

Abstract

Evidence suggests that attachment styles may influence subclinical psychosis phenotypes (Schizotypy) and affective disorders, and may play a part in the association between psychosis and childhood adversity. However, the role of attachment in the initial stages of psychosis remains poorly understood. Our main aim was to describe and compare attachment styles in 60 individuals at ultra high risk for psychosis (UHR) and a matched sample of 60 healthy volunteers (HV). The HV had lower anxious and avoidant attachment scores than the UHR individuals ($p < 0.001$). Sixty-nine percent of the UHR group had more than one DSM-IV diagnosis, mainly affective and anxiety disorders. The UHR group experienced more trauma ($p < 0.001$) and more mood and anxiety symptoms ($p < 0.001$). Interestingly, in our UHR group, only schizotypy paranoia was correlated with insecure attachment. In the HV group depression, anxiety, schizotypy paranoia and social anxiety were correlated with insecure attachment. This difference and some discrepancies with previous studies involving UHR suggest that individuals at UHR may compose a heterogeneous group; some experience significant mood and/or anxiety symptoms that may not be explained by specific attachment styles. Nonetheless, measuring attachment in UHR individuals could help maximise therapeutic relationships to enhance recovery.

Attachment Styles and Clinical Correlates in People at Ultra High Risk for Psychosis

Attachment theory provides a framework for understanding the influence of interpersonal relationships on the development and progression of psychosis (Berry, Wearden, Barrowclough and Liversidge, 2006). In recent years a growing amount of studies have applied Bowlby's (1969; 1973; 1980) attachment theory to further understanding of how psychosocial factors impact on the susceptibility, development and course of psychotic disorders (Berry, Barrowclough & Wearden, 2007), in addition to informing effective interventions (Mathews et al., 2014).

Attachment theory (Bowlby, 1969; 1973; 1980) proposes that early experiences with primary caregivers provide a prototype for all subsequent relationships. It is assumed that the responsiveness of attachment figures generates beliefs concerning how acceptable the self is and how others will respond in times of distress (Pietromonaco & Feldman Barrett, 2000). These internal 'working models' (Bowlby, 1973) are fundamental in determining an individual's attachment style due to their influence on behaviour and cognitive and affective processes (Mikulincer, Shaver & Pereg 2003). Supportive early experiences engender positive working models and result in a secure attachment style. Conversely, an insecure attachment style is defined by negative working models following adverse interpersonal relationships (Bowlby, 1969).

Most attachment measures reveal two dimensions of insecure attachment (Brennen, Clark & Shaver, 1998): [1] *anxious*, associated with the model of the self, and [2] *avoidant*, associated with model of others (Wickham, Stiko & Bentall, 2015). An anxious attachment style is characterised by a strong need for closeness and approval from others, worries about relationships, negative self-image and fear of being rejected or abandoned; whereas a **negative image** of others, compulsive self-reliance, fear of depending on others, a preference

for emotional distance from others and social withdrawal typify an avoidant attachment style (Berry et al., 2006; Mikulincer et al., 2003).

Two recent systematic reviews (Gumley, Taylor, Schwannauer & MacBeth, 2014; Korver-Nieberg, Berry, Meijer & Haan, 2014) of the attachment and psychosis literature reported similar findings. Both reviews agreed that attachment style is a relevant construct to improve understanding of the development, course and treatment of psychosis. Gumley et al. (2014) reported that poor engagement with services, experiences of trauma, greater positive and negative psychotic symptoms, increased depression and lower quality of life were all associated with insecure attachment. They concluded that avoidant attachment may impede recovery from psychosis and argued that attachment theory offered important insights for predicting transition in those at risk of developing psychosis. Korver-Nieberg et al. (2014) replicated the majority of these findings, with the additional interpretation that improving attachment security before attempting to address the experience of psychosis could be beneficial. A recent study has also suggested that an anxious type of attachment style is predominant in psychosis samples and advised that this could be explored as a potential risk factor (Harder, 2014). The most recent large sample study found that attachment anxiety predicted severity of positive and affective symptoms; that both attachment anxiety and avoidance were associated with severity of hallucinations and persecution and that attachment avoidance was not associated with negative symptoms (Korver-Nieberg, Berry, Meijer, Haan and Ponizovsky, 2015).

A criticism of this work with psychotic samples is that the majority are conducted with individuals with established or chronic psychosis, with first-episode psychosis (FEP) samples unrepresented Gumley et al. (2014). Moreover, there still is a paucity of work that specifically considers the pattern of attachment in people at a higher risk of developing a psychotic illness relative to the general population. Whilst not objectively measuring

attachment styles, studies with cohorts at high risk for developing psychosis (HR; Yung et al., 1996) have demonstrated the important role played by family relationships in the susceptibility to, and progression of, psychosis. For example, young adoptees at genetic risk for schizophrenia (high risk adoptees) in dysfunctional families had above normal rates of schizophrenia compared to high risk adoptees in families deemed by clinical evaluation to have healthy rearing patterns, where incidence rates were analogous to the general population. This suggests that there is a protective effect for high risk individuals raised in healthy, nurturing family environments (Tienari et al., 2004). In concurrence, higher frequencies of emotional involvement, positive remarks and warmth from parents were associated with decreased prodromal symptoms and enhanced social functioning at a three month follow up in individuals at UHR (O'Brien et al., 2006). Furthermore, parents with offspring at UHR displayed lower expressed emotion (EE) components e.g. warmth, acceptance, than parents of offspring with an established diagnosis of a chronic psychotic disorder (McFarlane & Cook, 2007). The authors concluded that the differences were related to stage and progression of illness, as parent's EE increased in response to the decreasing social functioning and symptoms of a developing psychotic disorder. The variables measured in these studies are indicative of insecure attachment and therefore attest to the importance of healthy relationships in the development and improvement of psychotic disorders.

To our knowledge, only two studies (Gajwani, Patterson & Birchwood, 2013; Quijada, Tizón, Artigue, Kwapil & Barrantes-Vidal, 2012) have specifically investigated attachment in UHR samples. One study reported that 80% of their sample was insecurely attached (Gajwani et al., 2013) and the other reported that only 6.5% were securely attached (Quijada et al., 2012), suggesting that a high proportion of people at UHR for psychosis endorse insecure attachment styles. However, the samples in these studies were relatively small (N= 51 and 31 respectively), precluding any confidence in the generalisability of the

results. Insecure attachment was significantly associated with greater depression, anxiety, and social anxiety; this was particularly applicable for individuals with an anxious attachment styles (Gajwani et al., 2013). In contrast, Quijada et al. (2012) found there was no relationship between attachment styles and psychotic symptoms or functioning at a baseline assessment.

To explore whether attachment styles map to symptom profile and identify any associations between attachment style and psychopathology it is necessary to explore a range of measures and their relation to insecure attachment. Evidence reliably reveals a relationship between childhood adversity and psychosis in adulthood and latest research indicates that current attachment styles can influence that association (Skito, Bentall, Shevlin, O'Sullivan & Sellwood, 2014). Therefore, it is important to consider traumatic experiences within the context of current attachment styles in interventions for HR individuals. Also, it has been proposed that demonstrating insecure forms of attachment are associated with the subclinical psychosis phenotype (Schizotypy) will help to identify any influence they have in the pathway from early relationship problems to psychosis (Sheinbaum, Bedoya, Ros-Morente, Kwapil, Barrantes-Vidal, 2013). Lastly, in light of the evidence supporting the association between insecure attachment and affective disorders (Roberts, Gotlib, & Kassel, 1996), and the finding that affective dysregulation in early psychosis is a predictive factor for transition to psychosis (Yung et al., 2003), it is important to explore the relationship between these disorders and attachment styles in this HR sample. The inclusion of these measures in our study will facilitate exploration of these factors.

Since psychotic symptoms are considered to be on a continuum with normal experiences, the use of non-clinical samples in attachment and psychosis research is informative. The Korver-Nieberg et al. review (2014) cited 8 articles investigating attachment and its association with psychotic phenomena in exclusively non-clinical samples;

with the majority investigating associations between attachment and schizotypal personality traits. Results revealed that both anxious and avoidant attachment has been associated with positive schizotypy generally and paranoia specifically. An avoidant attachment style has also been associated with negative symptoms generally and social anhedonia specifically.

This study contributes to the existing literature in two important ways; firstly, by providing additional evidence to help clarify whether attachment has a role in the development of psychosis. As stated above, the majority of studies exploring attachment in psychotic disorders were conducted with chronic patients, so the role of attachment in the initial stages of psychosis remains inadequately understood (Gumley et al., 2014; Quijada et al., 2012). When studying attachment in established FEP or chronic psychosis, it is not possible to understand what impact the episode of psychosis has had on attachment styles, i.e. whether any attachment difficulties predated, or were a consequence of the illness. Looking at an UHR sample could theoretically reveal the influence of attachment on the development and progression of psychosis, or the converse.

Secondly, it may provide further support for the claim that identifying patients' attachment styles early can help with planning and tailoring therapeutic goals and intervention approaches (Quijada et al, 2012). This is paramount, in light of the conjecture that delaying treatment in UHR patients impairs both pathological and functional prognosis (Clarke et al., 2006; Norman & Malla, 2001). Psychosocial interventions can be as effective as medication in UHR individuals (Bentall & Morrison, 2002) but requires engagement in the therapy by the patient and an ability to form an effective working relationship with the therapist (Lecomte et al., 2008). As these qualities are developed more successfully in the early stages of illness (Bechdolf et al., 2006) and affected by an individual's attachment style (Tait, Birchwood & Trower, 2004) timely knowledge of attachment styles can maximise treatment efforts.

Taking all previous evidence into consideration, it is possible to surmise that exploring attachment in UHR individuals will provide insight into affective, cognitive and interpersonal functioning and this could facilitate identification of those most at risk of impairment in the attachment domain and elucidate possible targets for timely treatment (Couture, Lecomte & Leclerc, 2007). Hence, the first aim of this paper was to describe attachment styles in sample of individuals at UHR for psychosis and compare them with a matched sample of healthy volunteers. As clinical samples usually have significant experience of treatment and/or have been exposed to potentially traumatic events that may manifest as psychotic experiences (Tiliopoulos & Goodall, 2009), the inclusion of a matched healthy sample eliminates the confounding effects of treatment and knowledge of the diagnosis. Also, it is necessary to characterise the attachment styles within the general population from which the at-risk individuals have been identified, especially in relatively rare conditions such as psychotic illness (Lee et al., 2007). Our second aim was to compare the relationship between attachment styles and affective symptoms, schizotypy and psychological trauma histories in both samples in order to explore whether attachment styles map to symptom profiles and identify any associations between attachment style and relevant psychopathology to psychosis risk.

Method

Setting

The study was conducted in an early intervention service (EIS) in psychosis which offers management for people aged 14–35 years suffering from first-episode psychosis (FEP) in the East of England, UK. This EIS also accepts referrals of people at UHR aged 16–35. Referrals are accepted from multiple sources including general practitioners, other mental

health services, school and college counsellors, relatives and self-referrals (Cheng et al., 2011).

Sample

A consecutive cohort of 60 help-seeking individuals, aged 16–35, referred to the EIS from February 2010 to September 2012 met criteria for UHR, according to the Comprehensive Assessment of At Risk Mental States (CAARMS) (Yung et al., 2005). Notably, the majority of help-seekers among this particular group that were referred to our clinical service agreed to be assessed and monitored in the context of this project. Thirty-nine (17%) referrals received during the 2-year period declined assessment; therefore, their clinical status could not be ascertained. From the CAARMS assessment, UHR individuals were divided into three groups based on whether they were mainly characterised by: i) vulnerability traits (family history of psychosis in first degree relative plus significant drop in functioning levels within past 12 months), ii) attenuated psychotic symptoms, or iii) brief limited intermittent psychotic symptoms (BLIPS). In our sample, all individuals fulfilled criteria for the attenuated psychotic symptoms' group. Seven individuals (11.7%) also qualified for the vulnerability traits' group. Intake exclusion criteria included: i) acute intoxication or withdrawal associated with drug or alcohol abuse or any delirium, ii) confirmed intellectual disability (Wechsler Adult Intelligence Scale — tested IQ < 70), or iii) prior total treatment with antipsychotics for more than one week. During the same period (February 2010–September 2012), a random sample of 60 healthy volunteers (HV) was recruited by post, using the Postcode Address File (PAF®) provided by Royal Mail, UK. Healthy volunteers interested in the study could only participate if they were aged 16–35, resided in the same geographical area as UHR participants (East of England), and did not have previous contact with mental health services. They were recruited for the exclusive purpose of this research.

Procedure

Following recruitment, HV and UHR participants underwent the same structured interviews and completed a battery of questionnaires under the direction of a senior clinical researcher. The interviews took place in the EIS, primary care practices or participants' homes. For HV participants, the process was completed in one session and typically within 90 minutes. All UHR referrals during the trial period were offered assessment which potentially involved at least 3 sessions. The procedure commenced with an initial assessment conducted by a medic and a senior research clinician. This was followed by a CAARMS questionnaire conducted by a senior research clinician trained in its use, the collection of socio-demographic information and provision of the study information sheet. Subsequently, feedback concerning the outcome of the CAARMS assessment was provided and if appropriate, consent obtained. The remaining battery of scales was then completed. This process could last up to two hours for each participant. Attempts were made to complete the entire battery in this session, to prevent the possibility that the participant would drop out and result in missing data and to ensure that there was a distinct gap between each of the 3 monthly sessions. However, if this was not possible, every effort was made to ensure the data collection was completed within 2 weeks. Individuals not meeting the UHR criteria were referred to more appropriate mental health teams, according to symptoms and needs.

Participant Compensation

Healthy volunteers received £50 for their initial session and another £50 for completing all sessions. Although UHR participants were not offered financial compensation, they were offered regular follow-up sessions every 3 months over a 2 year period. These monitoring sessions would not have been offered as part of their usual care by the National Health Service (NHS) in England at the time of this study.

Measures

Sociodemographic profile. This information comprised age, gender, ethnicity and marital status.

Attachment Styles. The Psychosis Attachment Measure (PAM, Berry et al., 2006) is a self-report measure specifically designed to assess current attachment styles in individuals with psychosis. It avoids focus on specifically romantic relationships as they can be less relevant to individuals with psychosis, who are often socially isolated (Berry et al., 2006). The PAM comprises of 16 items; eight items assessing attachment avoidance and eight items assessing attachment anxiety. All items are scored on a 4 point Likert scale from 0–3 with the response options of ‘Not at all’, ‘A little’, ‘Quite a bit’ and ‘Very much’. Total scores were calculated for each subscale by averaging individual item scores resulting in a possible range of scores from 0 to 3 for each of the anxiety and avoidance subscales; higher scores reflected higher levels of anxiety and avoidance. A high overall total score indicated an overall insecure attachment style. Studies using the PAM tend not to report attachment styles in samples as the measure is not designed to facilitate categorisation of attachment styles. However, previous research (Kvrgic et al., 2011) has described a method to calculate a difference score between the attachment anxiety and attachment avoidance subscales to identify whether participants demonstrated a predominantly anxious or avoidant attachment style. This method was employed in the present study by calculating the difference in individual scores between the anxiety subscale and the avoidance subscale, respectively (ranging from -3 to 3). A positive anxiety–avoidance difference indicates that individuals have a more anxious less avoidant attachment style, and the converse for a negative difference. Equally rated subscales indicate a balanced attachment style (Kvrgic et al., 2011). Previous research has shown the PAM to have good reliability and validity in clinical and non-clinical samples (Berry et al., 2006; Berry, Barrowclough & Wearden, 2008). Whilst the PAM has been used extensively, the few studies using it to measure attachment in UHR

samples have not reported any measures of reliability. Therefore, we conducted internal consistency analysis to confirm its reliability in our UHR sample. Cronbach's alphas for the 8 anxiety and 8 avoidance items were 0.82 and 0.84 respectively in the HV group. In the UHR group it was 0.80 for the anxiety subscale and 0.81 for the avoidance subscale. This indicates good reliability for both subscales of the PAM in both groups.

As the PAM assesses the two dimensions of attachment that have been shown to underlie existing self-report measures i.e. anxiety and avoidance, this study will facilitate comparisons with previous and future studies (Berry et al., 2008).

DSM-IV Diagnoses. The M.I.N.I. International Neuropsychiatric Interview Version 6.0.0 (MINI; Sheehan et al., 1998) is a widely used, brief structured diagnostic interview to evaluate major Axis I psychiatric disorders in DSM-IV and ICD-10. It can be used to assess current and/or lifetime diagnoses. Studies using the SCID-P (Sheeran et al., 1997) and the CIDI (Amorim, Lecrubier, Weiller, Hergueta & Sheehan, 1998) as comparisons have demonstrated its validity and reliability despite the M.I.N.I. being a much shorter instrument that can be administered in 15 – 20 minutes. The M.I.N.I. includes the following diagnoses: major depressive episode (including recurrent major depression and major depression with melancholic features); dysthymia; suicidality; mania and hypomania; panic disorder; social phobia; agoraphobia; obsessive compulsive disorder; post-traumatic stress disorder; alcohol abuse; alcohol dependence; substance abuse; substance dependence; psychotic disorders; mood disorder with psychotic features; anorexia; bulimia; generalised anxiety disorder; and antisocial personality disorder. The M.I.N.I. is divided into modules identified by letters, each corresponding to a diagnostic category. Structured questions are provided to enable the clinician to assess time frame, frequency, severity, and/or alternatives and require 'yes'/'no' responses. All questions must be rated. Clinical judgment is used to by the rater to assess whether diagnostic criteria are met for each of the diagnoses. If organic causes or the use of

substances better explains the symptoms, they should not be coded as positive. For the purposes of this study, all UHR participants were assessed by the same consultant psychiatrist. The study protocol did not administer a M.I.N.I. for HV participants. However, if the information elicited with any of the psychopathology measures indicated that scores were approaching the threshold for the specific disorder, the protocol was to administer a MINI for verification. This was not the case for any of them.

Trauma. The Trauma History Screen (THS; Carlson et al., 2011) was developed as a brief, easy to complete, self-report measure of exposure to severe stressors which the authors define as sudden events that have been found to cause extreme distress in most of those exposed (HMS) and events associated with significant subjective distress that lasts more than a month (PPD). The reliability and validity of the THS have been demonstrated in clinical and non clinical samples of homeless veterans, hospital trauma patients and their families, university students and adults and young adults from a community sample (Carlson et al., 2011). The THS assesses trauma load, frequency and the distress caused by the traumatic events. It is a 13-item self-report measure that examines 11 events and one general event, including military trauma, sexual assault and natural disasters. For each event, respondents are asked to indicate whether the event occurred ('yes' or 'no') and the number of times it happened. For each event endorsed as emotionally troubling additional dimensions are assessed, including age when it happened, a description of what happened, whether there was actual or a threat of death or injury, feelings of helplessness and feelings of dissociation, a 4-point scale for duration of distress ('not at all' to 'a month or more') and a 5-point scale for distress level ('not at all' to 'very much'). For the purposes of this study we only included the items that were scored *both*, 'a month or more' on the item 'After this happened, how long were you bothered by it?' *and* 'very much' for the item 'How much did

it bother you emotionally'. This was to ensure that the total trauma scores reflected actual trauma rather than merely stressful life events.

Depression. The Beck Depression Inventory Version II (BDI-II; Beck, Steer, Ball & Ranieri, 1996) is a widely used self-report measure to assess the severity of depressive symptoms over the previous two weeks. It consists of 21 items rated on a 4-point scale from absent (0), mild (1), moderate (2), to severe (3). Composite scores (range 0–63 points) were calculated by summing individual items in the BDI-II.

Anxiety. The Beck Anxiety Inventory (BAI; Beck, Epstein, Brown & Steer, 1988) is a validated, 21-item, self-complete measure of clinical anxiety symptoms also rated on a 4-point scale, from 0 indicating absent to 3 indicating severe. Individual item scores and composite score (range 0–63) were computed.

Schizotypal Symptoms. Schizotypy is often considered as an index of an individual's underlying vulnerability to developing psychosis. The Schizotypal Symptoms Inventory Brief Version (SSI, Hodgekins et al., 2012) is a modified version of the Schizotypal Personality Questionnaire (Raine, 1991). It is designed to measure current presence and frequency of low-level positive psychotic symptoms in clinical and non-clinical populations. This focus on recent symptom profiles is an enhancement of existing scales which tend to consider schizotypy as a personality trait (Hodgekins et al., 2012). The 20-item brief version was used as it comprises the most reliable items from the full scale and maximises both coherence and discrimination of items. As most current measures of schizotypy are lengthy, this quick and easy-to-use measure is advantageous. The scale contains 3 subscales: Social Anxiety (6 items), Paranoia (6 items), and Anomalous Experiences (8 items) and is scored on a 5 point Likert scale from 0 (Not at all) to 4 (All of the time) with higher scores indicating an increased frequency of symptoms. The SSI has

been shown to be a reliable and valid measure for assessing subthreshold psychotic phenomena in clinical and non-clinical populations (Hodgekins et al., 2012).

Statistical analysis

All statistical analyses were performed using R software (R Core Team, 2016). For demographic comparisons between UHR individuals and healthy volunteers Fisher's exact test (for categorical variables) and two-sample t-test (for continuous variables) were used. Two-sample t-test was also used for comparison of scale scores of UHR and HV individuals. Pearson product moment correlation was used to study associations among measures used in the study. All p-values were corrected for multiple comparisons using the method suggested by Benjamini and Hochberg (1995).

Results

Table 1 shows the comparison between UHR and HV individuals. HV were significantly older than the UHR participants ($t = -3.97$, $df = 86.6$, $p = < 0.001$). The UHR group had a slightly higher proportion of males and the HV group had a slightly higher proportion of females, though the difference was statistically non-significant. Both groups were predominantly white with a similar proportion of Mixed, Asian and Black participants. Distribution of marital status was different in UHR and HV ($p=0.030$); a slightly higher proportion of the UHR group were single, whilst more HV participants were married or in a partnership. A divorced or dissolved status was negligible for both groups.

Attachment Measure

The HV sample had significantly lower anxious and avoidant attachment scores than the UHR sample (See table 2). The mean PAM anxiety scores ranged from 0.25 to 2.88 for the UHR sample and 0 – 2.25 for HV. The mean PAM avoidance scores ranged from 1 –

2.25 for the UHR sample and 0.5 – 2 for HV. The difference score (Kvrgic et al., 2011) identified whether participants demonstrated a predominantly anxious or avoidant attachment style. The most prominent style for the UHR sample was anxious (N = 26; 59%), followed by avoidant (N = 16; 36%) and a balanced attachment style, i.e. both subscales were rated equally. (N = 2; 5%). In comparison the HV sample had a greater representation of individuals with a higher avoidant attachment style (86.7%; N=42). Eleven HV had a higher anxious attachment style (11.7%) and just one (1.7%) demonstrated a balanced attachment style. Results of Fisher's Exact Test suggested significant differences in the distribution of attachment styles across both groups ($p < 0.001$)

DSM-IV Diagnoses

We obtained MINI DSM-IV diagnoses for 55 of the 60 UHR individuals. Thirty Eight (69.1%) had more than one DSM-IV psychiatric diagnosis, mainly within the affective and anxiety diagnostic spectra. Primary diagnoses for this group were ranked as follows: depressive episode, current or recurrent (n=26; 47.3%) > social phobia (n=7; 12.7%) = generalised anxiety disorder (n=7; 12.7%) > obsessive compulsive disorder (n=5; 9.1%) > bipolar disorder, type II (n=2; 3.6%) > panic disorder (n=1; 1.8%) = posttraumatic stress disorder (n=1; 1.8%). Six UHR individuals (10.9%) did not fulfil sufficient criteria for a DSM-IV Axis I diagnosis.

Symptoms and trauma history

Table 2 shows a comparison of the mean scores for the all the questionnaires included in the study between the UHR and HV groups. The UHR group had significantly more symptoms on all the measures of psychopathology than the HV group and experienced significantly more trauma.

Associations with Insecure Attachment

Table 3 shows the Pearson's correlation coefficients, p values and confidence intervals for all the measures included in this study. The only significant association in the UHR sample was the schizotypy paranoia construct on the SSI with an anxious attachment style. For the HV sample, the affective measures were significantly associated with both anxious and avoidant attachment styles, as were the SSI constructs of social anxiety and paranoia.

Transition Rates

Two years after initial referral, 10% (6/60) of the UHR sample had made a transition to a DSM-IV psychotic disorder according to the CAARMS. Longitudinal data are not reported due to high attrition rates during the 2 year follow-up and subsequent incomplete measures. However, we were able to obtain information on current mental states and transition rates at two years from baseline from phone contacts and electronic clinical records for the 60 UHR individuals included in the study. No HV developed a psychotic disorder or a UHR mental state over the two-year follow-up period.

Discussion

The main aim of the present study was to describe attachment styles in sample of individuals at UHR for psychosis and compare them with a matched sample of healthy volunteers. Our second aim was to identify any associations between attachment styles and psychopathology in both samples.

There are three main findings in this study; firstly, the higher prevalence of insecure attachment in the UHR group. The significantly higher mean scores for the UHR sample compared to the HV indicates that not only did the UHR sample experience more psychopathology they also had significantly increased insecure attachment than their healthy

counterparts. This finding supports the premise that interpersonal factors may have an influence on vulnerability for developing psychotic experiences (Berry 2008 et al., 2008).

Recent evidence suggests that associations between the avoidant attachment style and psychosis are most consistent and these findings are replicated in non-clinical samples (Harder, 2014). However, a recent review concluded that both anxious and avoidant attachment are associated with psychotic phenomena (Korver-Nieberg et al., 2014). Results of the present study suggest that the most prominent attachment style for the HV sample was *avoidant*, and *anxious* in the UHR group. The relatively high level of avoidant attachment in the HV group is notable, particularly as the PAM scores and psychopathology were significantly lower than the UHR group. However, this could be explained by the use of Kvrjic et al.'s (2011) method to categorise the different types of attachment style (the PAM is not designed to facilitate categorisation of attachment styles). It is possible that this method of calculating the difference in individual scores between the PAM subscales to indicate style category is a blunt technique and does not reflect an accurate delineation of attachment styles. The attachment literature would be greatly enhanced if there was an established method of deriving attachment categories from the PAM.

The second important finding was the lack of correlations between insecure attachment and trauma in both samples. Gumley et al. (2014) proposed that trauma should be theoretically related to attachment measures, and an assessment of this construct was included in the present study. However, trauma was not associated with insecure attachment in this UHR sample. There is now considerable evidence that trauma may contribute to the development of psychosis and be associated with worse outcomes (Read & Bentall, 2012). Also, recent research suggests that insecure attachment could be the mechanism through which trauma exerts its effects on psychosis (Korver-Nieberg et al., 2015). Consequently, in a sample of individuals identified as being at risk of developing psychosis who have endorsed

experiencing a significant amount of trauma, we would expect to find associations between insecure attachment and traumatic experiences as have been found in FEP samples (Berry, Barrowclough, Wearden, 2009; Picken, Berry, Tarrier & Barrowclough, 2010). No other research with UHR samples (Gajwani et al., 2013; Quijada et al., 2012) has considered trauma and its association with insecure attachment; hence comparison with previous research is not possible. Similarly, our HV sample presented no significant associations between both avoidant and anxious attachment styles and traumatic experiences.

One explanation for these findings is that examining the relationship between frequency of traumatic events and insecure attachment is inappropriate. Perhaps, it is merely the presence of trauma that is associated with insecure attachment, i.e. when comparing those who have and have not been exposed to trauma; those who have been exposed would have more insecure attachment. This conjecture is further supported by the mean scores for the number of traumas experienced in each group. For the UHR group the mean number of traumas was nearly five, whereas for the HV group, it was just above one. Therefore, the presence of multiple traumas in the majority of the sample would explain the lack of association between frequency of trauma and attachment scores. However, this view is not corroborated by Gumley et al. (2014) who proposed that, to support construct validity, greater attachment insecurity should be associated with more experiences of trauma or Picken et al. (2010) who found that insecure attachment was significantly associated with total number of traumatic events. Another consideration is the importance of trauma type in the development of insecure attachment styles. Theorists contend that early-life, interpersonal trauma can facilitate the development and maintenance of psychotic symptoms through the development of negative 'working models' (Garety, Kuipers, Fowler, Freeman & Bebbington, 2001). Research supports this as Berry et al. (2009) found that interpersonal traumas with significant others that occur in childhood had the most impact on insecure attachment styles. It is

possible that because the present study considered all traumas combined, any relationships between specific trauma types were missed.

The third relevant finding in this study was the pattern of associations between attachment styles and different measures of psychopathology in our UHR group. We found an association between paranoia, measured by the SSI, and anxious attachment in our UHR group. Also, there was a strong relationship between paranoia and avoidant attachment, although it did not reach statistical significance. This association between schizotypal dimensions and insecure attachments had not been explored in UHR individuals before.

Conversely, the majority of studies with non-clinical samples investigated associations between attachment and schizotypal personality traits. A recent review (Kover-Nieberg et al., 2014) revealed that avoidant attachment has been associated with subclinical psychotic symptomatology. Anxious attachment has also been associated with positive schizotypy, whereas avoidant attachment has been associated with negative symptoms. On a symptom level, both avoidant and anxious attachment has been associated with paranoia and hallucinatory experiences with attachment anxiety. However, there are discrepancies across the studies with some finding associations with both or only one of the attachment subscales and some finding no associations. Different attachment measures, varying statistical analyses, controlling for different confounding factors or low study numbers resulting in reduced power could explain these inconsistencies (Kover-Nieberg et al., 2014). In our HV sample, paranoia measured by the SSI was moderately related to anxious attachment and weakly related to avoidant attachment. Furthermore, the schizotypy construct of social anxiety was weakly associated with anxious and avoidant attachments, but the construct of anomalous experiences was not.

Interestingly, we did not find associations between attachment styles and other specific symptoms in our UHR group. Gajwani et al. (2013) assessed the associations

between attachment insecurity and anxiety, depression, social anxiety, social interaction anxiety and social phobia in UHR individuals. They did not use the PAM but the Revised Adult Attachment Scale (Collins, 1996). This scale categorises insecure attachment into 3 insecure attachment sub-types (preoccupied, fearful and dismissing). Nevertheless, it has been proposed that the dismissing pattern is related to attachment avoidance, and the preoccupied pattern resembles attachment anxiety (Harder, 2014). Gajwani et al.'s results (2013) revealed that depression and anxiety were significantly associated with an anxious attachment style which was not replicated in our study. Whilst anxiety and depression were related to insecure attachment in our HV, this association was not found in our UHR group. Previous evidence shows that affective dysregulation in UHR individuals may be predicative of transition to psychosis (Yung et al., 2003), however, our finding suggests that insecure attachment may not always represent a key underlying mechanism for the development of depressive and/or anxiety symptoms in all individuals at UHR.

There are other factors that could also explain the lack of association between insecure attachment and psychopathology in our UHR sample. For example, as the PAM measures attachment in terms of dimensions rather than categories there are no cut-off points to determine the proportions of securely or insecurely attached individuals, therefore it is possible that our UHR group were relatively securely attached. The mean anxiety and avoidance attachment scores for the UHR sample are above the mid-scale score, whereas, they are below for the HV. Furthermore, the standard deviations, especially for attachment anxiety show increased deviations from the mean; thus indicating that there could be a distribution of responses with lower insecure attachment scores.

Despite the originality of this study and the valuable contribution it makes to the literature concerning psychotic symptoms and insecure attachment, the findings of this study should be interpreted in light of its limitations. First, the cross-sectional nature of the

research limits the understanding of the direction of the relationship between insecure attachment and psychotic symptomology; as Berry et al. (2007) assert, it is just as likely that psychosis could cause insecure attachment. Longitudinal studies are needed to help reveal how attachment impacts on the development of illness, or vice versa. Second, the sample size was relatively small; increasing the likelihood of Type I and II errors. Third, the HV were statistically significantly older than the UHR participants and this might be interrelated with attachment patterns. However, Chopik, Edelstein and Fraley (2013) examined attachment avoidance and anxiety across the lifespan. They did show some differences but these were mostly between young adults and middle aged/older adults. Therefore, we propose that, as both our samples correspond with the ‘young adult’ group in this work, any differences between them would not be due to age. Finally, the UHR participants were help-seeking, thus the sample may not be representative of the whole spectrum of individuals experiencing sub-threshold psychotic symptoms. Similarly, this could denote individuals with a relatively secure attachment style.

In short, our findings add to the understanding of attachment styles in UHR individuals. Contrary to Gajwani et al.’s results (2013), our study did not elicit associations between affective and anxiety symptomology and attachment styles in UHR individuals. This suggests that the UHR mental state, as currently defined, may be present in a heterogeneous group of individuals; some may suffer from significant co-morbid mood and/or anxiety symptoms (Hui et al., 2013) that may not be explained by specific attachment styles. However, research to date indicates that the negative beliefs about the self and others, combined with the maladaptive strategies to manage stress that are associated with an insecure attachment style can increase the vulnerability to psychotic experiences and facilitate the maintenance of those symptoms (Berry et al., 2007). Thus, measuring attachment styles in UHR individuals may become a useful mechanism for establishing how

to create the most effective therapeutic relationships and subsequently prevent further mental state deterioration and enhance recovery.

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Table 1

A comparison of sociodemographic characteristics between Ultra High Risk Individuals and Healthy Volunteers.

Note. UHR = ultra high risk; HV=healthy volunteers; SD=standard deviation; n=number;

Sociodemographic characteristics	UHR (n=60)	HV (n=60)	P-value^c
Age at study entry, years median (min, max, SD)	19.89 (16.41, 30.21, 2.38)	22.60 (16.18, 35.57, 5.68)	<0.001 ^a
Gender n (%)			
Male	31 (51.7)	26 (43.3%)	0.581 ^b
Female	29 (48.3%)	34 (56.7%)	
Ethnicity n (%)‡			
White	56 (93.3)	55 (91.7%)	1.000 ^b
Mixed	2 (3.3)	2 (3.3%)	
Asian	1 (1.7)	2 (3.3%)	
Black	1 (1.7)	1(1.7%)	
Marital status n (%) (†4)			
Single	49 (81.7)	42 (70.0)	0.050 ^b
Married/in partnership	7 (11.7)	17 (28.3)	
Divorced/dissolved	0 (0)	1 (1.7)	
Occupational status n (%) (†7)			
Unemployed	20 (33.3%)	8 (13.3%)	0.006 ^b
Employed	8 (13.3%)	27 (45.0%)	
Students	25 (41.7)	25 (41.7)	

†=Number of missing observations in brackets; ‡= ‘White ethnicity’ refers to subjects who are White British, White Irish, or other White backgrounds. ‘Mixed ethnicity’ refers to those who are White and Black Caribbean, mixed White and Black African, mixed White and Asian, or any other mixed backgrounds. ‘Asian ethnicity’ refers to those who are Indian or Chinese. ‘Black ethnicity’ refers to subject from any Black backgrounds. ^a = Independent samples t-test; ^b = Fisher’s exact test; ^c = All p-values were corrected for multiple comparisons using the method suggested by Benjamini and Hochberg (1995).

Table 2

Mean scores, standard deviations, standard errors and p values for the questionnaire battery for Ultra High Risk Individuals and Healthy Volunteers

	UHR		HV		P values ^{a,b}
	Mean	SD (SE)	Mean	SD (SE)	
Attachment anxiety	1.85	0.67 (0.10)	0.73	0.53 (0.07)	p < 0.001
Attachment avoidance	1.64	0.30 (0.04)	1.24	0.34 (0.04)	p < 0.001
Depression	29.9	12.8 (1.82)	6.65	6.46 (0.83)	p < 0.001
Anxiety	28.9	11.8 (1.64)	8.46	8.03 (1.04)	p < 0.001
Schizotypy social anxiety	13.6	6.44 (0.98)	5.03	4.66 (0.60)	p < 0.001
Schizotypy paranoia	11.3	6.11 (0.93)	3.22	3.43 (0.44)	p < 0.001
Schizotypy anomalous experiences	7.72	6.44 (0.98)	3.03	3.78 (0.49)	p < 0.001
Trauma	4.57	7.18 (1.03)	1.12	3.43 (0.44)	p = 0.003

Note. ^a = Wilcoxon rank test with continuity correction; SE = Standard Error; ^b = All p-values were corrected for multiple comparisons using the method suggested by Benjamini and Hochberg (1995)

Table 3

Correlation coefficients, p values and confidence intervals for PAM subscales and the battery of measures for Ultra High Risk Individuals and Healthy Volunteers

	Ultra High Risk Individuals						Healthy Volunteers					
	PAM anxiety	p^a	95% CI	PAM avoidance	p^a	95% CI	PAM anxiety	p^a	95% CI	PAM avoidance	p^a	95% CI
Depression	0.29	0.14	[-0.02, 0.54]	0.05	0.82	[-0.25, 0.35]	0.60	<0.001	[0.41, 0.74]	0.44	0.02	[0.21, 0.62]
Anxiety	0.27	0.14	[-0.03, 0.53]	0.11	0.60	[-0.19, 0.39]	0.60	<0.001	[0.40, 0.74]	0.41	0.04	[0.17, 0.60]
Schizotypy social anxiety	0.36	0.07	[0.05, 0.61]	0.28	0.14	[-0.03, 0.55]	0.43	0.02	[0.20, 0.62]	0.41	0.03	[0.17, 0.60]
Schizotypy paranoia	0.48	0.02	[0.19, 0.69]	0.36	0.07	[0.06, 0.61]	0.58	<0.001	[0.38, 0.72]	0.40	0.04	[0.16, 0.59]
Schizotypy anomalous experiences	0.32	0.13	[-0.00, 0.58]	0.19	0.32	[-0.13, 0.48]	0.34	0.19	[0.09, 0.55]	0.33	0.21	[0.08, 0.54]
Trauma	0.20	0.30	[-0.12, 0.48]	-0.01	0.96	[-0.32, 0.30]	0.32	0.25	[0.07, 0.53]	0.32	0.23	[0.08, 0.53]

Note. Correlation was considered significant at the $p \leq 0.05$ level; CI = confidence interval; ^a = All p-values were corrected for multiple comparisons using the method suggested by Benjamini and Hochberg (1995).