Childhood traumatic experiences and subsequent development of psychosis

Objective: Previous research has suggested that there is a relationship between being subjected to childhood trauma and the subsequent development of psychosis. This study aimed to assess the likelihood of experiencing specific positive symptoms of psychosis after experiencing different types of traumatic events during the childhood, with the personality traits taken into consideration as covariates.

Method: Data from the National Comorbidity Survey was used in the study. Latent class analysis was performed to identify sub-types of childhood traumas and psychosis-like symptoms. Multinomial logistic regression was used to estimate the associations between trauma latent classes, psychosis latent classes, and personality traits.

Results: Four-class solution was found to produce the best fit for both trauma and psychosis. The trauma classes were labeled as maltreatment, sexual trauma class, multiple trauma class, and a normative class. Psychosis classes were labeled as severe psychosis, paranoid class, hallucinatory class and a normative class. The associations between the classes indicated that the severity of childhood trauma positively affected the severity of expressing psychosis symptoms. Furthermore, some types of childhood abuse were associated with specific symptopathology. Personality traits did not seem to have a big impact on the whole model.

Conclusions: The study confirmed previous findings that individuals experiencing childhood trauma are more likely to experience psychotic symptoms than the normative group. Moreover, different types of childhood traumas experienced have been found to be associated with different

positive symptoms of psychosis. The study however, had several limitations such as the methodological problems of the questionnaire used, and therefore, further research is needed in order to better understanding the relationship between the nature of childhood trauma and the subsequent development of psychosis.

A growing literature suggests a strong positive association between experiencing traumatic events and adverse psychological and social outcomes (Kilcommons and Morrison, 2005., Spauwen et al., 2006., Shevlin et al., 2007). It has been proposed that severe mental illnesses might emerge as a reaction to trauma (Ellason and Ross, 1997), with a suggestion that childhood experiences have particularly strong impact on adult's psychopathology (Rosenberg et al., 2007). Traumatic event is often described as an experience which causes psychological distress and produces extreme fear, helplessness or horror as a response (American Psychiatric Association, 1994). Children experiencing different types of trauma (such as neglect, physical and sexual abuse, as well as witnessing domestic violence) are found to exhibit higher levels of social , behavioural, and cognitive impairments than children from nonviolent environments (Levendosky et al., 2002). It has been also shown that traumatized children express not only aggressive and antisocial (' externalized') behaviours but also fearful and inhibited (' internalized') behaviours (Edleson, 1999) which might lead to psychiatric disorders (Read et al., 2005).

Childhood sexual abuse (CSA) has gained a lot of researchers' attention over the past decade (Molnar et al., 2001, Lysaker et al., 2001). It has been found that a great number of individuals who had experienced sexual trauma

during their childhood expressed persistent problems in sexual, psychological, or social functioning (Herman and Schatzow, 1987) such as disturbances in interpersonal relationships, adolescence pregnancy, repeated victimization, and negative identity formation (Herman., 1986) in their adult life. Additionally, histories of CSA have been reported in a high percentage of psychiatric inpatients. Bryer and colleagues (1987) found a 54% of a clinical sample of 66 females to have a history of sexual abuse with the corresponding rate of 44% for incidents occurring during the childhood. Study conducted by Livingston (1987) showed that among child psychiatric inpatients 77% of those who suffered CSA were diagnosed as psychotic. These authors also suggested a positive correlation between experiencing CSA and the severity of psychotic-like symptoms (Bryer et al., 1987).

Childhood rape (before the age of 16) is claimed to be the ' most severe sexual trauma' (Darves-Bornoz et al., 1995), and therefore it has been studied separately from other forms of sexual abuse by some researchers. A lifetime prevalence of childhood rape has been found to constitute 23% of the female patients with schizophrenia (N= 15). It has been observed that these individuals had a history of more frequent hospitalizations and suicidal attempts when compared to females with schizophrenia experiencing CSA but with no rape history (Darves-Bornoz et al., 1995).

According to previous research, childhood physical abuse (CPA) is found to be four to six times more common in psychiatric patients than in general population (Read et al., 2004a). It has been argued that individuals experiencing this type of abuse not only have earlier first admissions and spend longer time in seclusion (Read et al., 2005), but also express higher

levels of aggressive behaviours comparing to individuals experiencing other types of childhood trauma (Briere and Runtz, 1988).

Although, CSA and CPA are the most common types of trauma studied, researchers stress the fact that other types of childhood adverse events are also linked to high levels of psychopathology (Rosenberg et al., 2007). Horowitz et al. (2001) reported that adult women who were neglected during the childhood express more symptoms of dysthymia and antisocial personality, as well as more symptoms of alcohol dependence than controls. Furthermore, recent research suggested that children who witness violence may suffer negative outcomes even when they are not themselves the target of abuse (Kitzman et al., 2003). As reported by Sisley et al. (1999): ' children who have witnessed domestic violence have high rates of internalizing and externalizing disorders such as depression, aggression, and alcohol or drug use'. Witnessing death or severe injury caused post-traumatic stress disorder symptoms in 77% of sample of female Vietnam veterans in a study conducted by Carson et al. (2000) and therefore, it has been suggested that witnessing cruelty should be included in studies examining childhood traumas (Holowka et al., 2003).

Above studies clearly indicate the huge negative impact of childhood traumatic events on one's psychological well-being. Mueser et al. (1998) found 98% of patients with severe mental illnesses experiencing at least one traumatic event in their lifetime. It has been suggested that childhood trauma disrupts the development of a child's sense of self and therefore, leads to the inability to control the reactions to stressful events, which might predispose to the development of psychiatric disorders, especially psychosis

(Molnar et al., 2001). Childhood traumatic experiences have been particularly linked to positive psychotic symptoms such as hallucinations and delusions (Shevlin et al., 2007).

Hallucinations (visual, auditory and tactile) tend to be explained as trauma flashbacks (Read et al., 2005) which are created in an attempt to integrate trauma memories (Briere, 2002). Some intrusive recollections of abuse seem to occur with the awareness that the experience is an internal event related to the individual's past however, other intrusions happen without this awareness which is explained as a faulty ' source monitoring' causing hallucinations (Read et al., 2005) . Furthermore, the content of hallucinations tends to be strongly related to the details of traumatic events experienced (Read et al., 2003). Hearing voices is the most common type of hallucinations expressed by psychiatric patients (Shevlin et al., 2007). Honig et al. (1998) reported that 83% of patients with schizophrenia experiencing auditory hallucinations had history of CSA. Childhood rape, as well as physical abuse have been found to be related not only to auditory but also to tactile hallucinations by Whitfield et al. (2005). Although, childhood neglect seems to have the least influential impact on developing psychotic symptoms it has been reported to be significantly related to visual hallucinations (Shevlin et al., 2007).

Interestingly, researchers indicate that not only the severity of childhood abuse is positively associated with the severity of hallucinations (Ucok and Bikmaz, 2007) but that experiencing multiple types of trauma (more than one) also increases the likelihood of expressing each of the three types of hallucinatory experiences (auditory, visual and tactile) (Whitfield et al.,

2005). It has been proposed that childhood trauma leads to greater appraisals of perceptual, psychological, and bodily experiences which might cause different types of hallucinations (Bak et al., 2005). Furthermore, dissociation hypothesis suggests that ' hallucinatory experiences may reflect dissociated traumatic content impinging on conscious awareness' (Ross et al., 1999). This leads to the conclusion that tactile hallucinations would be present in individuals, with a history of abuse involving physical contact between the child and the perpetrator, which finds its support in research findings (Shevlin et al., 2007).

People who were traumatized as children tend not only report higher number of experiencing intrusive images or voices but are also found to selectively attend to threat-related information (Young and Bentall, 1997). It has been argued, that abusive experiences might lead the victim to the conclusion that other people are dangerous, which then creates paranoid ideations and evaluation of normal events as threatening (Birchwood et al., 2000). Cognitive perspective proposes that childhood traumatic experiences form cognitive schemas characterized by negative beliefs about self and others which predispose to paranoid delusions (Kelleher et al., 2008). Moreover, traumatized individuals are found to have an exaggerated ' self-serving' bias and are prone to blaming other people, rather than general circumstances for all the negative events which happen to them (Bentall and Kaney, 1996). It is argued whether, persecutory ideas are a defence against low self-esteem (blaming others for all the bad events prevents negative thoughts from reaching awareness) (Bentall and Kaney, 1996) or whether delusions are a direct reflection of the emotions consistent with the one's concepts

about the self and others (Freeman et al., 2002). Study conducted by Scott et al. (2007) showed that individuals who experienced childhood abuse expressed significantly more delusions that persons with no trauma history. Although, delusional experiences were related to all types of trauma (including CSA, CPA and rape), the association was especially strong in those who had been raped during their childhood (Scott et al., 2007).

Previous studies clearly indicate the relationship between experiencing childhood trauma and the development of psychotic symptoms however, some researchers suggest there are various factors such as personality traits which might influence the association between childhood experiences and adult's mental health (Bak et al., 2005). Experiencing childhood trauma is strongly associated with emotional distress (Levendosky et al., 2002) which negatively affects one's integrity and sense of security (Nijenhuis et al., 2004). These interactions might then result in creating negative schematic models of the self and the world which facilitate low self-esteem (Garety et al., 2001). Traumatized individuals also tend to blame other people rather than interpersonal circumstances for all the negative events happening to them (Bental and Kaney, 1996). This attribution is known as an external locus of control, and it has been reported to have a strong positive association with psychotic symptoms such as hallucinations or delusions (Bak et al., 2005). Disrupted ability of trust might create emotional instability and difficulties in forming attachments with others which increases the individual's level of introversion (Lysaker et al., 2001). Conversely, poorer levels of psychosocial functioning have been found in patients with schizophrenia (Lysaker et al., 1998).

Furthermore, experiencing childhood trauma has been shown to increase mood reactivity and sensitivity which is often described as a higher neuroticism levels (Van Os et al., 2009). This personality trait is not only found to be common in patients with schizophrenia (Katon et al., 2001) but is also positively associated with the severity of psychotic symptoms such as hallucinations or delusions (Van Os et al., 2009).

The association between childhood trauma, psychosis, and other personality traits such as openness to experience or fatalism is still a subject of a debate. Some researchers have reported higher levels of fatalism and lower levels of openness to experience (Anders, 2003) in traumatized individuals, others indicate there is no significant difference between those personality traits and childhood trauma (Katon et al., 2001).

Although, the literature clearly indicates the relationship between experiencing childhood trauma and the subsequent development of psychosis, it has to be noticed that most of the studies focused on the CSA and CPA giving a little attention to other forms of traumatic events such as witnessing distressing incidents (Holowka et al., 2003, Molnar et al., 2001). Moreover, the findings of previous studies are based mostly on a research using psychiatric patients (Lysaker et al., 2001, Mueser et al., 1998).

The traditional psychiatric approach refers to psychosis as experiencing symptoms which differ in qualitative ways from symptoms experienced by the ' normal' general population, however recent research proposes a view of psychosis as a continuous distribution of psychosis-like symptoms (Johns and van Os, 2001). This perspective has been supported by the study

conducted by Shevlin et al. (2007) who identified different types of psychotic symptoms experienced by the general population as well as their relation to traumatic experiences. Furthermore, Murphy et al. (2007) identified four classes representing the distribution of positive psychosis symptoms among the general population which suggests that the expression of psychiatric disorders could be best explained as continuum (Murphy et al., 2007).

This study used latent class analysis to identify sub-types of childhood traumas as well as psychotic symptoms in a general population sample. The purpose of this study was also to assess the likelihood of experiencing various psychotic symptoms such as hallucinations or delusion after being subjected to trauma as a child. The research question was, whether individuals experiencing particular type of trauma during the childhood are prone to express specific psychotic symptoms, and whether this interaction might be influenced by personality traits thus, are there any specific personality traits in abused individuals which might influence the expression of psychotic symptoms. It was predicted that respondents who experienced traumatic event during the childhood would not only express more psychotic symptoms than the normative group, but also that severity of abuse (number of different types of trauma experienced) would positively affect the severity of psychotic symptoms (number of different psychotic symptoms expressed).

2. Method

2. 1 Sample

The National Comorbidity Survey (NCS) was a collaborative epidemiologic investigation (1990-1992) designed to study the prevalence and correlates of DSM III- R disorders. The face-to-face interviews were carried out by the professional field staff of the Survey Research Center (SRC) at the University of Michigan. The survey sample consisted of over 8000 respondents, aged 15 to 54 years from the noninstitutionalized civilian population plus students in group housing in the 48 conterminous states of America, which were chosen using multistage area probability sampling. Including respondents as young as aged 15 was done to minimize the recall bias of the early onset disorders whereas, exclusion of participant aged older than 54 years was based on the previous finding that active comorbidity between substance use disorders and nonsubstance psychiatric disorders is much lower among persons aged over 54 years than those aged 54 and below (Kessler, 1994). Full data were available for 5893 participants (response rate 82. 4%) with the mean age of 32 years (standard deviation= 10. 06) . Informed consent was obtained from all respondents as well as from parents for those 15 to 17 years. Details of the survey can be found in Kessler (1994).

2. 2 Instruments

The psychiatric diagnoses used in the NCS were based on the DSM-III-R (American Psychiatric Association, 1987) and were generated from a modified version of the Composite International Diagnostic Interview (CIDI) (WHO, 1990). CIDI has been documented to have a good reliability and validity for almost all diagnoses with an exception of acute psychotic disorder (Wittchen, 1994), and therefore, NCS included clinical re-interviews

with respondents who reported any evidence of having symptoms of non-affective psychoses (Kessler, 1994)

2. 2. 1 Childhood trauma

Information related to traumas experienced during the childhood was obtained from the Posttraumatic Stress Disorder module of the modified version of the CIDI. Respondents were shown a list of 12 traumas and were asked if the event had happened to them and if so at what age. Following the support from the literature (Rosenberg et al., 2007, Read et al., 2005) this study has chosen to measure five items which represented (1) witnessing someone being badly injured or killed, (2) being raped, (3) experiencing sexual abuse, (4) physical abuse or (5) neglect (scored ' yes' 1 or ' no' 0). These items are presented in Table 1. For the purpose of the present study to identify childhood traumas, only participants who experienced events 1-3 at the age of 15 or below were taken into consideration. No explicit age limit was stated for the last two ' childhood' events.

2. 2. 2 Psychosis

The psychosis screening section of the CIDI (Section K) contained of thirteen items related to classic psychotic symptoms such as hallucinations or delusions. In this study six items (representing visual, hallucinatory and tactile hallucinations as well as paranoi delusions) were selected which was based on the previous research findings about the association between childhood trauma and specific psychotic symptoms (Bak et al., 2005, Shevlin

et al., 2007). These items are presented in Table 1. Items were responded to using ' yes' (coded 1) or ' no' (coded 0) format.

2. 2. 3 Personality

Personality traits were measured on a variety of scales with the same response pattern. Respondents were asked to rate how closely does each statement relate to them scoring 1 for ' very true', 2 for ' somewhat true', 3 for ' a little true' and 4 for ' not true at all'.

External locus of control was measured on the six-item Levenson scale (Levenson, 1973). This scale gained support from previous research for its reliability and validity (Wallston, 2005). Questions referred to people's belief in powerful forces controlling their life e. g. " I feel like what happens in my life is mostly determined by powerful people'. Low scores corresponded to high level of external locus of control.

Self-esteem was measured on the four-item Rosenberg self-esteem scale (Rosenberg, 1965). The scoring of the first question : ' On the whole I am satisfied with myself' has been reversed and consequently low scores represented low self-esteem. Appropriate reliability and validity of this scale was described by Dieter and Signun-Heide (1996).

To measure fatalism scale developed by Schwartz and Robinson (1991) was used which consisted of three questions e. g. ' People die when it is their time to die and nothing can change that'. Low scores corresponded to high fatalism.

. Extraversion, neuroticism and openness to experience were all measured on the scale developed by Goldberg (1992). This scale has been reviewed by many previous research showing not only its reliability but also valuability in measuring the Big Five personality dimensions (extraversion, emotional stability, agreeableness, conscientiousness and openness to experience) (Gosling et al., 2003).

The section related to extraversion consisted of ten items; each of which started with a question: ' In general, how much are you?' and were followed by a list of adjectives such as: talkative, lively, sociable. For the five items which described introversion (private, passive, shy, quiet, easily embarrassed) the scores were reversed. Consequently low scores correspondent to higher levels of extroversion.

Neuroticism section consisted also of ten items with the same question pattern as above. List of adjectives included being: tense, temperamental, high-strung, and irritable. Section measuring openness to experience included nine items related to characteristics such as being creative, artistic, and imaginative. For both neuroticism and openness to experience low scores corresponded to high levels of personality traits.

2. 2. 4. Analyses

Latent class analysis (LCA) is a multivariate statistical method used to identify homogenous groups from categorical data. In this study, LCA was used to recognize the number and nature of subtypes of childhood traumatic experiences and psychosis, based on the responses to the screening items. The fit of four models (two-class through to a five-class model) was assessed

for both conditions. Selection of the optimal number of latent classes was based on several statistical fit indices which were: likelihood ratio chi-square (LRX²), Akaike information criterion (AIC: Akaike, 1987), Bayesian information criterion (BIC: Schwartz, 1978), sample-size adjusted BIC (SSBIC: Sclove, 1987), the Lo-Mendell-Rubin's adjusted likelihood ratio test (LRT: Lo et al., 2001). A non-significant likelihood ratio chi-square indicates acceptable model fit (Hagennars and McCutcheon, 2002). The information statistics AIC, BIC, and SSABIC are goodness-of-fit measures used t compare different measures. Lower observed values of AIC, BIC, and SSABIC specify better fit (ref). A non- significant value ($p > 0.05$) of the Lo- Mendell Rubin's LRT indicates that the model with one fewer class should be accepted. Entropy (Ramaswamy et al., 1993) is a classification measure of how accurately participants are classified. Higher values of Entropy suggest better classification.

The latent class analyses were carried out using a Demo version of the statistical program Mplus 5. 21 (Muthen and Muthen, 2004).

Multinomial logistic regression (MLR) is the extension for the logistic regression when the categorical dependent variable has more than two levels (Chan, 2005). MLR was used to asses the associations between trauma classes, psychosis classes and personality variables. The odds ratios indicate the contribution of each variable to the model, showing the expected increase/decrease in the likelihood of scoring positively on a given variable compared to the reference group (in this study- respondents with no psychotic experiences).

3. Results

Table 1 shows the endorsement rates for each of the traumatic experiences as well as, the psychosis screening items for the entire sample after listwise deletion of missing data -N= 5856 (100%).

Table 1

Frequency of endorsement traumatic experiences and psychosis items

Item

Yes N (%)

Childhood trauma

Have you ever witnessed someone being badly injured or killed?

Have you ever been raped?

Have you ever been sexually molested?

Have you ever been physically abused as a child?

Have you ever been seriously neglected as a child?

Psychosis

Have you ever believed that people were spying in you or following you?

Have you ever believed that you were being secretly tested or experimented on, that someone was plotting against you or that someone was trying to hurt you?

Have you ever believed that someone was reading your mind?

Have you ever had the experience of seeing something or someone that others present could not see, that is had a vision when you were wide awake?

Have you ever had the experience of hearing things that other people could not?

Have you ever had unusual feelings inside or on your body like being touched when nothing was there or feeling something moving inside your body?

562 (9. 5%)

183 (3. 1%)

517 (8. 8%)

449 (7. 6%)

341 (5. 8%)

756 (12. 9%)

212 (3. 6%)

435 (7. 4%)

496 (8. 5%)

486 (8. 3%)

412 (7. 0%)

It can be seen that witnessing someone being badly injured or killed (9. 5%), and being sexually (8. 8%) or physically (7. 6%) abused were experienced by a higher proportion of the sample than being raped (3. 1%) or seriously neglected as a child (5. 8%). Table 1 shows as well that endorsement rates for psychosis items vary across the sample with a high level of saying ' yes' to the item related to belief about being followed or spied on (12. 9%) and a relatively small level of saying ' yes' to the question asking about belief about being secretly tested or experimented on (3. 6%). Items related to belief ' that someone was reading your mind' (7. 4%), visual hallucinations (8. 5%), auditory hallucinations (8. 3%), and tactile hallucinations (7. 0%) were endorsed by relatively similar proportion of the sample.

3. 1 Latent class analysis

3. 1. 1 Childhood trauma

Table 2 presents the fit indices from the latent class analyses for the traumatic experiences.

Table 2

Fit indices for the latent class analysis of the childhood traumatic experiences.

Model

Log

Free parameters

LRX² (df) p

AIC

BIC

SSABIC

LRT p

Entropy

Two classes

-5916. 19

11

73. 40 (19)

p= 0. 00

11854. 37

11927. 80

11892. 85

864. 04

p= 0. 00

0. 85

Three classes

-5891. 66

17

24. 07 (13)

p= 0. 03

11817. 32

11930. 80

11876. 78

48. 13

p= 0. 00

0. 91

Four classes

-5884. 08

23

8. 84

(7)

p= 0. 26

11814. 17

11967. 70

11894. 61

14. 87

p= 0. 01

0. 86

Five classes

-5881. 93

29

4. 61

(1)

p= 0. 03

11821. 85

12015. 43

11923. 28

4. 24

p= 0. 74

0. 86

LRX²= likelihood ratio chi-square, AIC= Akaike information criterion, BIC= Bayesian information criterion, SSABIC= sample size adjusted BIC, LRT= Lo-Mendell-Rubins adjusted likelihood ratio test.

The four class solution is considered to be the best model ; the likelihood ratio chi-square is non-significant, the AIC information statistic is markedly lower for the 4-class solution than for the 2-class and 3-class solution and the Lo-Mendell-Rubin's LRT indicates that the 5-class solution is not significantly better than the 4-class solution (and so the 4-class solution should be preferred on the basis of parsimony). The entropy value (0. 86) indicates acceptable classification of participants. Although, the SSABIC indicates better value for the 3-class solution, and the entropy value is also higher, there are more fit statistics in favour for the 4-class solution.

Figure 1 presents the probabilities profile plots for the trauma classes.

Fig. 1. Latent class profile plot of childhood traumas

Neglect

Physical abuse

Sexual abuse

Rape

Witnessing someone being injured or killed

Probability

Class 4 was the largest class (88. 6%) and was characterised by almost zero probability of endorsing any of the items. This class was considered to be the normative group. Class 3 was the smallest class (0. 8%) and was distinguished by a relatively high probability (from 0. 38 for witnessing someone being badly injured or killed to 1 for neglect) of endorsing all of the items, This class was labeled a ' Multiple traumas class'. Classes 1 (4. 9%) and 2 (5. 7%) were intermediate classes. Class 1 was characterized by higher probabilities of being physically abused (0. 4) and neglected (0. 4) and was named the ' Maltreatment class'. Class 2 was characterized by highest probability of being sexually abused (0. 7) however, the probability of ' being raped' (0. 2) was also higher than for class 1 and 3, and therefore this class was labeled ' Sexual abuse class'.

3. 1. 2. Psychosis

Table 3 presents the fit indices from the latent class analyses for the psychosis screening items.

Table 3

Fit indices for latent class analysis of the psychosis screening items

Model

Log

Free

parameters

LRX²

(df) p

AIC

BIC

SSABIC

LRT

p

Entropy

Two classes

-8710. 44

13

159. 65

(50)

p= 0. 00

17533. 88

17533. 66

17492. 35

1717. 17

p= 0. 00

0. 78

Three classes

-8679. 82

20

68. 92

(43)

p= 0. 01

17399. 64

17533. 15

17469. 59

60. 25

p= 0. 30

0. 64

Four classes

-8664. 23

27

35. 22

(36)

p= 0. 51

1738. 47

17562. 70

17476. 90

30. 67

p= 0. 01

0. 78

Five classes

-8658. 47

34

22. 43

(29)

p= 0. 80

17384. 94

17611. 90

17503. 86

11. 34

p= 0. 09

0. 72

Although, the fit indices such as BIC and SSABIC suggest the 3-class solution as the most favourable, other fit statistics such as likelihood ratio chi-square, AIC, and Lo-Mendell- Rubin's LRT indicate 4-class solution to be the best model for psychosis. The entropy value for the 4-class solution indicates that 78% of the sample can be accurately classified within the model, which is higher than for 3-class solution (64%), and therefore, 4-class solution has been decided to be the best model for psychosis.

Figure 2 presents the probabilities profile plots for psychosis classes.

Fig. 2. Latent class profile plot of positive psychosis symptoms

Probability

Auditory hall.

Visual hall.

Tactile hall.

Reading mind

Reading mind

Trying to hurt

Spying

Class 4 was the largest class (81. 7%) and was characterised by almost zero probability of endorsing any of the items and therefore, it was considered to be called the ' Normative class'. Class 1 was the smallest class (1. 2%) characterized by a relatively high probability of endorsing all of the items (probability varied from 0. 47 for belief that ' someone is tying to hurt you' to the value of 1 for auditory hallucinations). This class was labeled ' Severe psychosis class'. Class 2 (5. 6%) was distinguished by higher probability of endorsing items related to persecution and obsession (0. 58 for belief that ' someone is spying on you', 0. 35 for belief that ' someone is trying to hurt yo