39
40
41

42 Results for each of the distal outcomes are reported in **Table 4**. The results showed a 13-fold
43 (95%CI=8.539 – 19.021), 7-fold (95%CI=4.730 – 10.171) and 9-fold (95%CI=6.436 –
44 12.542) increased odds of past 12-month suicidal ideation in the socially disconnected, sexual
45 victimisation and lifespan adversity classes respectively, in reference to the baseline class. A
46 24-fold (95%CI=10.349 – 56.860), 15-fold (95%CI=6.792 – 33.319) and 10-fold
47 (95%CI=4.188 – 24.011) increased odds of past 12-month suicide attempt were reported for
48 the socially disconnected, sexual victimisation and lifespan adversity classes in reference to
49 the baseline.

1
2
3 **Table 4. ***** ABOUT HERE *******
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

5. Discussion

The present study is the first, to our knowledge, to identify latent classes of inter-relationships between lifespan traumas and PEs on the odds of suicidal ideation and attempts. The generated classes represent underlying subgroups of individuals in the sampled population. As anticipated, a class emerged (class 4 labelled the ‘baseline typology’) constituting the majority of participants ($n=6538$, 88.3%) and consisting of individuals endorsing low lifespan adversity and a moderate probability of a single PE, ‘Strange experiences’ with a low probability of other PEs. In keeping with this, this class exhibited the lowest risk of all suicide outcomes.

The second-largest class (class 3: lifespan adversity – low PEs), represented 4.6% of the population and was characterised by moderate to high endorsement of most trauma indicators but particularly high probability of physical abuse. This class had a low endorsement of ‘thought control’ and ‘paranoia’ but higher endorsement of strange experiences and hallucinations compared to the baseline class. There were an elevated odds of both 12-month suicidal ideation (OR=9.0) and 12-month suicide attempt (OR=10.0) in this group compared to baseline. Questionnaire self-reports of hallucinations have previously been shown to have the highest validity compared to clinical interview (versus questionnaire items on paranoia and strange experiences) (Kelleher et al., 2011). The increased probability of clinically relevant PEs and multiple adversities may partially explain the high odds of suicidal behaviour amongst this class.

A further class emerged (Class 2: Sexual victimization – moderate PEs) representing 4.2% of the population and was characterised by individuals who experienced high levels of sexual abuse in both childhood and adulthood coupled with moderate levels of both intimate

1
2
3 partner violence (IPV) and PEs. This aligns with prior literature which found that females
4 with a history of childhood sexual assault are especially vulnerable to future revictimization
5 (Barnes et al., 2009). This class also had increased odds of both 12-month suicidal ideation
6 (OR=7.0) and 12-month suicide attempt (OR=15.0).
7
8
9
10
11
12
13

14
15 However, the latent class analysis produced several unexpected outcomes. A socially
16 disconnected and high Pes (class 1) was generated, representing 2.9% of the population. This
17 was characterised by low endorsement of all lifespan trauma, yet moderate probabilities of
18 social disconnection, and exhibited the greatest probability of PE endorsement across all
19 emergent classes. Research evidence suggests there is a trauma-psychosis relationship,
20 however, the disparity in the probability of endorsement of PEs between the lifespan
21 adversity class vs sexual victimization vs socially disconnected classes is difficult to discern.
22 Nevertheless, whether causal or consequential, social disconnection and related appraisals of
23 loneliness is a dominant feature among individuals with psychosis (Lim et al., 2018;
24 Michalska da Rocha et al., 2018).
25
26
27
28
29
30
31
32
33
34
35
36
37

38 Finally, we anticipated that a high lifespan trauma-high PE class would emerge and
39 confer the highest risk of suicidality over and above other typologies, however this was not
40 supported by the data since no such class materialised from the data. Whilst unexpected,
41 these findings do serve to substantiate prior assertions that traumatic encounters do not
42 inevitably manifest in the development of PEs and conversely, that PEs can also emerge in
43 the absence of prior traumas (Murphy et al., 2014).
44
45
46
47
48
49
50
51
52
53

54 Instead, a socially disconnected class and high PE class emerged which was
55 unexpected. Previous research has placed the greatest emphasis on physical and sexual abuse
56 in determining poor psychological outcomes, however, our results suggest that social
57
58
59
60

1
2
3 disconnection is at least as important a factor since this class showed a strong relationship
4 with 12-month suicide thoughts (OR=13.0) and 12-month attempts (OR=24.2). The
5
6 chronology of the encounters is likely to have contributed to these findings; whereby a
7
8 history of multiple adverse experiences may create an enduring predisposition for suicidal
9
10 thoughts and behaviours, however, it may be that such distal events (e.g. childhood trauma)
11
12 may be less influential in determining current suicidality over more proximal factors such as
13
14 lack of connectedness and poor mental health, which were captured in real-time.
15
16
17 Additionally, the amplified ORs among the only high PE class aligns with recent research
18
19 showing that positive symptoms of psychosis were significant risk factors for suicidal
20
21 thoughts and behaviours (Huang, Fox, Ribeiro, & Franklin, 2018). Likewise, Kelleher et al.
22
23 (2012b) found that adolescents who reported psychotic symptoms had a nearly 20-fold
24
25 increased odds of suicide plans and acts compared with adolescents with suicidal ideation
26
27 who did not report psychotic symptoms. Indeed, DeVylder, Lukens, Link and Lieberman
28
29 (2015) also showed that the risk of concurrent suicidal ideation is increased 4-fold amongst
30
31 individuals with recent psychotic experiences, thus, alluding to the frequent simultaneity of
32
33 psychotic experiences and suicidal ideation.
34
35
36
37
38
39
40
41

42 The observed results may also tie in with research by van Os and Reininghaus (2016)
43
44 who posited a synergistic pathway theory, whereby symptom manifestation may not vary
45
46 independently, but instead, dynamically interact overtime to recruit more severe additional
47
48 phenotype symptoms. As a result of increased network activity between psychotic
49
50 phenomena and environmental stress, in this case, social disconnection, the risk of suicidality
51
52 may become magnified through feelings of thwarted belongingness. Therefore, the socially
53
54 disconnected and high PE class is conceivably the highest risk class for suicide, not least
55
56 because of the presence of PE, but also because they are likely to have a greater propensity
57
58
59
60

1
2
3 for thwarted belongingness (*alienation, loneliness etc.*) which is central to contemporary
4 theories of suicide (Joiner, 2007; Van Orden et al., 2010, 2008) and posited as one of the key
5
6 motivators for suicide (O'Connor & Kirtley, 2018).
7
8
9

10 11 12 5.1 Limitations 13 14 15 16

17 The results should be interpreted in light of potential limitations. First, since all information
18 was obtained via self-report, there is a possibility of reporting bias. For example, social
19 desirability may have affected the reporting of psychotic symptoms (DeVylder & Hilimire,
20 2015; Read et al., 2004), suicidal thoughts and behaviour (Jenkins et al., 2002), and traumatic
21 experiences (Read, Van Os, Morrison, & Ross, 2005). There is also some evidence that
22 individuals may under-report their symptoms due to a misunderstanding of the questions
23 posed or because of a tendency to normalise experience(s) (Wittchen, Knäuper, et al., 1994;
24 Wittchen, Zhao, et al., 1994). Second, the reliability and validity of self-reported trauma
25 histories could not be established. However, several systematic reviews have concluded that
26 adults recall childhood experiences with sufficient accuracy to provide useful information in
27 retrospective studies (Brewin et al., 1993; Hardt & Rutter, 2004; Maughan & Rutter, 1997).
28 Third, several of the measures were derived from either single survey items or a compilation
29 of items which may call into question the reliability and validity of this method of
30 operationalisation. Whilst this limitation must be acknowledged, this approach simply reflects
31 the nature of epidemiological data and the efforts by the authors to best capture the observed
32 constructs within the constraints of the available data. Future studies may seek to corroborate
33 the current findings utilising more robust and objective assessment methods. Similarly, the
34 suicidal thoughts and behaviour items in the APMS were not based on a specific suicide risk
35 assessment scale but were instead measured through a clinical diagnostic instrument (CIS-R).
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 Relatedly, we lacked detailed information about suicidal thoughts and behaviour, such as the
4 number and timing of previous suicide attempts, as well as methods used, which would have
5 enabled us to illuminate the association between the emergent latent classes and suicidal
6 thoughts and behaviour to a fuller extent. Fourth, some obtained estimates, especially those
7 for a suicide attempt, had wide confidence intervals due to the small number of endorsed
8 cases; at the same time, lower confidence intervals were well in excess of one. Finally, as
9 with all cross-sectional research, the temporal association or causality cannot be established.

21 5.2 Implications

23
24
25
26 Psychosis significantly increases the risk of suicide ideation, attempt or death (Huang et al.,
27 2018), and although evidence suggests PEs are transitory for the majority of individuals, in a
28 small but significant minority, such experiences can increase the likelihood of transition to a
29 clinically relevant disorder (Reininghaus et al., 2016; van Os & Linscott, 2012; van Os &
30 Reininghaus, 2016). Moreover, recent research suggests that individuals with PEs may be
31 greater consumers of mental health services, including primary care, compared to those
32 without (Bhavsar et al., 2018; DeVlyder et al., 2014). Therefore, where individuals present
33 with psychotic phenomena, be that in a primary or secondary health care settings, health
34 professionals should be better trained to recognise the potential need for a more rigorous
35 investigation, that not only includes a comprehensive assessment of (1) distal trauma, but also
36 (2) social connectedness of the presenting client, since both factors have been linked to
37 suicidal thoughts and behaviours. For mental health professionals who are tasked with
38 conducting such assessments, there should be clear practice guidelines in place to help guide
39 the process, particularly in light of sustained barriers to abuse enquiries (Hepworth &
40 McGowan, 2013; Read et al., 2007, 2007; Sampson & Read, 2017; Young et al., 2001).

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Moreover, despite significant progress in mental health provision (Jenkins, 1992) and improvements in recognition and detection of mental health conditions within primary care settings (Pfaff et al., 2001; Taliaferro et al., 2013) there is an ongoing need for training among general practitioners in relation to issues such as suicide, depression and abuse (Bajaj et al., 2008; Graham et al., 2011; Leavey et al., 2017; Zuckerbrot & Jensen, 2006).

5.3 Conclusion

Our findings tentatively suggest, that while adverse life events increase the risk of 12-month suicide thoughts and behaviours, further elevated risk of suicide enactment may in fact, be contingent on more proximal problems such as poor-quality social relationships and current psychological wellbeing. Indeed, feelings of loneliness can arise from social disconnection and are thought to play either maintenance and/or a causal role in the development of psychotic experiences (van der Werf et al., 2010). Conceivably, if psychotic experiences worsen, the ability to avail of support, maintain or create social connections could become strained; thereby antagonising further psychopathology and perpetuating a pernicious cycle of exclusion, psychopathology and increased risk of suicide thoughts and behaviours.

References

- Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, *52*(3), 317–332.
- Asparouhov, T., & Muthén, B. (2014). Auxiliary variables in mixture modeling: Three-step approaches using Mplus. *Structural Equation Modeling: A Multidisciplinary Journal*, *21*(3), 329–341.
- Bajaj, P., Borreani, E., Ghosh, P., Methuen, C., Patel, M., & Joseph, M. (2008). Screening for suicidal thoughts in primary care: The views of patients and general practitioners. *Mental Health in Family Medicine*, *5*(4), 229.
- Barnes, J. E., Noll, J. G., Putnam, F. W., & Trickett, P. K. (2009). Sexual and physical revictimization among victims of severe childhood sexual abuse. *Child Abuse & Neglect*, *33*(7), 412–420. <https://doi.org/10.1016/j.chiabu.2008.09.013>
- Bebbington, P., & Nayani, T. (1995). The psychosis screening questionnaire. *International Journal of Methods in Psychiatric Research*, *5*, 11–19.
- Bertolote, J. M., Fleischmann, A., De Leo, D., & Wasserman, D. (2004). Psychiatric Diagnoses and Suicide: Revisiting the Evidence. *Crisis*, *25*(4), 147–155. <https://doi.org/10.1027/0227-5910.25.4.147>
- Bhavsar, V., McGuire, P., MacCabe, J., Oliver, D., & Fusar-Poli, P. (2018). A systematic review and meta-analysis of mental health service use in people who report psychotic experiences. *Early Intervention in Psychiatry*, *12*(3), 275–285. <https://doi.org/10.1111/eip.12464>
- Björkenstam, C., Björkenstam, E., Hjern, A., Bodén, R., & Reutfors, J. (2014). Suicide in first episode psychosis: A nationwide cohort study. *Schizophrenia Research*, *157*(1–3), 1–7. <https://doi.org/10.1016/j.schres.2014.05.010>

- 1
2
3 Boyda, D., & McFeeters, D. (2015). Childhood Maltreatment and Social Functioning in
4
5 Adults with Sub-Clinical Psychosis. *Psychiatry Research*, *226*(1), 376–382.
6
7 <https://doi.org/10.1016/j.psychres.2015.01.023>
8
9
10 Boyda, D., McFeeters, D., & Shevlin, M. (2014). Intimate Partner Violence, Sexual Abuse,
11
12 and the Mediating Role of Loneliness on Psychosis. *Psychosis*, *7*(1), 1–13.
13
14 <https://doi.org/10.1080/17522439.2014.917433>
15
16
17 Brewin, C. R., Andrews, B., & Gotlib, I. H. (1993). Psychopathology and early experience: A
18
19 reappraisal of retrospective reports. *Psychological Bulletin*, *113*(1), 82.
20
21
22 Burns, C. R., Lagdon, S., Boyda, D., & Armour, C. (2016). Interpersonal polyvictimization
23
24 and mental health in males. *Journal of Anxiety Disorders*.
25
26 <https://doi.org/10.1016/j.janxdis.2016.04.002>
27
28
29 Cacioppo, J. T., & Cacioppo, S. (2014). Social relationships and health: The toxic effects of
30
31 perceived social isolation. *Social and Personality Psychology Compass*, *8*(2), 58–72.
32
33
34 Chau, A. K. C., Zhu, C., & So, S. H.-W. (2019). Loneliness and the psychosis continuum: A
35
36 meta-analysis on positive psychotic experiences and a meta-analysis on negative
37
38 psychotic experiences. *International Review of Psychiatry*, *31*(5–6), 471–490.
39
40 <https://doi.org/10.1080/09540261.2019.1636005>
41
42
43 Croft, J., Heron, J., Teufel, C., Cannon, M., Wolke, D., Thompson, A., Houtepen, L., &
44
45 Zammit, S. (2019). Association of trauma type, age of exposure, and frequency in
46
47 childhood and adolescence with psychotic experiences in early adulthood. *JAMA*
48
49 *Psychiatry*, *76*(1), 79–80.
50
51
52 Darby, K. H. (2007). *Co-Occurring Disorders: An Outpatient Latent Class Analysis*.
53
54 http://trace.tennessee.edu/utk_graddiss/146/
55
56
57
58
59
60

- 1
2
3 DeVylder, J. E., & Hilimire, M. R. (2015). Suicide Risk, Stress Sensitivity, and Self-Esteem
4 among Young Adults Reporting Auditory Hallucinations. *Health & Social Work,*
5
6 *40(3)*, 175–181. <https://doi.org/10.1093/hsw/hlv037>
7
8
9
10 DeVylder, J. E., Lukens, E. P., Link, B. G., & Lieberman, J. A. (2015). Suicidal Ideation and
11
12 Suicide Attempts Among Adults With Psychotic Experiences: Data From the
13
14 Collaborative Psychiatric Epidemiology Surveys. *JAMA Psychiatry, 72(3)*, 219.
15
16 <https://doi.org/10.1001/jamapsychiatry.2014.2663>
17
18
19 DeVylder, J. E., Oh, H. Y., Corcoran, C. M., & Lukens, E. P. (2014). *Treatment seeking and*
20
21 *unmet need for care among persons reporting psychosis-like experiences.*
22
23 <http://ps.psychiatryonline.org/doi/10.1176/appi.ps.201300254>
24
25
26 Dutta, R., Murray, R. M., Hotopf, M., Allardyce, J., Jones, P. B., & Boydell, J. (2010).
27
28 Reassessing the Long-term Risk of Suicide After a First Episode of Psychosis.
29
30 *Archives of General Psychiatry, 67(12)*, 1230.
31
32 <https://doi.org/10.1001/archgenpsychiatry.2010.157>
33
34
35 Fialko, L., Freeman, D., Bebbington, P. E., Kuipers, E., Garety, P. A., Dunn, G., & Fowler,
36
37 D. (2006). Understanding suicidal ideation in psychosis: Findings from the
38
39 Psychological Prevention of Relapse in Psychosis (PRP) trial. *Acta Psychiatrica*
40
41 *Scandinavica, 114(3)*, 177–186.
42
43
44 Finkelhor, D., Ormrod, R. K., & Turner, H. A. (2007). Polyvictimization and Trauma in a
45
46 National Longitudinal Cohort. *Development and Psychopathology, 19(01)*, 149–166.
47
48 <https://doi.org/10.1017/S0954579407070083>
49
50
51 Gatov, E., Rosella, L., Chiu, M., & Kurdyak, P. A. (2017). Trends in standardized mortality
52
53 among individuals with schizophrenia, 1993–2012: A population-based, repeated
54
55 cross-sectional study. *CMAJ, 189(37)*, E1177–E1187.
56
57 <https://doi.org/10.1503/cmaj.161351>
58
59
60

- 1
2
3 Graham, R. D., Rudd, M. D., & Bryan, C. J. (2011). Primary care providers' views regarding
4 assessing and treating suicidal patients. *Suicide and Life-Threatening Behavior*, *41*(6),
5 614–623.
6
7
8
9
10 Hakulinen, C., Pulkki-Råback, L., Virtanen, M., Jokela, M., Kivimäki, M., & Elovainio, M.
11 (2018). Social isolation and loneliness as risk factors for myocardial infarction, stroke
12 and mortality: UK Biobank cohort study of 479 054 men and women. *Heart*, *104*(18),
13 1536–1542. <https://doi.org/10.1136/heartjnl-2017-312663>
14
15
16
17
18
19 Hardt, J., & Rutter, M. (2004). Validity of adult retrospective reports of adverse childhood
20 experiences: Review of the evidence. *Journal of Child Psychology and Psychiatry*,
21 *45*(2), 260–273. <https://doi.org/10.1111/j.1469-7610.2004.00218.x>
22
23
24
25
26 Hepworth, I., & McGowan, L. (2013). Do mental health professionals enquire about
27 childhood sexual abuse during routine mental health assessment in acute mental
28 health settings? A substantive literature review. *Journal of Psychiatric and Mental*
29 *Health Nursing*, *20*(6), 473–483.
30
31
32
33
34
35
36 Heron, J. E., Croudace, T. J., Barker, E. D., & Tilling, K. (2015). A comparison of
37 approaches for assessing covariate effects in latent class analysis. *Longitudinal and*
38 *Life Course Studies*, *6*(4), 420–434. <https://doi.org/10.14301/llcs.v6i4.322>
39
40
41
42
43 Hjørthøj, C., Stürup, A. E., McGrath, J. J., & Nordentoft, M. (2017). Years of potential life
44 lost and life expectancy in schizophrenia: A systematic review and meta-analysis. *The*
45 *Lancet Psychiatry*, *4*(4), 295–301. [https://doi.org/10.1016/S2215-0366\(17\)30078-0](https://doi.org/10.1016/S2215-0366(17)30078-0)
46
47
48
49
50 Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social Relationships and Mortality
51 Risk: A Meta-analytic Review. *PLOS Medicine*, *7*(7), e1000316.
52
53
54
55
56
57
58
59
60

1
2
3 experiences and incident suicidal ideation and behaviour: Disentangling the
4 longitudinal associations from connected psychopathology. *Psychiatry Research*, 245,
5 267–275.
6
7
8
9

10 Hor, K., & Taylor, M. (2010). Suicide and schizophrenia: A systematic review of rates and
11 risk factors. *Journal of Psychopharmacology (Oxford, England)*, 24(4_supplement),
12 81–90. <https://doi.org/10.1177/1359786810385490>
13
14
15
16

17 Huang, X., Fox, K. R., Ribeiro, J. D., & Franklin, J. C. (2018). Psychosis as a risk factor for
18 suicidal thoughts and behaviors: A meta-analysis of longitudinal studies.
19 *Psychological Medicine*, 48(5), 765–776.
20
21
22
23

24 Jenkins, G. R., Hale, R., Papanastassiou, M., Crawford, M. J., & Tyrer, P. (2002). Suicide
25 rate 22 years after parasuicide: Cohort study. *BMJ*, 325(7373), 1155.
26
27 <https://doi.org/10.1136/bmj.325.7373.1155>
28
29
30

31 Jenkins, R. (1992). Developments in the primary care of mental illness—A forward look.
32 *International Review of Psychiatry*, 4(3–4), 237–242.
33
34

35 Joiner, T. (2007). *Why People Die by Suicide* (1 edition). Harvard University Press.

36 Kelleher, I., Cederlöf, M., & Lichtenstein, P. (2014). Psychotic experiences as a predictor of
37 the natural course of suicidal ideation: A Swedish cohort study. *World Psychiatry*,
38 13(2), 184–188. <https://doi.org/10.1002/wps.20131>
39
40
41
42
43

44 Kelleher, I., Corcoran, P., Keeley, H., Wigman, J. T., Devlin, N., Ramsay, H., Wasserman,
45 C., Carli, V., Sarchiapone, M., & Hoven, C. (2013). Psychotic symptoms and
46 population risk for suicide attempt: A prospective cohort study. *JAMA Psychiatry*,
47 70(9), 940–948.
48
49
50
51
52

53 Kelleher, I., Corcoran, P., Keeley, H., Wigman, J. T., Devlin, N., Ramsay, H., Wasserman,
54 C., Carli, V., Sarchiapone, M., Hoven, C., & others. (2013). Psychotic symptoms and
55
56
57
58
59
60

- 1
2
3 population risk for suicide attempt: A prospective cohort study. *JAMA Psychiatry*,
4
5 70(9), 940–948.
6
7
8 Kelleher, I., Devlin, N., Wigman, J. T., Kehoe, A., Murtagh, A., Fitzpatrick, C., & Cannon,
9
10 M. (2014). Psychotic experiences in a mental health clinic sample: Implications for
11
12 suicidality, multimorbidity and functioning. *Psychological Medicine*, 44(8), 1615–
13
14 1624.
15
16
17 Kelleher, I., Harley, M., Murtagh, A., & Cannon, M. (2011). Are Screening Instruments
18
19 Valid for Psychotic-Like Experiences? A Validation Study of Screening Questions for
20
21 Psychotic-Like Experiences Using In-Depth Clinical Interview. *Schizophrenia*
22
23 *Bulletin*, 37(2), 362–369. <https://doi.org/10.1093/schbul/sbp057>
24
25
26 Kelleher, I., Lynch, F., Harley, M., Molloy, C., Roddy, S., Fitzpatrick, C., & Cannon, M.
27
28 (2012). Psychotic symptoms in adolescence index risk for suicidal behavior: Findings
29
30 from 2 population-based case-control clinical interview studies. *Archives of General*
31
32 *Psychiatry*, 69(12), 1277–1283.
33
34
35 Lanza, S. T., Tan, X., & Bray, B. C. (2013). Latent Class Analysis With Distal Outcomes: A
36
37 Flexible Model-Based Approach. *Structural Equation Modeling : A Multidisciplinary*
38
39 *Journal*, 20(1), 1–26. <https://doi.org/10.1080/10705511.2013.742377>
40
41
42 Laursen, T. M., Plana-Ripoll, O., Andersen, P. K., McGrath, J. J., Toender, A., Nordentoft,
43
44 M., Canudas-Romo, V., & Erlangsen, A. (2018). Cause-specific life years lost among
45
46 persons diagnosed with schizophrenia: Is it getting better or worse? *Schizophrenia*
47
48 *Research*. <https://doi.org/10.1016/j.schres.2018.11.003>
49
50
51 Leavey, G., Mallon, S., Rondon-Sulbaran, J., Galway, K., Rosato, M., & Hughes, L. (2017).
52
53 The failure of suicide prevention in primary care: Family and GP perspectives—a
54
55 qualitative study. *BMC Psychiatry*, 17(1), 369.
56
57
58
59
60

- 1
2
3 Leigh-Hunt, N., Bagguley, D., Bash, K., Turner, V., Turnbull, S., Valtorta, N., & Caan, W.
4
5 (2017). An overview of systematic reviews on the public health consequences of
6
7 social isolation and loneliness. *Public Health, 152*, 157–171.
8
9
- 10 Lim, M. H., Gleeson, J. F. M., Alvarez-Jimenez, M., & Penn, D. L. (2018). Loneliness in
11
12 psychosis: A systematic review. *Social Psychiatry and Psychiatric Epidemiology,*
13
14 *53*(3), 221–238. <https://doi.org/10.1007/s00127-018-1482-5>
15
16
- 17 Lo, Y. (2001). Testing the number of components in a normal mixture. *Biometrika, 88*(3),
18
19 767–778.
20
21
- 22 Logan, J., Hall, J., & Karch, D. (2011). Suicide categories by patterns of known risk factors:
23
24 A latent class analysis. *Archives of General Psychiatry, 68*(9), 935–941.
25
26
- 27 Maughan, B., & Rutter, M. (1997). Retrospective reporting of childhood adversity: Issues in
28
29 assessing long-term recall. *Journal of Personality Disorders, 11*(1), 19–33.
30
31
- 32 Michalska da Rocha, B., Rhodes, S., Vasilopoulou, E., & Hutton, P. (2018). Loneliness in
33
34 Psychosis: A Meta-analytical Review. *Schizophrenia Bulletin, 44*(1), 114–125.
35
36 <https://doi.org/10.1093/schbul/sbx036>
37
- 38 Murphy, J., Shevlin, M., Houston, J. E., & Adamson, G. (2014). Modelling the co-occurrence
39
40 of psychosis-like experiences and childhood sexual abuse. *Social Psychiatry and*
41
42 *Psychiatric Epidemiology, 49*(7), 1037–1044. [https://doi.org/10.1007/s00127-014-](https://doi.org/10.1007/s00127-014-0845-9)
43
44 *0845-9*
45
46
- 47 Muthén, L., & Muthén, B. (2013). Mplus: Statistical analysis with latent variables: User's
48
49 guide. *Los Angeles, CA: Muthén & Muthén.*
50
51
- 52 Nishida, A., Sasaki, T., Nishimura, Y., Tani, H., Hara, N., Inoue, K., Yamada, T., Takami,
53
54 T., Shimodera, S., Itokawa, M., & others. (2010). Psychotic-like experiences are
55
56 associated with suicidal feelings and deliberate self-harm behaviors in adolescents
57
58 aged 12–15 years. *Acta Psychiatrica Scandinavica, 121*(4), 301–307.
59
60

- 1
2
3 Nordentoft, M., Madsen, T., & Fedyszyn, I. (2015). Suicidal behavior and mortality in first-
4 episode psychosis. *The Journal of Nervous and Mental Disease*, *203*(5), 387–392.
5
6 <https://doi.org/10.1097/NMD.0000000000000296>
7
8
9
10 Nordentoft, M., Wahlbeck, K., Hällgren, J., Westman, J., Osby, U., Alinaghizadeh, H.,
11 Gissler, M., & Laursen, T. M. (2013). Excess mortality, causes of death and life
12 expectancy in 270,770 patients with recent onset of mental disorders in Denmark,
13 Finland and Sweden. *PloS One*, *8*(1), e55176.
14
15 <https://doi.org/10.1371/journal.pone.0055176>
16
17
18
19
20
21 O'Connor, R. C., & Kirtley, O. J. (2018). The integrated motivational-volitional model of
22 suicidal behaviour. *Philosophical Transactions of the Royal Society of London. Series*
23 *B, Biological Sciences*, *373*(1754). <https://doi.org/10.1098/rstb.2017.0268>
24
25
26
27
28
29 Palmer, B. A., Pankratz, V. S., & Bostwick, J. M. (2005). The lifetime risk of suicide in
30 schizophrenia: A reexamination. *Archives of General Psychiatry*, *62*(3), 247–253.
31
32 <https://doi.org/10.1001/archpsyc.62.3.247>
33
34
35
36 Pfaff, J. J., Acres, J. G., & McKelvey, R. S. (2001). Training general practitioners to
37 recognise and respond to psychological distress and suicidal ideation in young people.
38 *Medical Journal of Australia*, *174*(5), 222–226.
39
40
41
42
43 Piotrowski, P., Gondek, T. M., Królicka-Deręgowska, A., Misiak, B., Adamowski, T., &
44 Kiejna, A. (2017). Causes of mortality in schizophrenia: An updated review of
45 European studies. *Psychiatria Danubina*, *29*(2), 108–120.
46
47
48
49 Radomsky, E. D., Haas, G. L., Keshavan, M. S., & Sweeney, J. A. (1995). Suicidal behavior
50 in schizophrenia and other psychotic disorders. *Schizophrenia Research*, *1*(15), 196–
51
52
53
54
55
56
57
58
59
60 Read, J., Van Os, J., Morrison, A. P., & Ross, C. A. (2005). Childhood trauma, psychosis and
schizophrenia: A literature review with theoretical and clinical implications. *Acta*

1
2
3 *Psychiatrica Scandinavica*, 112(5), 330–350. <https://doi.org/10.1111/j.1600->
4
5 0447.2005.00634.x
6

7
8 Read, J., Bentall, R., & Mosher, L. (2004). *Models of Madness: Psychological, Social and*
9
10 *Biological Approaches to Schizophrenia (The International Society for the*
11
12 *Psychological Treatments of the Schizophrenias and Other Psychoses)* (New Ed
13
14 edition). Routledge.
15

16
17 Read, J., Hammersley, P., & Rudegeair, T. (2007). Why, when and how to ask about
18
19 childhood abuse. *Advances in Psychiatric Treatment*, 13(2), 101–110.
20

21
22 Reininghaus, U., Gayer-Anderson, C., Valmaggia, L., Kempton, M. J., Calem, M.,
23
24 Onyejiaka, A., Hubbard, K., Dazzan, P., Beards, S., Fisher, H. L., & others. (2016).
25
26 Psychological processes underlying the association between childhood trauma and
27
28 psychosis in daily life: An experience sampling study. *Psychological Medicine*,
29
30 46(13), 2799–2813.
31

32
33 Saha, S., Scott, J. G., Johnston, A. K., Slade, T. N., Varghese, D., Carter, G. L., & McGrath,
34
35 J. J. (2011). The association between delusional-like experiences and suicidal
36
37 thoughts and behaviour. *Schizophrenia Research*, 132(2), 197–202.
38

39
40 Sampson, M., & Read, J. (2017). Are mental health staff getting better at asking about abuse
41
42 and neglect? *International Journal of Mental Health Nursing*, 26(1), 95–104.
43

44
45 Sanchez-Gistau, V., Baeza, I., Arango, C., González-Pinto, A., de la Serna, E., Parellada, M.,
46
47 Graell, M., Paya, B., Llorente, C., & Castro-Fornieles, J. (2013). Predictors of suicide
48
49 attempt in early-onset, first episode psychoses: A longitudinal 24-month follow-up
50
51 study. *The Journal of Clinical Psychiatry*.
52

53
54 Schwarz, G. (1978). Estimating the Dimension of a Model. *The Annals of Statistics*, 6(2),
55
56 461–464.
57
58
59
60

- 1
2
3 Sclove, S. L. (1987). Application of model-selection criteria to some problems in multivariate
4
5 analysis. *Psychometrika*, *52*(3), 333–343.
6
7
8 Sullivan, S. A., Lewis, G., Gunnell, D., Cannon, M., Mars, B., & Zammit, S. (2015). The
9
10 longitudinal association between psychotic experiences, depression and suicidal
11
12 behaviour in a population sample of adolescents. *Social Psychiatry and Psychiatric*
13
14 *Epidemiology*, *50*(12), 1809–1817.
15
16
17 Taliaferro, L. A., Hetler, J., Edwall, G., Wright, C., Edwards, A. R., & Borowsky, I. W.
18
19 (2013). Depression screening and management among adolescents in primary care:
20
21 Factors associated with best practice. *Clinical Pediatrics*, *52*(6), 557–567.
22
23
24 Tanskanen, A., Tiihonen, J., & Taipale, H. (2018). Mortality in schizophrenia: 30-year
25
26 nationwide follow-up study. *Acta Psychiatrica Scandinavica*, *138*(6), 492–499.
27
28 <https://doi.org/10.1111/acps.12913>
29
30
31 van der Werf, M., van Winkel, R., van Boxtel, M., & van Os, J. (2010). Evidence that the
32
33 impact of hearing impairment on psychosis risk is moderated by the level of
34
35 complexity of the social environment. *Schizophrenia Research*, *122*(1), 193–198.
36
37 <https://doi.org/10.1016/j.schres.2010.05.020>
38
39
40 Van Orden, K. A., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A., & Joiner
41
42 Jr, T. E. (2010). The interpersonal theory of suicide. *Psychological Review*, *117*(2),
43
44 575.
45
46
47 Van Orden, K. A., Witte, T. K., Gordon, K. H., Bender, T. W., & Joiner Jr, T. E. (2008).
48
49 Suicidal desire and the capability for suicide: Tests of the interpersonal-psychological
50
51 theory of suicidal behavior among adults. *Journal of Consulting and Clinical*
52
53 *Psychology*, *76*(1), 72.
54
55
56
57
58
59
60

- 1
2
3 van Os, J., & Linscott, R. J. (2012). Introduction: The Extended Psychosis Phenotype—
4
5 Relationship With Schizophrenia and With Ultrahigh Risk Status for Psychosis.
6
7 *Schizophrenia Bulletin*, 38(2), 227–230. <https://doi.org/10.1093/schbul/sbr188>
8
9
10 van Os, J., & Reininghaus, U. (2016). Psychosis as a transdiagnostic and extended phenotype
11
12 in the general population. *World Psychiatry: Official Journal of the World Psychiatric*
13
14 *Association (WPA)*, 15(2), 118–124. <https://doi.org/10.1002/wps.20310>
15
16
17 Varese, F., Smeets, F., Drukker, M., Lieveise, R., Lataster, T., Viechtbauer, W., Read, J., Os,
18
19 J. van, & Bentall, R. P. (2012). Childhood Adversities Increase the Risk of Psychosis:
20
21 A Meta-analysis of Patient-Control, Prospective- and Cross-sectional Cohort Studies.
22
23 *Schizophrenia Bulletin*, 38(4), 661–671. <https://doi.org/10.1093/schbul/sbs050>
24
25
26 Walker, E. R., McGee, R. E., & Druss, B. G. (2015). Mortality in Mental Disorders and
27
28 Global Disease Burden Implications: A Systematic Review and Meta-analysis. *JAMA*
29
30 *Psychiatry*, 72(4), 334–341. <https://doi.org/10.1001/jamapsychiatry.2014.2502>
31
32
33 Wittchen, H.-U., Knäuper, B., & Kessler, R. C. (1994). Lifetime risk of depression. *The*
34
35 *British Journal of Psychiatry*, 165(S26), 16–22.
36
37
38 Wittchen, H.-U., Zhao, S., Kessler, R. C., & Eaton, W. W. (1994). DSM-III-R generalized
39
40 anxiety disorder in the National Comorbidity Survey. *Archives of General Psychiatry*,
41
42 51(5), 355–364.
43
44
45 Yates, K., Lång, U., Cederlöf, M., Boland, F., Taylor, P., Cannon, M., McNicholas, F.,
46
47 DeVlyder, J., & Kelleher, I. (2019). Association of Psychotic Experiences With
48
49 Subsequent Risk of Suicidal Ideation, Suicide Attempts, and Suicide Deaths: A
50
51 Systematic Review and Meta-analysis of Longitudinal Population Studies. *JAMA*
52
53 *Psychiatry*, 76(2), 180. <https://doi.org/10.1001/jamapsychiatry.2018.3514>
54
55
56
57
58
59
60

1
2
3 Young, M., Read, J., Barker-Collo, S., & Harrison, R. (2001). Evaluating and overcoming
4 barriers to taking abuse histories. *Professional Psychology: Research and Practice*,
5
6 32(4), 407.
7
8
9

10 Yuan, K.-H., & Bentler, P. M. (2008). Three Likelihood-Based Methods For Mean and
11
12 Covariance Structure Analysis With Nonnormal Missing Data. *Sociological*
13
14 *Methodology*, 30(1), 165–200.
15
16

17 Zuckerbrot, R. A., & Jensen, P. S. (2006). Improving recognition of adolescent depression in
18
19 primary care. *Archives of Pediatrics & Adolescent Medicine*, 160(7), 694–704.
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Table 1. Descriptive statistics for all variables of interest.

Items	<i>N</i>	Valid (%)
Sex abuse before 16	658	(8.5)
Neglect	253	(3.2)
Physical abuse	351	(4.7)
Witness to violence in home before 16	216	(3.3)
Sex abuse after 16	459	(5.8)
Intimate partner violence	449	(5.2)
Social disconnection	900	(11.6)
Thought Insertion	77	(0.9)
Paranoia	125	(1.8)
Strange experiences	239	(36.9)
Hallucinations	323	(4.4)
Seriously thought about suicide in the last year	339	(4.3)
Attempted suicide within the last year	49	(0.7)

Unweighted *N*, Weighted %

Table 2. Fit Indices for Latent Class Models Two to Six.

Model	Log likelihood	AIC	BIC	Adjusted-BIC	LRT / P value	Entropy
2	-13372.289	26790.579	26949.501	26876.412	1572.674 **	0.77
3	-13286.101	26642.203	26884.040	26772.818	170.779	0.84
4	-13200.823	26495.645	26820.398	26671.043	168.977	0.86
5	-13172.330	26462.659	26870.328	26682.839	56.458	0.82
6	-13149.121	26440.242	26930.826	26705.204	45.987	0.80

AIC=Akaike information criterion, BIC=Bayesian Information Criterion, SSABIC=Sample Size Adjusted BIC, LRT=Lo-Mendell–Rubin adjusted LRT value and associated significance level. **= $P < 0.001$, Weights applied.

Table 3. Socio-demographic predictors of class membership.

	Socially disconnected	Sexual victimisation	Lifespan adversity
	High PEs	Moderate PEs	Low PEs
	β (S.E) P-value	β (S.E) P-value	β (S.E) P-value
Age			
16 - 24	- 0.64 (0.5)	- 0.78 (0.4) *	- 0.28 (0.3)
25 - 34	- 0.13 (0.1)	- 0.09 (0.1)	- 0.20 (0.1)
35 - 44	0.08 (0.1)	- 0.01 (0.1)	- 0.21 (0.1) **
45 - 54	- 0.06 (0.1)	- 0.11 (0.1)	- 0.23 (0.1) **
55 - 64	0.04 (0.1)	- 0.06 (0.1)	- 0.02 (0.0)
65 - 75	- 0.01 (0.1)	- 0.02 (0.0)	- 0.05 (0.0)
75+	(- -)	(- -)	(- -)
Gender	0.01 (0.1)	1.51 (0.1) **	0.09 (0.14)
Education	0.16 (0.2)	- 0.75 (0.1) **	0.14 (0.5)
Drug dependent	1.12 (0.3) **	1.18 (0.3) **	2.13 (0.2) **
12month help-seeking	- 0.67 (0.3) **	- 0.35 (0.2)	- 0.07 (0.2)
Ethnicity			
Caucasian	(- -)	(- -)	(- -)
Black	- -	- 0.18 (0.4)	0.51 (0.3)
South Asian	- 0.61 (0.7)	- 0.69 (0.6)	0.23 (0.4)
Mixed or other	0.34 (0.5)	- 0.86 (0.6)	- 0.12 (0.5)
Marital Status			
Married or cohabiting	(- -)	(- -)	(- -)
Widowed	0.17 (0.2)	- 0.09 (0.2)	- 0.85 (0.2) **
Divorced	- 0.06 (0.3)	0.26 (0.2)	- 0.24 (0.2)
Separated	0.87 (0.30) **	1.18 (0.3) **	- 0.13 (0.2)
Single	0.02 (0.3)	- 0.35 (0.2)	- 0.16 (0.2)

(- -) = Reference group

- - = No estimates were calculated

 β = Standardized beta coefficient, (S.E) = Standard error

Weights applied

*= $P < 0.05$, **= $P < 0.001$

Table 4. Estimated probabilities for suicide distal outcomes across the four classes.

Typologies	12month ideation †	12month attempt †
	Odds Ratio (95%CI)	Odds Ratio (95%CI)
Socially disconnected - High PEs	12.7 (8.539 – 19.021)	24.2 (10.349 – 56.860)
Sexual victimization - Moderate PEs	6.93 (4.730 – 10.171)	15.0 (6.792 – 33.319)
Lifespan adversity - Low PEs	8.98 (6.436 – 12.542)	10.0 (4.188 – 24.011)
Reference group	(- -)	(- -)
χ^2 P value =	130.264 **	26.438.458 **

OR = Odds Ratio

† = Distal within-class proportions (i.e., 0=No, 1=Yes) significantly different from each other at $P < 0.05$

** = $P < 0.001$

Weights applied

Figure 1. Profile plot of lifespan trauma and psychotic experiences.

