**How Does Attachment Style Affect Psychosis? A Systematic Review of Causal Mechanisms and Guide to Future Inquiry**

**Abstract**

Purpose: The link between attachment and psychosis is now well established, but less is known about the causal mechanisms underlying this relationship. This systematic review synthesises the studies that examine mediating mechanisms in the attachment and psychosis relationship, in both clinical and non-clinical samples.

Method: We conducted a database search (PsychINFO, MEDLINE, Web of Science) to identify all eligible studies irrespective of publication status, language of article, or article date. We assessed methodological quality and completed a narrative synthesis given the heterogeneity of studies to date.

Results: We identified 17 papers, comprising 3672 participants. The relationship between attachment and psychosis is mediated by four variables or groups of variables. There is good evidence for the causal role of affective factors (affective dysregulation and affective disturbances) and cognitive factors (e.g. self-beliefs and self-esteem, and beliefs about symptoms). Affective factors differed by attachment style. Tentative evidence was also found for the role of duration of untreated psychosis and baseline negative symptoms in the relationship between attachment and the presence / severity of psychosis symptoms.

Conclusions: Affective and cognitive factors mediate the relationship between attachment style and psychosis. While cognitive factors are routinely targeted in recommended psychological interventions for psychosis, affective factors and attachment style are less commonly considered. Psychological therapies may be improved by calibrating cognitive and affective interventions by attachment style, and should be subjected to experimental and then field studies to assess the impact on clinical and recovery outcomes.

**Background**

 Psychosis refers to the experience of thoughts and perceptions that differ from commonly shared reality (Cooke et al., 2014; National Institute for Health and Care Excellence [NICE], 2014). This includes hallucinations (perceptions of stimuli that are not present), delusions (firmly held beliefs despite evidence to the contrary), and disorganised thinking (e.g. flight of ideas; Cooke et al., 2014; NICE, 2014). Psychotic experiences are reported by both clinical and non-clinical populations, ranging on a continuum from common concerns to clinically significant symptoms (van Os et al., 2009). For example, 28% of us regularly have suspicious thoughts that others may use or hurt us (Bebbington et al., 2013), whereas less than 5% experience delusional type beliefs, such as there being conspiracies against us (Freeman et al., 2005). Many people have a few psychotic-like experiences, and few people have severe psychotic symptoms. In clinical groups, psychosis is typically associated with diagnoses such as schizophrenia, schizoaffective disorder, and delusional disorder (Cooke, 2014).

While pharmacological treatments for psychosis reduce symptom severity for some, the benefits may be overestimated (Morrison et al., 2012), and these medications have been associated with serious adverse effects, such as reduction in volume of brain matter (Moncrieff & Leo, 2010). Many decline medication due to more immediate side effects or a preference for psychological therapies (Cooke et al., 2014). Notwithstanding the need and demand for psychological interventions, these currently yield modest effects (Jauhar et al., 2014; Jones et al., 2018; Laws et al., 2018). We need to understand the factors that lead to the development and maintenance of psychosis in order to determine which factors should be targeted in therapeutic interventions to improve clinical and recovery outcomes. Attachment theory provides an explanatory psychological framework of the development and maintenance of psychosis (Berry et al., 2007; Berry et al., 2020; Gumley, Taylor, et al., 2014).

***Attachment***

Attachment theory assumes that humans have an innate desire to seek connections with others, and that our early experiences with caregivers influence relationships and psychological functioning in later life (Bowlby, 1969/1982). The dimensional conceptualisation of attachment (Brennan et al., 1998) suggests that individuals vary on attachment anxiety and attachment avoidance. Low scores on both dimensions indicate secure attachment, whereas a high score on either indicates insecure attachment.

Secure attachment typically develops from responsive caregiving (Mikulincer & Shaver, 2007). The child learns to use effective affect regulation strategies – self-managing distress and seeking out others appropriately in times of need (Cooke et al., 2019; Shaver & Mikulincer, 2002). In adulthood, attachment security is associated with comfort with autonomy and intimacy, and positive and realistic self and other appraisals (Gillath et al., 2016).

Attachment anxiety typically develops following inconsistent caregiving, which motivates the child to adopt hyperactivating affect regulation strategies (e.g. exaggerating calls of distress) in an attempt to get their needs met and maintain parental proximity (Cassidy, 1994; Cooke et al., 2019; Mikulincer & Shaver, 2007). In adulthood, this is linked with an intense desire for closeness and fear of abandonment, and continued use of hyperactivating strategies; individuals may view themselves as helpless and others as unreliable (Mikulincer et al., 2003).

Attachment avoidance typically develops following unavailable or rejecting caregiving, which motivates the child to adopt deactivating affect regulation strategies (e.g. minimising or supressing emotions) to avoid further rejection (Cassidy, 1994; Cooke et al., 2019; Mikulincer & Shaver, 2007). In adulthood, this is linked with discomfort with closeness and a desire for independence, and continued use of deactivating strategies; individuals may view others as untrustworthy and hold unrealistic beliefs about their ability to manage alone (Mikulincer et al., 2003).

In addition to these two dimensions, Main and Solomon (1986) identified a disorganised attachment style, in cases where infants did not exhibit consistent behaviour when separated or reunited with caregivers. Disorganised attachment is assumed to develop when the caregiver is a source of both safety and fear. In adulthood, disorganised attachment involves alternating between approach and avoidance behaviours in close relationships (Bartholomew, 1994). Until recently, psychological research examining disorganised attachment is psychosis has been limited by the absence of a practicable measure, though this may change with the recent validation of the Revised Psychosis Attachment Measure (Pollard et al., 2020).

***Attachment and Psychosis***

A number of systematic reviews and meta-analyses have now established that insecure attachment is overrepresented in individuals with psychosis, and is associated with increased psychotic symptomology across clinical and non-clinical samples (Berry et al., 2007; Carr et al., 2018; Gumley, Taylor, et al., 2014; Korver-Nieberg et al., 2014; Lavin et al., 2020; Murphy et al., 2020). While there is strong evidence of a relationship between attachment and psychosis, little is known about the underlying mediating mechanisms which explain *how* attachment style influences psychosis. Mediators may be amenable to change and therefore possible targets for psychological interventions, since attachment style is assumed to be a stable construct (Bowlby, 1969/1982).

**Aims**

There has been no systematic review of the literature focused on mediating mechanisms in the relationship between attachment and psychosis. This review examines this literature, evaluates the quality of the evidence to date, and presents a guide for future inquiry.

**Method**

***Search Procedure***

The review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009). The protocol was published in advance on The International Prospective Register of Systematic Reviews (Registration ID: CRD42020187917). Three electronic databases were searched on 15th January 2021 (PsycINFO, MEDLINE, Web of Science), using free text and subject headings to improve search accuracy (Boland et al., 2017). Subject headings are set by some databases to identify different terms for the same concept. Table 1 shows the search strategy across platforms. The British Library and the Open Grey database were also searched to locate relevant grey literature.

Table 1 about here

***Inclusion and Exclusion Criteria***

To reduce publication bias, increase comprehensiveness of the search, and yield a balanced overview of the evidence (Paez, 2017) the search strategy contained no limits regarding publication status, publication date, or language of article. Assuming the continuity model of psychosis (van Os et al., 2009), studies with clinical and/or non-clinical participants were included. In this review, we use the term ‘psychosis’ in reference to all experiences across the clinical and non-clinical continuum. Table 2 summarises eligibility criteria.

Table 2 about here

***Study Selection, Data Extraction, and Analysis Plan***

We collated results from the main and grey literature searches using referencing software. We removed duplicates and screened abstracts against the eligibility criteria. Ten percent of abstracts were double rated by a second independent reviewer (*n* = 78), with good agreement (93.6%). We then screened full texts for eligible papers. Once the final papers were identified, we examined reference lists and conducted a forward search. Figure 1 outlines the paper selection procedure.

Figure 1 about here

Once the data had been extracted, we synthesised the results into a coherent textual narrative regarding mediating mechanisms. It was not possible to complete a meta-analysis due to the high degree of variance in study design, hypothesised mediators, outcome measures, data analyses, and statistics reported (cf. Haidich, 2010).

***Quality Assessment***

A recent systematic review examining mediators in the relationship between childhood adversities and psychosis (Williams et al., 2018) adapted The Effective Public Health Practice Project tool (EPHPP; Thomas, 2003) to enable quality assessment of studies using mediation. Given the relevance of the previous review, and the fact that we also focused on papers employing mediation analysis, we used the adapted EPHPP for the present review.

The adapted EPHPP assesses ﬁve domains: (1) selection bias, (2) confounders, (3) data collection methods, (4) withdrawals and drop-outs, and (5) data analysis. Papers are rated “strong”, “moderate”, or “weak” on each domain and assigned an overall global rating (strong = no weak rating; moderate = one weak rating; weak = two or more weak ratings).

Quality assessment was undertaken by the first author and an independent rater, with good agreement (93.2%). Discrepancies were agreed through discussion and with the second and third authors. In terms of overall quality, twelve studies received a weak rating and five received a moderate rating (see Table S1).

**Results**

***Study Characteristics***

Seventeen studies met inclusion criteria. Table 3 summarises the extracted data.

Table 3 about here

All studies, with the exception of Pickering et al. (2008), were carried out between 2014 and 2020, demonstrating an increased interest in this area. Most (*n =* 15) are published in peer-reviewed journals. Two are unpublished doctoral theses (Jones, 2015; Dominguez-Pereira, 2019), one of which (Jones, 2015) was located through grey literature searches. Studies originated mainly from the United Kingdom (*n* = 11), and a minority from other European countries (Portugal, Germany, Slovakia; *n* = 3), Australia (*n* = 2), and the United States (*n* = 1).

Most studies (*n* = 15) utilised a cross-sectional design, collecting data at one time point. The remaining studies utilised longitudinal (Gumley, Schwannauer, et al., 2014) and experimental designs (Sood & Newman-Taylor, 2020). Twelve used methods to test direct and indirect effects (e.g. Preacher & Hayes, 2004). Five inferred mediation through the use of regression (following Baron & Kenny, 1986), and two of these used additional inferential methods (e.g. the Sobel test).

***Participant Characteristics***

The 17 studies included 3672 participants with a reported mean age of 32.4 years (SD = 9.5), ranging from 16 – 86 years. There was a reasonable balance of gender representation, with 56.2% of participants identifying as female. There were more females in non-clinical (73.8%) than clinical samples (35.45%). The majority (78.4%) of participants identified as White, though information on ethnic origin was unavailable for nine studies.

Participants reported a range of psychosis experiences across the clinical and non-clinical continuum. Seven studies recruited participants with a psychosis-related diagnosis from inpatient mental health settings, community mental health settings, and the general population (*n* = 587). Of these, 384 (65%) were schizophrenia-related diagnoses, 152 (26%) were psychotic disorder diagnoses, and 51 (9%) were first-episode psychosis. Two studies recruited individuals with current voice hearing from the general population (mainly via charities) without criteria for a diagnosis (*n* = 224). Sood and Newman-Taylor (2020) recruited individuals with high non-clinical paranoia from a mainly student population (*n* = 117). The remaining seven studies recruited from the general population without criteria for psychotic experiences (*n* = 2744), four of which recruited university students.

***Measures of Attachment***

Eight instruments were used to measure attachment style, five of which were variations of the Experiences in Close Relationship questionnaire (see Table S2). Fourteen studies used dimensional measures of attachment anxiety and avoidance (Brennan et al., 1998). The remaining studies used categorical measures (Gumley, Schwannauer, et al., 2014; Jones, 2015; Udachina & Bentall, 2014), which some argue to be less reliable and valid than dimensional tools (Fraley & Shaver, 2000).

Most measures explored attachment in relation to close/key others, though Castilho et al. (2017) measured attachment in relation to mother, father, romantic partner, and best friend. All studies utilised self-report measures with the exception of Gumley, Schwannauer, et al. (2014), who used a semi-structured interview to explore more unconscious processes (George et al., 1985). All studies used valid and reliable measurements of attachment, obtaining strong quality ratings in this domain.

***Measures*** ***of Psychosis***

Thirteen instruments were used to measure psychosis (see Table S3). Thirteen studies measured psychosis symptoms, three measured voice-related distress, and one measured negative voice hearing content. Of the studies measuring psychosis symptoms, nine measured paranoia/suspicious thinking and four measured more general positive and negative symptoms. Most used valid and reliable measures (*n* = 13), obtaining strong quality ratings. Two studies adapted valid and reliable measure and obtained moderate ratings (Dominguez-Pereira, 2019; Martinez et al., 2020), and two used non-validated self-reported estimates and obtained weak ratings (Robson & Mason, 2015; Scott et al., 2020).

***Measures of Mediators***

A considerable range of mediators were explored across the studies (see Table S4). Most studies employed valid and reliable measures (*n* = 15), obtaining strong quality ratings. Two studies adapted valid and reliable measures and therefore obtained moderate ratings (Ascone et al., 2020; Hajduk & Heretik, 2016).

**Synthesis of Research Examining Mediators in the Relationship between Attachment and Psychosis**

 Figure 2 presents a summary of mediators in the relationship between attachment and psychosis, as found in the present review.

Figure 2 about here

***Affective Factors***

**Affective Dysregulation.** Attachment style impacts affect regulation; specifically, attachment anxiety is associated with hyperactivating strategies (e.g. rumination) and attachment avoidance is associated with deactivating strategies (e.g suppression of emotions) in both clinical and general population samples (Mikulincer and Shaver, 2007; Owens et al., 2013). Individuals with psychosis use more maladaptive (e.g. suppression) and less adaptive strategies (e.g. cognitive reappraisal) than the general population (Livingstone et al., 2009). Importantly, affect regulation predicts increases in psychosis, for example suppression has been shown to predict increases in hallucinations in individuals with a diagnosis of schizophrenia (Kimhy et al., 2020)**,** and self-blame predicted paranoia in a non-clinical sample one month later (Westermann et al., 2013).

In the present review, four studies examined affective dysregulation, three of which recruited people with clinical levels of psychosis (Ascone et al., 2020; Castilho et al., 2017; Jones 2015) and one recruited university students (Udachina & Bentall, 2014). Ascone et al. (2020) also recruited healthy controls.

In terms of anxious attachment, Ascone et al. (2020) found that hyperactivating affect regulation (rumination, self-blame, and catastrophising) fully mediated the link between attachment anxiety and increased paranoia in the psychosis sample, but not in healthy controls. Similarly, more internal dysfunctional affect regulation (e.g. dwelling on thoughts and feelings) mediated the relationship between fearful attachment (negative view of self and other) and increased hallucinations, but not between fearful attachment and other positive symptoms (Jones, 2015). Experiential avoidance (unwillingness to experience and attempts to supress feelings; Hayes et al., 1999) mediated the relationship between attachment anxiety and paranoia (Castilho et al., 2017), and Udachina and Bentall (2014) found in a path analysis that attachment insecurity (anxiety and avoidance) predicted increased negative self-esteem, which in turn predicted increased experiential avoidance and paranoia.

In terms of avoidant-type attachment, the relationship between dismissing (avoidant) attachment and positive symptoms was partially mediated by more internal-functional affect regulation (e.g. putting the situation into perspective) (Jones, 2015). This was unexpected, as the strategy is considered adaptive. However, as individuals with an avoidant style are overly self-reliant and tend to dismiss interpersonal support, excessive reliance on internal strategies may be maladaptive. As noted above, experiential avoidance mediated attachment insecurity (anxiety and avoidance) and paranoia (Udachina & Bentall, 2014). Affect regulation did not mediate the relationship between dismissing (avoidant) attachment and hallucinations (Jones, 2015), and blaming others did not mediate the relationship between attachment avoidance and paranoia (Ascone et al., 2020).

Inferential methods identified no specific mediators in the relationship between secure attachment and positive symptoms generally, but the relationship with hallucinations was fully mediated by less internal dysfunctional emotion regulation (e.g. keeping feelings locked up inside); specifically, secure attachment was *negatively* associated with internal dysfunctional emotion regulation, which in turn was *positively* associated with severity of hallucinations (Jones, 2015).

All but one study obtained a weak overall quality rating, with Jones (2015) obtaining a moderate score. This was largely due to the recruitment of self-selecting participants and not controlling for confounders. All but Castilho (2017) employed strong and reliable data analysis, however the use of post-hoc analyses by Ascone et al. (2020) increases the likelihood of false positive results. Overall, our results suggest that affect regulation plays a key role in mediating the relationship between attachment and psychosis, and that this differs by attachment style. Anxious attachment is associated with hyperactivating strategies such as rumination, with some support for the role of experiential avoidance, resulting in increased psychosis experiences. Avoidant attachment is associated with deactivating strategies such as excessive self-reliance and experiential avoidance, again resulting in increased psychosis experiences.

**Affective Disturbances.** The meta-analysis completed by Gumley, Taylor and colleagues (2014) found that insecure attachment is associated with greater affective problems in individuals with psychosis. In the present review, three studies examined the mediating role of affective disturbances, all of which recruited non-clinical participants.

Increased fear of intimacy mediated the relationship between attachment anxiety and suspicious jealousy (Dominguez-Pereira, 2019), and increased emotional distress partially mediated the relationship between attachment anxiety and subclinical paranoia (Hajduk & Heretik, 2016). Fear of intimacy and emotional distress did not mediate the avoidant attachment and psychosis-type experiences relationship. Parenting stress mediated the relationship between attachment anxiety and avoidance, and schizotypy in first-time primary caregivers (Hugill et al., 2017).

Hugill et al. (2017) obtained a moderate overall quality rating and the remaining two studies obtained weak ratings. Hajduk and Heretik (2016) was the only study to employ weak data analysis, though controlled for confounders as did Hugill et al. These results suggest that affective disturbances play a role in mediating the attachment and psychosis relationship, with stronger evidence for the relationship between attachment anxiety and non-clinical psychosis. Study replication with clinical samples is needed.

***Cognitive Factors***

**Beliefs About Symptoms.** Appraisal of symptoms influences psychotic experiences (Chadwick & Birchwood, 1994), for example holding beliefs that voices are malicious and omnipotent is associated with hallucination severity in people with a diagnosis of schizophrenia (Chawla et al., 2019). Individuals high in attachment anxiety are more likely to believe that their voices are powerful, comply with demands, and relate to voices from a dependent position (Berry et al., 2017). Those high on attachment avoidance are more likely to view their voices as malevolent and attempt to suppress them and resist demands (Berry et al., 2017).

In the present review, three studies investigated the role of beliefs about auditory hallucinations in the relationship between attachment and voice-related distress. Two recruited current voice hearers from the general population (Cole et al., 2017; Robson & Mason, 2015) and one recruited individuals with a clinical diagnosis of psychosis (Pilton et al., 2016).

The relationship between anxious attachment and voice-related distress was mediated by voice malevolence, omnipotence, and resistance in both clinical and non-clinical samples (Pilton et al. 2016; Robson & Mason, 2015), and by voice intrusiveness, dominance, and hearer-distance in the non-clinical sample (Robson & Mason, 2015). Pilton et al. (2016) found no evidence for voice dominance or hearer-distance as mediators.

The relationship between attachment avoidance and voice-related distress was mediated by voice dominance, intrusiveness, omnipotence, and malevolence, but not resistance or hearer-distance in the clinical sample (Pilton et al., 2016). Robson and Mason (2015) found no correlation between avoidant attachment and voice-related distress.

Cole et al. (2017) found that the relationships between both attachment avoidance and anxiety, and voice distress were mediated by negative self and other schema and then persecutory beliefs about voices (malevolence and omnipotence) in their path analysis.

 All three studies obtained a weak overall quality rating for their use of self-selecting samples and not controlling for confounders, however all employed robust data analysis. These results suggest beliefs about voices mediate the attachment and psychosis relationship in both clinical and non-clinical samples, with no clear differences by attachment style.

 **Self-Beliefs and Self-Esteem.** There is good evidence that attachment anxiety is associated with negative self-beliefs and low self-esteem, though findings are less consistent for attachment avoidance, probably due to the tendency for this group to supress negative self-information (cf. Mikulincer & Doron, 2016). Negative self-beliefs and low self-esteem have been shown to play a role in the onset, experience and maintenance of psychosis (e.g. Bentall et al., 2008; Krabbendam et al., 2002; Stowkowy & Addington, 2012)**.** Importantly, an experience sampling study found decreases in self-esteem predicted immediate increases in paranoia (Thewissen et al., 2008).

We found nine studies that investigated the mediating effect of self-beliefs or self-esteem. Three recruited university students (Hajduk & Heretik, 2016; Pickering et al., 2008; Udachina & Bentall, 2014), two recruited from the general population (Hugill et al., 2017; Martinez et al., 2020), two recruited voice hearers from the community (Cole et al., 2017; Robson & Mason, 2015), and two recruited individuals with a schizophrenia-related diagnosis (Scott et al. 2020; Wickham et al., 2015).

 Three studies found that negative self-esteem mediated the relationship between attachment anxiety and avoidance, and increased paranoia in clinical (Wickham et al., 2015) and non-clinical samples (Pickering et al., 2008; Udachina & Bentall, 2014). Martinez et al. (2020) found that negative self-esteem mediated the relationship between attachment anxiety (but not avoidance) and paranoia. Hajduk and Heretik (2016) found no evidence that self-esteem mediated the attachment and paranoia relationship.

 In path analyses, negative self-schema mediated the relationship between attachment anxiety and avoidance, and voice-related distress (Cole et al., 2017), and between attachment anxiety (but not avoidance) and negative voice hearing content (Scott et al., 2020). Beliefs of deserving persecution fully mediated the relationship between attachment anxiety and avoidance, and voice-related distress (Robson & Mason, 2015). Sense of parental competence did not mediate the relationship between attachment and schizotypy in first time primary caregivers (Hugill et al., 2017).

Hugill et al. (2017) and Wickham et al. (2015) obtained moderate quality ratings, and all others obtained weak ratings. All but Hajduk and Heretik (2016) scored at least moderate for data analysis. Scott et al. (2020) and Robson and Mason (2015) obtained weak ratings for their use of non-validated measures. Wickham et al. and Hajduk and Heretik both controlled for confounders. These results suggest that self-beliefs and self-esteem play a mediating role in the attachment and psychosis relationship. Unexpectedly, only two studies found that this was dependent on attachment style (Martinez et al., 2020; Scott et al., 2020).

**Beliefs about Others and the World.** Insecure attachment (anxiety and avoidance) is associated with unstable and/or negative beliefs about others and the world, especially in those with avoidant attachment due to the tendency for this group to strive for independence (Mikulincer et al., 2003). Negative self and other schemas correlate with psychosis, and mistrust of others predicts psychotic experience in people with a diagnosis of schizophrenia (Bortolon et al., 2013).

 We identified four studies which investigated the mediating role of other/world beliefs. Two recruited current voice hearers from the community (Cole et al., 2017; Robson & Mason, 2015), one recruited university students (Pickering et al., 2008), and one recruited from the general population (Martinez et al., 2020).

 Negative other schema/beliefs mediated the relationship between attachment anxiety and avoidance, and voice related distress (Cole et al., 2017; Robson & Mason, 2015). Mistrust of others, perceptions of others as more powerful than the self, and anticipation of negative events all mediated the relationship between attachment anxiety and avoidance, and paranoia (Martinez et al., 2020; Pickering et al., 2008).

 All studies obtained a weak overall quality rating but scored at least moderate for data analysis. Robson and Mason (2015) obtained weak ratings for the use of non-validated measures. These results suggest that beliefs about others and the world play a role in mediating the attachment and psychosis relationship, and this does not appear to be dependent on attachment style.

 **Meta-Cognitive Beliefs and Processes.** People with psychosis report more unhelpful metacognitive beliefs than healthy controls (Morrison et al., 2007; Morrison & Wells, 2003). In the present review, three studies explored meta-cognitive beliefs and processes, recruiting a student/general sample (Marlowe et al., 2020b), high non-clinical paranoia sample (Sood & Newman-Taylor, 2020), and individuals with a schizophrenia-related diagnosis (Gumley, Schwannauer, et al., 2014).

 Ontological insecurity (experiencing the self as lacking in coherence, separate from the body, others, and the world) mediated the relationship between attachment anxiety / avoidance and positive (but not negative) psychotic-type experiences (Marlowe et al., 2020b). Cognitive fusion mediated the relationship between attachment and paranoia in an experimental study using attachment imagery priming (Sood & Newman-Taylor, 2020). Insight mediated the relationship between insecure attachment (assessed using the Adult Attachment Interview [Hesse, 2008]) and both positive and negative symptoms at 12 months in the one longitudinal study, using path analysis (Gumley, Schwannauer, et al., 2014).

Marlowe et al. (2020b) obtained a weak overall quality rating and employed weak data analysis, whereas the other two studies obtained moderate quality ratings, utilising strong designs and statistical analyses. These findings suggest that metacognitive processes play a role in the attachment and psychosis relationship, though study replication for each variable is needed. These studies did not explore differences between attachment styles.

***Duration of Untreated Psychosis and Negative Psychotic Symptoms***

Duration of untreated psychosis (DUP – the interval between psychosis onset and commencement of treatment) is a strong predictor of future psychosis symptom severity, relapse and long-term prognosis (Drake et al., 2000). Just one study examined the role of DUP and, using path analysis, found that this fully mediated the relationship between attachment and both positive and negative symptoms at 12 months (Gumley, Schwannauer, et al., 2014). Differences in attachment style were not explored. The same study also found that baseline negative symptoms partially mediated the relationship between attachment and negative (but not positive) symptoms at 12 months. This study obtained a moderate quality rating and used a longitudinal design, and requires replication.

**Discussion**

 The aim of this systematic review was to examine and assess the quality of the literature investigating mediating mechanisms in the relationship between attachment and psychotic experiences, and to present a guide for future inquiry.

***Overview of Findings***

 We found evidence that four variables or groups of variables mediate the relationship between attachment and psychosis: 1) affective factors, 2) cognitive factors, 3) DUP, and 4) negative psychotic symptoms. Most studies tested affective and cognitive variables, and so there is stronger evidence for these. Study replication is needed for DUP and negative symptoms before conclusions can be drawn about the role of these factors.

 Attachment theory assumes that anxious and avoidant attachment styles lead to increased mental health difficulties through affect dysregulation (Mikulincer & Shaver, 2012). Attachment anxiety is associated with hyperactivating strategies (e.g. catastrophising), and attachment avoidance is associated with deactivating strategies (e.g. suppression) (Mikulincer & Shaver, 2007). Both are associated with greater psychotic experiences such as hallucinations and suspiciousness (Dozier & Lee, 1995); hyperactivating strategies intensify negative feelings, and deactivating strategies prohibit the expression and management of emotions (Mikulincer & Shaver, 2012), resulting in exacerbation of psychosis (Berry et al., 2020).

 The present review identified two subcategories of affective factors: affective dysregulation and affective disturbances, consistent with Williams et al.’s (2018) review of the relationship between childhood adversity and psychosis. Hyperactivating strategies (rumination, catastrophising, dwelling on thoughts and feelings) as well as experiential avoidance mediated the relationship between attachment anxiety and psychosis. Deactivating strategies, including experiential avoidance and excessive internal strategies (e.g. coping with problems alone), mediated the relationship between attachment avoidance and psychosis. Secure attachment was associated with less psychotic symptoms through less dysfunctional affect regulation.

 Affect disturbances (stress, emotional distress, fear of intimacy) mediated the relationship between attachment and non-clinical psychosis, with stronger evidence for attachment anxiety than avoidance. In line with attachment theory, it is likely that affective dysregulation and disturbance are not independent, with hyperactivating strategies intensifying emotion, and deactivating strategies suppressing emotion, explaining the differential effects.

 Attachment insecurity is also assumed to lead to increased mental health difficulties through dysfunctional cognitive processes (Mikulincer & Shaver, 2012). Insecurely attached individuals are prone to unhelpful cognitive processes such as self‐criticism, self-doubt, and setting unrealistically high self-standards, all of which are risk factors for mental ill-health (Mikulincer & Shaver, 2012). The present review found four subcategories of cognitive factors, with strong evidence for the mediating role of beliefs about symptoms; self-beliefs and self-esteem; and beliefs about others and the world. Tentative evidence was found for the mediating role of metacognitive processes (cognitive fusion, ontological insecurity, insight).

 Attachment theory assumes that self-beliefs differ by attachment style, specifically that those with an anxious attachment rely on others rather than the self at times of distress which is reflected in negative self-beliefs, whereas those with an avoidant attachment are reluctant to rely on others, reflected in exaggeratedly positive self-beliefs (Mikulincer & Shaver, 2007). In the present review self-beliefs did *not* discriminate between attachment styles. Mikulincer and Shaver (2007) argue that avoidantly attached individuals hold underlying negative self-beliefs, and that positive self-beliefs are a surface level defense strategy that holds aversive underlying self-beliefs out of conscious awareness. In support of this, there is some evidence that such individuals appraise themselves more positively following threatening events (e.g. Hart et al., 2005). In one review, around half of the studies found negative associations between avoidant attachment and self-esteem, suggesting these defenses are not always successful (Mikulincer & Doron, 2016). This suggests that both anxiously and avoidantly attached individuals may struggle to maintain a stable and positive self-view, which would explain the lack of systematic differences in self-beliefs by attachment style in the present review. The present review also found no differences between attachment styles in beliefs about others, the world, and symptoms – negative beliefs consistently played a mediating role in the studies to date. Studies exploring metacognitive processes did not examine differences by attachment style.

 DUP and negative psychotic symptoms were examined in just one study (Gumley, Schwannauer, et al., 2014). Insecure attachment predicted increased psychotic symptomology through longer DUP and negative symptoms at baseline. This suggests that individuals with insecure attachment are less likely to seek support or encounter difficulties when attempting to do so, which increases future symptomology. This study did not explore differences by attachment style, though previous research found that attachment anxiety is associated with increased help-seeking, whereas attachment avoidance is associated with reduced help-seeking (Vogel & Wei, 2005). The combination of negative symptoms and avoidant attachment is likely to be particularly problematic for people with psychosis. The mediating role of negative symptoms at baseline in the relationship between attachment and negative symptoms at 12 months, is also interesting. It may be that attachment avoidance is associated with the early emergence of negative symptoms, which in turn predicts negative symptoms a year later. Exploration of differences by attachment style would again prove informative here. Alternatively, it may be that affective or cognitive confounders are responsible for the apparent role (or conceptually overlap with) negative symptoms, the measurement of which includes assessment of blunted affect, emotional withdrawal, and difficulty in abstract thinking (Kay et al., 1987). Conceptual clarity and carefully aligned measures are needed to distinguish the relative contributions of these factors.

***Strengths***

 This comprehensive review is the first to examine mediating mechanisms between attachment style and psychosis. We included articles regardless of publication status, year of publication, and language. The search strategy was strong and sensitive, utilising subject headings and incorporating screening of references and subsequent citations. The use of the EPHPP quality assessment tool, which was developed for the public health sector and has proven reliability and validity (Thomas et al., 2004), also allows for comparison with the conceptually linked review examining childhood trauma and psychosis (Williams et al., 2018).

***Limitations***

 Many studies were of weak quality, largely due to the use of self-selecting participants, and not controlling for confounders which may have influenced or accounted for observed effects (Kazdin, 2007). Studies consisted mostly of cross-sectional, correlational designs which gathered data at one time point. While this is appropriate for initial exploration of mediating mechanisms, it is not possible to draw firm conclusions about causality, for which longitudinal or experimental methods are required (Kazdin, 2007).

 While participants were recruited from a variety of settings with a range of psychotic experiences, most identified as White and all studies were conducted in developed countries, with the majority conducted in the United Kingdom. This means we cannot generalise results across socio-economic and cultural groups.

***A Guide to Future Inquiry***

 Future studies should address the quality concerns raised in this review by using randomised or systematic sampling, controlling for confounders, employing robust statistical mediation analyses, and utilising longitudinal or experimental designs. It is essential that research is replicated in a wider range of countries and across ethnic groups. In order to progress the field and improve outcomes for people with psychosis, we now need to prioritise a combination of replication, experimental, and clinical outcome studies (see Table 4).

Table 4 about here

Replication / extension studies are required where just one study has been completed to date, all relevant studies have been rated as weak overall using the EPHPP, or mechanisms have only been demonstrated with non-clinical samples. Experimental / longitudinal studies are needed to determine temporal relationships and causal mechanisms where initial studies have collected data at just one time point. Clinical outcome research should explore the impact of psychological interventions for psychosis that target affective and cognitive factors calibrated by attachment style.

***Clinical Implications***

 Individuals with high levels of attachment anxiety or avoidance are likely to be at greater risk of increased psychotic experiences through affective factors, cognitive factors, DUP, and negative psychotic symptoms.

 Cognitive Behavioural Therapy (CBT) is a first line recommended treatment for psychosis (NICE, 2014), and focuses predominately on alleviating distress through cognitive and behavioural change methods, for example reappraising relationships with voices, and facing feared situations (Morrison & Barratt, 2010). Our review supports this focus, having identified cognitive factors as key mediating mechanisms. Based on the current review, affective factors and attachment style are also likely to be valuable treatment targets. Indeed, preliminary evidence suggests that targeting affect regulation benefits people with psychosis, and that while trait attachment style may be a relatively stable construct (Bowlby, 1969/1982), attachment priming and affect regulation skills training may be effective ways to facilitate these changes (Newman-Taylor, 2020; Pitfield et al., 2020; Silva et al., 2020)

 Therapies for psychosis may benefit from calibrating cognitive and affective interventions by attachment style (cf. Bucci et al., 2015; Williams et al., 2018). People high in attachment anxiety are likely to engage in hyperactivating strategies and experience and report higher affective disturbances. These individuals may benefit from support to regulate and reduce the intensity of their emotions, and learn to have confidence in their ability to manage difficult experience. By contrast, people high in attachment avoidance are likely to be overly self-reliant on internal affect regulation strategies, struggle to seek or accept help from others, and not experience or report affective disturbances. These individuals may therefore benefit from learning to recognise and express emotional experiences, and practise accepting support from others.

We did not find differences in cognitive processes by attachment style. Individuals with psychosis and insecure attachment (regardless of type) may benefit from exploring and reframing unhelpful beliefs about symptoms, negative self-esteem, and negative self, other, and world beliefs. The tentative evidence for the role of unhelpful metacognitive processes, DUP and negative symptoms require replication before drawing clinical implications in this context.

Finally, though not a focus of the present review, we note the lack of research examining the role of attachment in individuals at risk of developing psychosis. The limited evidence available suggests that improvement in psychosis-type experiences may be predicted by attachment style (Quijada et al., 2012), and that a reduction in insecure attachment is associated with reduction in symptoms (Quijada et al., 2015). This suggests that attachment style may play a significant role in the illness trajectories of those at risk of developing psychosis. Based on the results of the current review, we recommend that clinicians working with at risk groups assess attachment routinely so we can better understand the role of attachment over the course of people’s psychosis, and consider interventions designed to facilitate attachment security.

**Conclusions**

 This systematic review identified 17 studies that investigated mediating mechanisms in the relationship between attachment style and clinical and non-clinical psychosis. While there are likely to be other mediators than have been identified by the papers in the current review, our results indicate that insecure attachment leads to increased psychosis via four variables or categories of variables. Strong evidence was found for affective and cognitive factors, and preliminary evidence for DUP and negative symptoms. Unlike cognitive factors, affective factors differed by attachment style. The review has clear implications for future research and psychological therapies.

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**Table 1**
*Free Text and Subject Headings used in the Search Strategy*

|  |  |  |  |
| --- | --- | --- | --- |
|  | Terms for psychosis | Terms for attachment | Terms for mediator |
| Free text  | paranoi\* OR persecut\* OR delusion\* OR suspici\* OR psychosis OR psychotic OR schizo\* OR voice\* OR hallucinat\* | attachment\* | mechanism\* OR mediat\* OR pathway\* |
| Medline subject headings  | "Psychotic Disorders" OR "Delusions" OR "Voice" OR "Voice Disorders" OR "Schizophrenia Spectrum and Other Psychotic Disorders" OR "Schizotypal Personality Disorder" OR "Schizophrenia, Paranoid" "Schizophrenia" OR "Psychoses, Substance-Induced" OR "Paranoid Personality Disorder" OR "Paranoid Disorders" OR "Paranoid Behavior" | "Object Attachment" | -† |
| PsycInfo subject headings  | "Acute Psychosis" OR "Paranoia (Psychosis)" OR "Schizophrenia" OR "Chronic Psychosis" OR "Paranoid Schizophrenia" OR "Schizophrenia (Disorganized Type)" OR "Psychosis" OR "Voice" OR "Persecution" OR "Delusions" | "Attachment Disorders" OR "Attachment Behavior" OR "Attachment Theory" | "Mediation" |

*Note*. The Web of Science platform does not utilise subject headings.

†No subject headings were relevant for this term on this database.

**Table 2**

*Inclusion and Exclusion Criteria for Study Selection*

|  |  |  |
| --- | --- | --- |
|  | Inclusion | Exclusion |
| Publication type | Published and unpublished empirical studies | Conference posters, abstracts, reviews and proposals |
| Participants | Participants 18 years and over | Participants under 18 years |
| Measures | Included a measure of attachment style, psychosis, and at least one potential mechanism in this relationship | Did not measure attachment style, psychosis, or at least one potential mechanism in this relationship |
| Analyses | Examined the effect of potential mechanism(s) in the relationship between attachment style and psychosis | Did not examine the effect of potential mechanism(s) in the relationship between attachment style and psychosis |
|  |  |  |

**Figure 1**

*PRISMA Diagram for Paper Selection*

Records identified through database searching
(n = 1138)

(PsycInfo = 359, Medline = 383, Web of Science = 396)

**Screening**

**Identification**

Additional records identified through other sources
(n = 2)

Records after duplicates removed
(n = 780)

Titles and Abstracts screened
(n = 780)

Records excluded for not meeting criteria
(n = 713)

**Eligibility**

**Included**

Full-text articles assessed for eligibility
(n = 67)

Full-text article not available†

(n = 1)

Full-text articles excluded for not meeting criteria (n = 49)

Review (n = 16)

Poster (n = 3)

No attachment measure (n = 3)

No psychosis measure (n = 4)

No exploration of mediating mechanisms (n = 5)

No exploration of mediating mechanisms between attachment-psychosis (n = 16)

Mean age under 18 (n = 2)

Studies included in narrative synthesis
(n = 17)

†University librarians were unable to locate the full-text and there were no available correspondence details for author or journal.

**Table 3**

*Summary of Study Data Extraction*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Author(s), date, country | Sample (M = mean, SD = standard deviation) | Design and analysis | Attachment measure | Mediator or mechanism measure(s) | Psychosis measure(s) | Main (relevant) findings |
| Ascone et al. (2020); Germany | Psychotic disorder (*n* = 60). Recruited from inpatient, outpatient, and community. Aged 18 - 65 years (M = 40.2, SD = 11.7). 63.3% female. Healthy controls (*n* = 40).  | Cross-sectional; SEM | Relationship Scales Questionnaire  | Cognitive Emotion Regulation Questionnaire  | Paranoia Checklist | Attachment anxiety and paranoia fully mediated by hyperactivating affect regulation strategies in psychosis sample (B = .24, *p*=.02), but not in healthy controls. Attachment avoidance and paranoia not mediated by blaming others.Attachment style did not correlate with self-blame.  |
| Castilho et al. (2017); Portugal | Psychotic disorder (*n* = 37). Recruited from outpatient and inpatient.Aged 19 – 52 years (M = 37.14, SD = 7.27). 18.92% female. | Cross-sectional; Mediation (Baron & Kenny, 1986)  | Experiences in Close Relationships- Relationship Structure | Acceptance and Action Questionnaire-II | Paranoia Checklist | Attachment anxiety (in relation to mother) and paranoid ideation frequency partially mediated by experiential avoidance, relationship reduced from β = 2.84, *p*<.05, toβ= 1.42, *p*>.05 with experiential avoidance.No other attachment style associated with experiential avoidance or paranoia. |
| Cole et al. (2017); UK | Individuals hearing voices in community (*n* = 180). Aged 18 – 65 years (M = 36.65, SD = 11.06). 62% female. | Cross-sectional; Path analysis | Experiences in Close Relationships-Revised | Brief Core Schema Scale; Beliefs about Voices Questionnaire-Revised  | Hamilton Program for Schizophrenia Voices Questionnaire | Attachment style and voice distress mediated by (i) negative self and other schema, and (ii) negative self and other schema and persecutory beliefs about voices (*ꭙ²* = 11.38, *p*=.08).  |
| Author(s), date, country | Sample | Design and analysis | Attachment measure | Mediator or mechanism measure(s) | Psychosis measure(s) | Main (relevant) findings |
| Dominguez-Pereira (2019); USA | In or previous romantic relationship (*n* = 210). Recruited from community.Aged 19 – 74 years (M = 36.8, SD = 11.64). 75.7% female. | Cross sectional; Mediation (Baron & Kenny, 1986), normal theory test | Experiences in Close Relationships  | Fear of Intimacy Scale | Multi-dimensional Jealousy Scale  | Attachment anxiety and suspicious jealousy mediated by fear of intimacy (B = .06, *p*=.005). Attachment avoidance and suspicious jealousy not mediated by fear of intimacy. |
| Gumley, Schwannauer, et al. (2014); UK | Schizophrenia or related diagnosis (*n* = 68). Recruited from inpatient and outpatient. Age range not reported(M = 24.64 years, SD = 7.08). 31.6% female. | 12-month cohort study; Path analysis  | Adult Attachment Interview | DUP; Positive and Negative Syndrome Scale | Positive and Negative Syndrome Scale | Attachment and positive symptoms at 12 months fully mediated by insight and DUP (*ꭙ²*=13.82, *p*=.06), not by baseline positive symptoms.Attachment and negative symptoms at 12 months partially mediated by insight, DUP, and baseline negative symptoms (*ꭙ*²=9.89, *p*=.09). |
| Hajduk and Heretik (2016)a; Slovakia | Students (*n* = 176). Aged 18 – 40 years (M = 21.62, SD = 2.55). 68.8% female. | Cross-sectional; Mediation (Baron & Kenny, 1986) | Relationship Questionnaire | Rosenberg Self-esteem Scale; Depression, Anxiety and Stress Scale  | Paranoia Scale | Attachment anxiety and subclinical paranoia partially mediated by emotional distress, relationship reduced from B = 1.13, *p*<.001 to B = .58, *p*<.01 with emotional distress. Attachment avoidance and subclinical paranoia not mediated by emotional distress. Attachment and subclinical paranoia not mediated by self-esteem.Controlled for gender and relationship status.  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Author(s), date, country | Sample | Design and analysis | Attachment measure | Mediator or mechanism measure(s) | Psychosis measure(s) | Main (relevant) findings |
| Hugill et al. (2017); UK | First-time primary caregivers in community (*n* = 134). M = 31 years, range, SD not reported. 94% female.  | Cross-sectional; Mediation (Preacher & Hayes, 2004)  | Experiences of Close Relationships Scale-Short Form | Parental Stress Scale; Parenting Sense of Competence Scale | Schizotypal Personality Questionnaire-Brief Revised | Attachment anxiety and schizotypy mediated by parenting stress (B = .36,), medium effect (*b* = .11). Attachment avoidance and schizotypy mediated by parenting stress (B = .37), medium effect (*b* = .10).Attachment and schizotypy not mediated by sense of parental competence. No significant difference when controlling for multiple confounders. |
| Jones (2015); UK | First-episode psychosis with clinical diagnosis (*n* = 51). Recruited from outpatient. Aged 16 – 35 years (M = 22.45, SD = 4.29). 41.2% female.  | Cross-sectional; Mediation (Preacher & Hayes, 2008)  | Relationship Questionnaire  | Regulation of Emotion Questionnaire | Positive and Negative Syndrome Scale | Dismissing attachment and positive symptoms partially mediated by internal functional strategies (β = -.15). Fearful/secure attachment and positive symptoms not mediated by affect regulation. Dismissing attachment and hallucinations not mediated by affect regulation. Fearful attachment style and hallucinations mediated by internal dysfunctional strategies (β = .30). Secure attachment and hallucinations fully mediated by less internal dysfunctional strategies (β = -.16).  |
|  |  |  |  |  |  |  |
| Author(s), date, country | Sample | Design and analysis | Attachment measure | Mediator or mechanism measure(s) | Psychosis measure(s) | Main (relevant) findings |
| Marlowe et al. (2020b); Australia | General population recruited through university and social media (*n* = 298). Aged 18 – 64 years (M = 33.08, SD = 10.65). 74.83% female. | Cross sectional; Hierarchical multiple regression (Baron & Kenny, 1986) | Psychosis Attachment Measure  | Ontological Insecurity Scale (OIS) | Community Assessment of Psychiatric Experiences  | Attachment (anxiety and avoidance) and positive psychotic-like experiences mediated by OIS, relationship became insignificant with OIS (avoidance reduced from β = .15 to β = .06; anxiety reduced from β = .37 to β = .07). Attachment and negative psychotic-like experiences not mediated by OIS.Controlled for demographics and mental health history. |
| Martinez et al. (2020); UK | General population (*n* = 1,121).Aged 18 – 86 years (M = 47.8, SD = 17.2). 50.7% female.  | Cross-sectional; SEM | Relationship Questionnaire  | Self-esteem Rating Scale-Short Form; Facial Trust Detection Task | Paranoia and Deservedness Scale-Revised  | Attachment anxiety and paranoia mediated by negative self-esteem β = .064, *p*<.001 and mistrust bias β = .003, *p*<.001. Attachment avoidance and paranoia mediated by mistrust bias β = .003, *p*<.001, not self-esteem. |
| Pickering et al. (2008); UK | Students (*n* = 503).Aged 18 - 63 years (M = 20.9, SD = 5.22). 70% female.  | Cross-sectional; Mediation (Baron & Kenny, 1986), Sobel test | Relationship Questionnaire  | Self-Esteem Rating Scale; Negative Events Scale; Locus of Control Scale  | Persecution and Deservedness Scale | Attachment anxiety and paranoia partially mediated by negative self-esteem (Sobel’s z = 10.57, *p*<.001), anticipation of threat (z = 6.83, *p*<.001) and powerful others (z = 5.99, *p*<.01).Attachment avoidance and paranoia partially mediated by negative self-esteem (z = 5.45, *p*<.001), anticipation of threat (z = 3.19, *p*<.001) and powerful others (z = 2.41, *p*<.01). |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Author(s), date, country | Sample | Design and analysis | Attachment measure | Mediator or mechanism measure(s) | Psychosis measure(s) | Main (relevant) findings |
| Pilton et al. (2016); UK | Psychotic disorder with voices (*n* = 55). Recruited from outpatient and community. Aged 21 – 66 years (M = 42.16, SD = 11.33). 20% female. | Cross-sectional; Mediation (Preacher & Hayes, 2004)  | Psychosis Attachment Measure | Beliefs about Voices Questionnaire-Revised; Voice and You | Psychotic Symptom Rating Scales–Auditory Hallucinations Scale | Anxious attachment and voice-related distress mediated by voice-malevolence (B = .15, *p*=.03), voice-omnipotence (B = .14, *p*=.02) and voice-resistance (B = .21, *p*=.01), not hearer-distance or voice-dominance.No association between avoidant attachment and voice distress.  |
| Robson and Mason (2015); UK | Current voice hearers in community (*n* = 44).Aged above 18 years (M = 39.6, SD = 11.7). 66% female.  | Cross-sectional; Mediation (Preacher & Hayes, 2004)  | Psychosis Attachment Measure | Beliefs About Voices Questionnaire – Revised; Voice and You; Persecution and Deservedness Scale  | Self-reported voice distress | Attachment anxiety and voice related distress fully mediated through voice dominance (B = .09), voice hearer distance (B = .07), voice omnipotence (B = .08), voice malevolence (B = .08), voice resistance (B = .06), persecution (B = .09) and deservedness of persecution (B = .05), and partially mediated through voice intrusiveness (B = .05), *p*s<.01.Attachment avoidance and voice related distress fully mediated through voice dominance (B = .11), voice intrusiveness (B = .08), voice omnipotence (B = .11), voice malevolence (B = .09), persecution (B = .13) and deservedness of persecution (B = .09), *p*s<.01, not voice resistance or hearer distance. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Author(s), date, country | Sample | Design and analysis | Attachment measure | Mediator or mechanism measure(s) | Psychosis measure(s) | Main (relevant) findings |
| Scott et al. (2020); Australia | Schizophrenia spectrum disorder and voices (n = 140). Recruited from inpatient, outpatient, and community. Aged 18 - 66 (M = 36.7, 12.83). 43% female. | Cross-sectional; SEM  | Psychosis Attachment Measure | Brief Core Schema Scale | Self-reported negative voice frequency | Attachment anxiety and negative voice hearing content mediated through negative self-schema *ps*<.001.Attachment avoidance and negative voice hearing content not mediated through negative self-schema. |
| Sood and Newman-Taylor (2020); UK | High non-clinical paranoia, students / general population (*n* = 117). Aged 18 - 65 years (M = 21.6, SD = 6.07). 71.79% female. | Randomised experiential design; Mediation (Hayes, 2018)  | Experiences in Close Relationships  | Cognitive Fusion Questionnaires | Adapted Paranoia Checklist | Attachment imagery and paranoia mediated by cognitive fusion (B = 2.64, CI [1.01, 4.66]). Controlled for time 1 variables (paranoia and fusion). |
| Udachina and Bentall (2014); UK  | Students (n = 302). M = 22.01 years, range, SD not reported. 74.17% female.  | Cross sectional; SEM | Relationship Questionnaire | Acceptance and Action Questionnaire-II; Self-Esteem Rating Scale-Short Form | Persecution and Deservedness Scale; Persecutory Ideation Questionnaire | Attachment and paranoia mediated by (i) negative self-esteem and (ii) negative self-esteem and experiential avoidance *ps*<.001. Well-fitting model TLI = .96.  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Author(s), date, country | Sample | Design and analysis | Attachment measure | Mediator or mechanism measure(s) | Psychosis measure(s) | Main (relevant) findings |
| Wickham et al. (2015); UK | Schizophrenia spectrum disorder (n = 176). Recruited from inpatient, outpatient and community. Aged 17 – 77 years (M = 38.23, SD = 11.78). 30.11% female.  | Cross sectional; Mediation (Preacher & Hayes, 2008) | Relationship Questionnaire  | Self-esteem Rating Scale; Locus of Control Scale  | Persecution and Deservedness Scale; Positive and Negative Syndrome Scale | Attachment anxiety and paranoia partially mediated by negative self-esteem using PaDS (ß= .14, *p*<.001) and PANSS (ß=.09, *p*=.006). Attachment avoidance and paranoia fully mediated by negative self-esteem using PaDS (ß=.11, *p*=.001) and PANSS (ß=.07, *p*=.01).Controlled for age, gender, and hallucinations. Attachment did not correlate with hallucinations. |

*Note*. SEM = Structural Equation Modelling. DUP = Duration of Untreated Psychosis.

aThis paper is written in Slovak. An author of the paper translated the results section to English and answered questions to enable data extraction and quality assurance however, the full-text has not been accessed for this systematic review.

**Figure 2**

*Summary of the Mediating Mechanisms Underlying the Insecure Attachment and Psychosis Relationship*

aEvidence for non-clinical psychosis only

bTentative evidence

cEvidence for clinical psychosis only

Affective factors

Dysfunctional affective regulation (hyperactivating strategies, experiential avoidance)

Affective disturbances (fear of intimacy, emotional distress, stress)a

Cognitive factors

Negative beliefs about voices

Negative self-esteem and self-beliefs

Negative beliefs about other and the worlda

Metacognitive processes (ontological insecurity, insight, fusion)b

Duration of untreated psychosis and negative symptomsbc

Clinical / non-clinical psychosis

Affective factors

Dysfunctional affective regulation (excessive self-reliance, experiential avoidance)

Affective disturbances (stress)a

Cognitive factors

Negative beliefs about voices

Negative self-esteem and self-beliefs

Negative beliefs about other and the worlda

Metacognitive processes (ontological insecurity, insight, fusion)b

Duration of untreated psychosis and negative symptomsbc

Attachment anxiety

Attachment avoidance

**Table 4**

*Research Priorities in Understanding Causal Mechanisms in the Attachment-Psychosis Relationship, and Impact of Clinical Interventions*

|  |  |
| --- | --- |
| Study type | Research questions |
| Replication / extension studies*Ensuring study quality by controlling for confounders and recruiting participants representative of target population* | * Do affective disturbances mediate the relationship between attachment (anxiety and avoidance) and psychosis in clinical samples? *(Currently only non-clinical evidence)*
* Do metacognitive processes (ontological insecurity, insight, fusion), duration of untreated psychosis, and negative symptoms mediate the relationship between attachment (anxiety and avoidance) and psychosis in clinical samples? *(Currently only evidence from one study for each mediator)*
* Do beliefs about voices, others, and the world mediate the relationship between attachment (anxiety and avoidance) and psychosis in clinical samples? *(Currently only weak evidence)*
 |
| Experimental / longitudinal studies*(No direct evidence to date)* | * Do affective regulation strategies, affective disturbances, negative beliefs about voices, negative self-esteem and self-beliefs, negative other and world beliefs, and ontological insecurity mediate the relationship between attachment (anxiety and avoidance) and psychosis in experimental or longitudinal studies?
 |
| Clinical outcome studies*(No direct evidence to date)* | * Can people with psychosis and attachment anxiety learn strategies to regulate and reduce the intensity of their emotions, and does this reduce psychosis and associated intensity of distress?
* Can people with psychosis and attachment avoidance learn to improve their emotional expression and practise accepting support from others, and does this reduce psychosis and associated intensity of distress?
* Can people with psychosis and insecure attachment (anxious and avoidant) learn to reframe unhelpful beliefs about symptoms, negative self-esteem, and negative self, other, and world beliefs, and does this reduce psychosis and associated intensity of distress?
 |