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

Boyda, D., McFeeters, D., Dhingra, K., & Kelleher, I.

Version accepted for publication in *Journal of Interpersonal Violence*

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, Keeley, Wigman, Devlin, Ramsay, Wasserman, Carli, Sarchiapone, Hoven, et al., 2013;

Kelleher, Devlin, et al., 2014; Kelleher et al., 2012), particularly in relation to subthreshold psychotic symptoms which are believed to be transdiagnostic in nature (van Os & Reininghaus, 2016). Yet, psychotic experiences have been shown to be a robust predictor of the subsequent development of suicidal thoughts and behaviours in a series of longitudinal studies (Kelleher, Cederlöf, et al., 2014; Kelleher, Corcoran, Keeley, Wigman, Devlin, Ramsay, Wasserman, Carli, Sarchiapone, & Hoven, 2013; Sullivan et al., 2015). Moreover, the risk of suicidal behaviour has been found to increase in line with the number of psychotic symptoms endorsed (Dutta et al., 2010; Nishida et al., 2010; Saha et al., 2011) irrespective of accompanying mental disorders (Honings et al., 2016). Nonetheless, a limitation of this existing research surrounding psychotic experiences and suicide has been the failure to fully account for different combinations of putative factors (e.g., interpersonal trauma) that may interact with psychotic experiences to influence suicide outcomes.

Likewise, a growing number of prospective studies examining the role of social and environment factors within the developmental trajectory of psychosis have found that early childhood trauma is a common precursor to the onset of psychotic experiences (Croft et al., 2019; Varese et al., 2012). Research also suggests that traumatic experiences during childhood are often highly interrelated, rarely occurring in isolation (Finkelhor et al., 2007), are frequently associated with revictimization and co-morbid psychopathologies in adulthood (Burns et al., 2016). In addition, the relationship between trauma and psychosis symptomology has been shown to be mediated by various intervening environmental factors such as loneliness and perceived social disconnection (Boyda et al., 2015, 2014). Indeed, literature shows that social disconnection and loneliness has an analogous risk for mortality as other well-established mortality factors (physical activity, obesity, substance abuse, responsible sexual behaviour, mental health, environmental quality, immunization, and access to health care) (Holt-Lunstad et al., 2010).

Furthermore, a recent meta-analysis found loneliness was more strongly associated with psychotic experiences in non-clinical samples compared to clinical samples (Chau et al., 2019), indicating that irrespective of the methods of assessment, a sense of social disconnection is considered a significant aversive experience which is linked to a wide array of accompanying negative public health consequences (Cacioppo & Cacioppo, 2014; Hakulinen et al., 2018; Leigh-Hunt et al., 2017).

Yet, as with the aforementioned literature in psychosis and suicide literature, important co-occurring relationships are largely overlooked within studies examining the trauma-psychosis pathway. As a result, there is a disconnect between evidence of a (1) potential aetiological pathway in psychosis-suicide studies, and (2) psychopathological co-occurrences in trauma-psychosis studies. Given the abundance of research linking (1) trauma and psychosis, and (2) psychosis and suicide; the next logical step is to implement statistical models which seek to adjoin these intersecting research areas.

Traditional variable centred approaches are likely to lead to an underestimation of risk since they are limited in the ability to capture the influence of co-occurring relationships within groups (Darby, 2007). To depict the possible interrelatedness of such experiences, corresponding analytic procedures must be employed so that research can refine the heterogeneity between those who experience diverse variations of trauma and psychosis. Thus, Latent Class Analysis (LCA) is useful to identify inherent subgroups of individuals within a larger heterogeneous population based on shared endorsements. It addresses several of the methodological challenges that can arise in traditional subgroup analyses, including low statistical power, high Type 1 error, and limitations in examining higher-order interactions. In this way, it is well suited to capture the multidimensional nature of trauma and its relationships with co-occurring factors (Logan et al., 2011).

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

2. Method

2.1 Participants and Procedure

The Adult Psychiatric Morbidity Survey 2007 (APMS 2007) was carried out between October 2006 and December 2007 by the National Centre for Social Research (NatCen) in conjunction with the University of Leicester. The survey was commissioned by the NHS Information Centre for Health and Social Care and employed a multistage stratified probability sampling design. The survey consisted of a phase one and a phase two (clinical) interview. Individuals aged 16 years and over living in private households were identified for interview using the small user postcode address file (PAF). In instances where there was more than one person aged 16 years or over, one adult was chosen randomly in order to ensure that all eligible members of any household had the same chance of being selected. From 13,171 eligible households, 7,403 individuals undertook phase one interviews, which consisted of a series of demographic questions and the assessment of a range of common mental disorders, alcohol and drug use, and general health using standardised instruments. Of this group, 849 respondents were found to be eligible for a phase two clinical interview based on disorder-specific probability calculations, of which 74% (N=630) took part in the clinical interviews. To ensure that the results were representative of the population living in private households in England, the data was weighted to account for non-response, gender, age, and region.

2.2 Measures

The analytic model adjusted for a variety of socio-demographic and clinical correlates of suicidality and PEs.

2.2.1 Demographic factors

Demographic factors included respondent sex, age band, marital status, educational attainment (0=No qualifications, 1=Any qualification) and ethnic origin (Caucasian, Black, South Asian, Mixed or other). A proxy measure of socioeconomic status was formed from responses to two items, specifically the receipt of job seekers allowance and/or housing benefit, with a positive endorsement of one or both items used to signify low SES.

Clinical variables included GP contact relating to a mental, nervous or emotional complaint within the past year (0=No, 1=Yes), in addition to the presence or absence of a drug dependency within their lifetime (0=No, 1=Yes).

2.2.2 Adverse Childhood Experiences

Items were extracted which were indicative of physical and sexual abuse, neglect and household dysfunction in childhood.

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

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

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

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

A measure of parental separation in childhood was formed from a negative endorsement of the item “*Lived with both natural parents until the age of 16?*” together with a positive endorsement of the “*Parental separation or divorce*” response option for the subsidiary question “*Reason you did not live continuously with both natural parents at home until the age of 16.*”

2.2.3 Adverse adult experiences

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

Intimate partner violence (0=No, 1=Yes) was measured through responses to ten domestic violence items. Initially, the items were grouped into three categories specifically exclusion (2 items), threats of violence (3 items) and physical assault (5 items). Endorsement of a minimum of one item in each category was used to indicate a positive response to that category. Next, a binary measure of IPV experiences was computed whereby endorsement of all three categories of IPV was taken to indicate prior experiences of domestic abuse.

Social disconnectedness was generated from seven items taken from the social support section. Responses to each item ranged between 1=not true to 3=certainly true. Example items include “Family & friends make me feel loved” and “Family & friends would see that I am taken care of if I needed to be.” A composite total score was created and then

dichotomised into a binary social disconnectedness variable (0=No, 1=Yes), whereby the bottom 10% of scores taken to indicate a positive endorsement of lower quality and availability of social support.

2.2.4 Psychotic experiences

The Psychosis Screening Questionnaire (PSQ; Bebbington & Nayani, 1995) was used to capture four types of psychotic-like experiences (0=not endorsed, 1=endorsed) in the year preceding the survey. The PSQ screens for the presence of mania, thought insertion, paranoia, strange experiences and hallucinations through a core item and two supplementary items for each group of PEs. For the current study, items pertaining to mania were excluded. The core hallucination question “*Over the past year, have there been times when you heard or saw things that other people could not*” was utilised as this encompassed both auditory and visual experiences. For the remaining three groups of PEs, subsidiary items were analysed as these have been found to more accurately reflect true psychotic-like experiences. The three core and selected subsidiary questions were as follows (analysis questions in italics):

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

Paranoia: “Over the past year, have there been times when you felt that people were against you? *Have you felt that a group of people was plotting to cause you serious harm?*”

Strange experiences “Over the past year, have there been times when you felt that something strange was going on? *Was it so strange that other people would find it very hard to believe?*”

2.2.5 Suicidality

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

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 conducted using Mplus version 8.3 (Muthén & Muthén, 2017) using sample weights and robust maximum likelihood (Yuan & Bentler, 2008).

4. Results

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

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 shows the fit statistics for the latent class analysis. Although the LRMT was non-significant, the 4-class solution was determined to be the optimal solution due to the lower BIC values in comparison to class 3. Classes 5 and 6 were rejected due to higher BIC, and non-significant LRMT. Entropy for this model was 0.86. Within each class, the average probability of belonging to that class ranged from 0.70 to 0.95, indicating adequate classification accuracy (values of 1.00 indicate certainty with respect to classification).

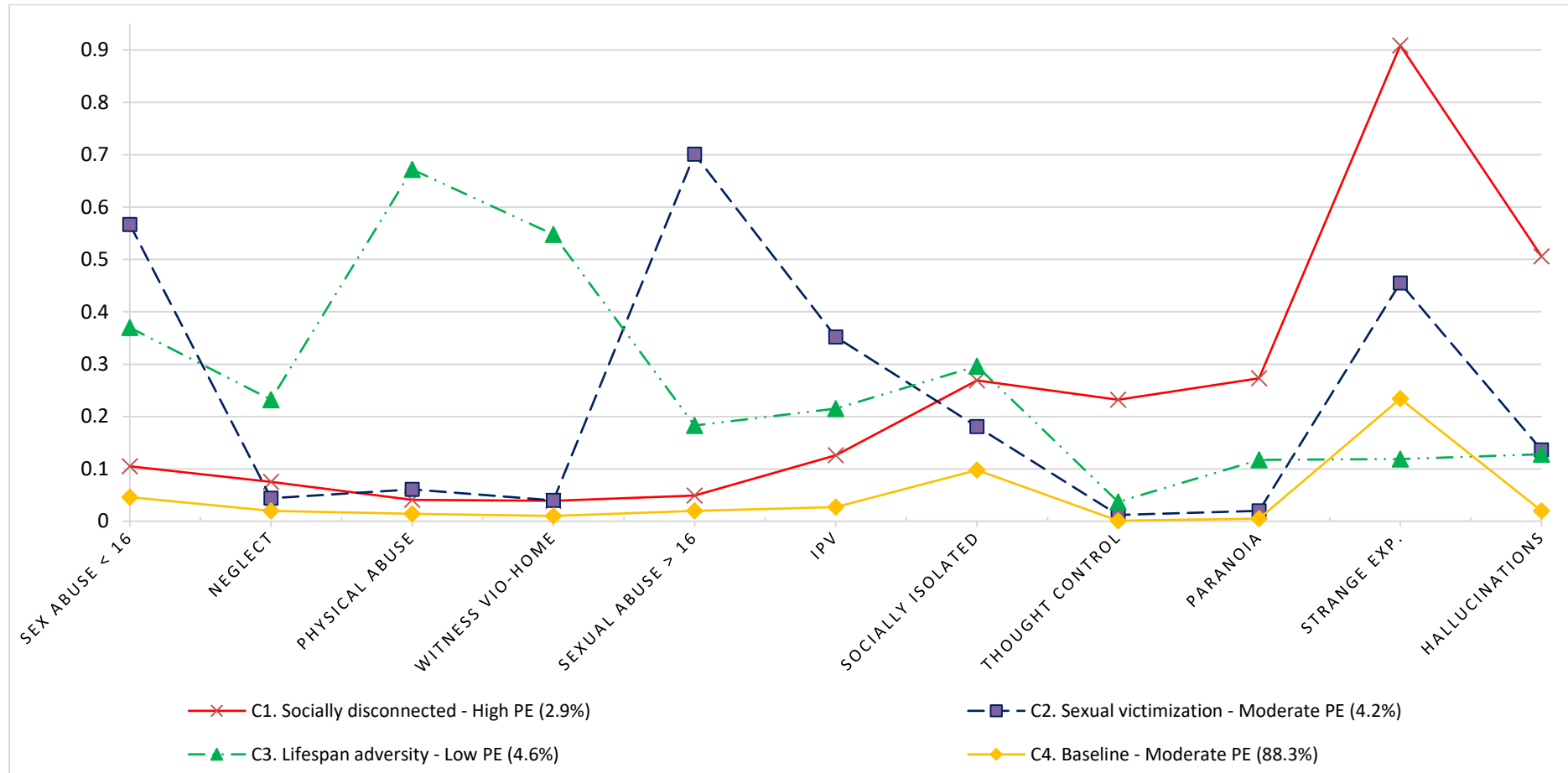
The profile plot and endorsement probabilities for the four-class solution are shown in **Fig.1**. The Y-axis refers to the probability of having endorsed yes to the category of events. Probabilities were classified as follows: low ($<.20$), moderate ($0.21 - 0.50$) and high ($> 0.51 - 1.0$). Interpretation of the 4-class was as follows: Class 1 (Socially disconnected - high PEs; $n=213$, 2.9%) was the smallest class who endorsed low levels of lifespan trauma, but the moderate probability of social disconnection combined with the highest endorsement of PEs. Class 2 (Sexual victimisation; $n=312$, 4.2%) reflected individuals with a high probability of sexual abuse in both childhood and adulthood, coupled with the moderate endorsement of IPV experiences and low endorsement of PEs, with the exception of strange experiences. Class 3 (Lifespan adversity; $n=338$, 4.6%) reflected individuals who endorsed the moderate to high levels of both childhood and adult adversity coupled with low levels of PEs. Class 4 (baseline class; $n=6538$, 88.3%) reflected individuals with low probabilities of all lifespan adversity and moderate endorsement of strange experiences (PEs).

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.

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



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

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

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

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

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

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 partner violence (IPV) and PEs. This aligns with prior literature which found that females with a history of childhood sexual assault are especially vulnerable to future revictimization

(Barnes et al., 2009). This class also had increased odds of both 12-month suicidal ideation (OR=7.0) and 12-month suicide attempt (OR=15.0).

However, the latent class analysis produced several unexpected outcomes. A socially disconnected and high Pes (class 1) was generated, representing 2.9% of the population. This was characterised by low endorsement of all lifespan trauma, yet moderate probabilities of social disconnection, and exhibited the greatest probability of PE endorsement across all emergent classes. Research evidence suggests there is a trauma-psychosis relationship, however, the disparity in the probability of endorsement of PEs between the lifespan adversity class vs sexual victimization vs socially disconnected classes is difficult to discern. Nevertheless, whether causal or consequential, social disconnection and related appraisals of loneliness is a dominant feature among individuals with psychosis (Lim et al., 2018; Michalska da Rocha et al., 2018).

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

Instead, a socially disconnected class and high PE class emerged which was unexpected. Previous research has placed the greatest emphasis on physical and sexual abuse in determining poor psychological outcomes, however, our results suggest that social disconnection is at least as important a factor since this class showed a strong relationship with 12-month suicide thoughts (OR=13.0) and 12-month attempts (OR=24.2). The chronology of the encounters is likely to have contributed to these findings; whereby a history of multiple adverse experiences may create an enduring predisposition for suicidal

thoughts and behaviours, however, it may be that such distal events (e.g. childhood trauma) may be less influential in determining current suicidality over more proximal factors such as lack of connectedness and poor mental health, which were captured in real-time.

Additionally, the amplified ORs among the only high PE class aligns with recent research showing that positive symptoms of psychosis were significant risk factors for suicidal thoughts and behaviours (Huang, Fox, Ribeiro, & Franklin, 2018). Likewise, Kelleher et al. (2012b) found that adolescents who reported psychotic symptoms had a nearly 20-fold increased odds of suicide plans and acts compared with adolescents with suicidal ideation who did not report psychotic symptoms. Indeed, DeVlyder, Lukens, Link and Lieberman (2015) also showed that the risk of concurrent suicidal ideation is increased 4-fold amongst individuals with recent psychotic experiences, thus, alluding to the frequent simultaneity of psychotic experiences and suicidal ideation.

The observed results may also tie in with research by van Os and Reininghaus (2016) who posited a synergistic pathway theory, whereby symptom manifestation may not vary independently, but instead, dynamically interact overtime to recruit more severe additional phenotype symptoms. As a result of increased network activity between psychotic phenomena and environmental stress, in this case, social disconnection, the risk of suicidality may become magnified through feelings of thwarted belongingness. Therefore, the socially disconnected and high PE class is conceivably the highest risk class for suicide, not least because of the presence of PE, but also because they are likely to have a greater propensity for thwarted belongingness (*alienation, loneliness etc.*) which is central to contemporary theories of suicide (Joiner, 2007; Van Orden et al., 2010, 2008) and posited as one of the key motivators for suicide (O'Connor & Kirtley, 2018).

5.1 Limitations

The results should be interpreted in light of potential limitations. First, since all information was obtained via self-report, there is a possibility of reporting bias. For example, social desirability may have affected the reporting of psychotic symptoms (DeVylder & Hilimire, 2015; Read et al., 2004), suicidal thoughts and behaviour (Jenkins et al., 2002), and traumatic experiences (Read, Van Os, Morrison, & Ross, 2005). There is also some evidence that individuals may under-report their symptoms due to a misunderstanding of the questions posed or because of a tendency to normalise experience(s) (Wittchen, Knäuper, et al., 1994; Wittchen, Zhao, et al., 1994). Second, the reliability and validity of self-reported trauma histories could not be established. However, several systematic reviews have concluded that adults recall childhood experiences with sufficient accuracy to provide useful information in retrospective studies (Brewin et al., 1993; Hardt & Rutter, 2004; Maughan & Rutter, 1997). Third, several of the measures were derived from either single survey items or a compilation of items which may call into question the reliability and validity of this method of operationalisation. Whilst this limitation must be acknowledged, this approach simply reflects the nature of epidemiological data and the efforts by the authors to best capture the observed constructs within the constraints of the available data. Future studies may seek to corroborate the current findings utilising more robust and objective assessment methods. Similarly, the suicidal thoughts and behaviour items in the APMS were not based on a specific suicide risk assessment scale but were instead measured through a clinical diagnostic instrument (CIS-R). Relatedly, we lacked detailed information about suicidal thoughts and behaviour, such as the number and timing of previous suicide attempts, as well as methods used, which would have enabled us to illuminate the association between the emergent latent classes and suicidal thoughts and behaviour to a fuller extent. Fourth, some obtained estimates, especially those for a suicide attempt, had wide confidence intervals due to the small number of endorsed

cases; at the same time, lower confidence intervals were well in excess of one. Finally, as with all cross-sectional research, the temporal association or causality cannot be established.

5.2 Implications

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

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.

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