



Published: January 31, 2024

**Citation:** van Bussel EMM, Burghouwt D, et al., 2024. Assessment of Attachment in Psychosis: The Validity of the Psychosis Attachment Measure, Medical Research Archives, [online] 12(1).

<https://doi.org/10.18103/mra.v12i1.5005>

**Copyright:** © 2024 European Society of Medicine. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

**DOI**

<https://doi.org/10.18103/mra.v12i1.5005>

**ISSN:** 2375-1924

RESEARCH ARTICLE

## Assessment of Attachment in Psychosis: The Validity of the Psychosis Attachment Measure

drs. E.M.M. van Bussel<sup>\*,1,3</sup>, drs. D. Burghouwt<sup>2</sup>, drs. B.C. van Aken<sup>3</sup>, dr. I.E.M.G. Willems<sup>4</sup>, prof. dr. C.L. Mulder<sup>3,5</sup>, dr. A.I. Wierdsma<sup>3</sup>

<sup>1</sup>GGZ Oost Brabant, Institute for Mental Health, Oss, the Netherlands

<sup>2</sup>GGZ Breburg, Institute for Mental Health, Tilburg, the Netherlands

<sup>3</sup>ESPRI, Department of Psychiatry, Erasmus MC, Rotterdam, the Netherlands

<sup>4</sup>GGZ Eindhoven, Institute for Mental Health, Eindhoven, the Netherlands

<sup>5</sup>Parnassia Psychiatric Institute, Rotterdam, the Netherlands

\*Corresponding author: [emm.van.bussel@ggzooostbrabant.nl](mailto:emm.van.bussel@ggzooostbrabant.nl)

### ABSTRACT

**Background.** Attachment has become a central construct in explanatory models of psychosis. The Psychosis Attachment Measure is currently the most widely used measure for attachment in a population with a psychotic disorder. However, concerns have been raised about its psychometric properties. In addition, there are two perspectives to operationalize attachment: dimensional and categorical. The categorical method offers added value for the assessment of disorganized attachment which has been mostly linked with vulnerability to psychosis.

**Aim.** The aims of this study were to re-evaluate the structural and construct validity of the dimensional and categorical approaches of the Psychosis Attachment Measure in a Dutch sample (N=287).

**Results.** Confirmatory factor analysis indicated poor fit indices for the two-factor model with low loadings of the reversed questions of the Psychosis Attachment Measure on the avoidance factor. Removing these items improved model fit to conventional threshold values. Latent profile analyses suggested a four-class solution: secure, preoccupied, dismissive-avoidant, and disorganized attachment. The construct validity of both approaches was largely in line with expectations.

**Conclusion.** Both the dimensional and categorical perspective of attachment in psychosis may be used to gain a better understanding of the complexities in the attachment system.

**Keywords:** attachment (dimensional and categorical), psychosis, schizophrenia, validation.

## 1. Introduction

Attachment refers to the universal human need to form and manage emotional bonds with significant others<sup>1,2</sup> and involves a complex interaction between genetic, biological, developmental and environmental factors<sup>3</sup>. Attachment has become a central construct for understanding adult psychopathology and interpersonal problems<sup>4,5</sup>, and it has been argued that attachment theory can help extend existing models and conceptualizations of psychosis<sup>6,7</sup>. While the link between developmental adversity and psychosis is well established<sup>8</sup>, attachment has been identified as a key potential mediating factor<sup>4,6</sup>. In addition, research in psychosis suggests that attachment measures correlate not only with positive psychotic symptoms<sup>9</sup> and depressive symptoms<sup>10</sup>, but also with mentalizing<sup>11</sup>, social functioning<sup>12</sup>, personal recovery<sup>13</sup> and working alliance<sup>4</sup>.

Bowlby<sup>14</sup> describes attachment theory as a life span theory based on the assumption that early experiences lead to the formation of internal working models consisting of mental representations of the self and others. These working models are

carried forward into adulthood, affecting the development not only of current and future stress regulation, but also of interpersonal functioning and relationships<sup>15</sup>. Research suggests that there are two major dimensions of insecure attachment: anxiety (about separation, abandonment or insufficient love) and avoidance (of intimacy, dependency and emotional expressiveness)<sup>16-18</sup>. Bartholomew<sup>19</sup> provided an interpretation of these dimensions in terms of Bowlby's<sup>20</sup> ideas about internal working models of self and others. She proposed that the anxiety dimension be conceptualized as "model of self" (positive versus negative) and the avoidance dimension as "model of others" (positive versus negative). Combinations of the anxiety and avoidance dimensions define four attachment patterns or categories in a two-dimensional space (see Figure 1): people with positive models of self and others are "secure"; those with positive models of others and negative models of self are "preoccupied" (or anxious-ambivalent<sup>21</sup>); those with a negative model of others but a positive model of self are "dismissing-avoidant" (or dismissive<sup>22</sup>); and those with negative models of both self and others are "fearful-avoidant" (or disorganized<sup>16,18</sup>).

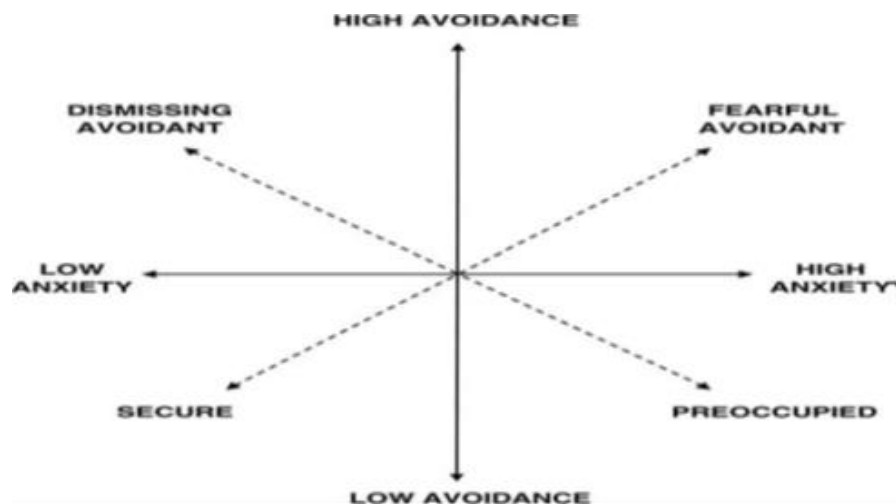


Figure 1. Diagram of the two-dimensional space defined by attachment anxiety and avoidance, showing the quadrant names suggested by Bartholomew<sup>19</sup>, adapted from Bartholomew & Horowitz<sup>23</sup>.

Several instruments have been developed to measure adult attachment. Not only can adult states of mind with respect to attachment and attachment styles be assessed with self-report-based tools or interview-based (or narrative) assessments, each of these two approaches has multiple exemplars<sup>16</sup>. Self-report measures are the least time consuming and easy to administer<sup>24</sup>. Although self-reports do not generate detailed descriptions of attachment figures and social relationships, they can be used as

indicators of the way adults recount attachment-relevant descriptions and stories<sup>16</sup>.

In order to capture both the anxiety and avoidance dimension, Berry and colleagues<sup>25</sup> developed the Psychosis Attachment Measure (PAM) which is currently the most widely used measure of attachment in psychosis<sup>9,26</sup>. However, concerns have been raised about the psychometric properties of the PAM and different approaches were proposed to overcome these problems. Most validation studies

of the PAM investigated the two-dimensional structure via Principal Component Analysis (PCA)<sup>4,10,24</sup>. Olbert et al.<sup>27</sup> observed that generally PCA is not considered methodologically sound for factor analysis and consequently analyzed PAM responses using Confirmatory and Exploratory Factor Analysis (CFA and EFA). Results did not yield evidence of the two-dimensional structure, especially because reverse-scored avoidance items showed poor factor loadings. Likewise, two studies have reported poor internal consistency for the avoidance attachment dimension, with Cronbach's alpha ranging from 0.55 to 0.57<sup>13,27</sup>.

Other approaches have been proposed to address the structural validity problems of the PAM. Bucci et al.<sup>3</sup> used latent profile analysis (LPA) to identify four categories of attachment (among which disorganized or fearful-avoidant attachment). However, Mikulincer and Shaver<sup>16</sup> strongly argue in favor of the two-dimensional (anxiety and avoidance) measures to retain information about differences within the dimensions. The authors state that effects of fearful-avoidant/disorganized attachment could be analyzed using regression analysis, as this would make it possible to determine whether interaction between the two dimensions added to their main effects. Other authors suggested that, rather than assessing differences in attachment along the anxiety and avoidance dimensions, it would be better to assess them along the dimensions of security versus insecurity and anxiety versus avoidance<sup>28-30</sup>.

Olbert et al.<sup>27</sup> opted for an unidimensional, anxiety-based scale comprising a subset of the original PAM items. In order to hold on to the dimensional factors and improve the internal consistency of the avoidance dimension of the PAM, one earlier Dutch validation study deleted two items and used one item in both subscales<sup>24</sup>. In contrast, Pollard et al.<sup>26</sup> developed a revised PAM: a three-dimensional version including anxious, avoidant and disorganized attachment. Mikulincer and Shaver<sup>16</sup> acknowledge the likely inter-correlation between these specialized scales, but expect them to be sufficiently different in their associations with clinical and other outcomes to be useful in future research.

However, these alternatives to address poor model fit of a two-dimensional structure of the PAM by themselves appear to be questionable. A unidimensional or three-dimensional approach does not fit Bartholomew's attachment model, thereby complicating the statistical modelling of attachment orientations and the effects of insecure attachment styles. Construct validity cannot be assessed using a uni-dimensional measure as high and low scores on

this scale could both show outcome effects related to the latent anxiety and avoidance dimensions.

More complicated multi-dimensional models are bound to violate statistical assumptions of multicollinearity and independence. In addition, the joint effect of anxious and avoidant attachment may be difficult to interpret, as an interaction effect in regression analysis is a product term, whereas fearful-avoidant or disorganized attachment is characterized by high scores on both dimensions, which is additive ("different" not "more"). Regression models with categorical predictor variables may be better suited to analyze effects of normal and problematic attachment, especially when the assumption of linearity of effects is problematic. With attachment as a dependent concept – as distinct from attachment as an independent variable - structural equation models or multinomial logistic regression analyses are needed to model the effects on attachment of genetic, biological, developmental and environmental predictors. In this perspective, we do not have to choose between categories or continuous scores, but may use both to get a better understanding of the complexities in the attachment system.

In response to concerns mentioned above, this study aimed to re-evaluate the psychometric properties of the PAM in a sample of Dutch outpatients with a psychosis spectrum disorder. More specifically, we aimed to re-evaluate the structural validity of the dimensional and categorical perspectives of the PAM; and to assess construct validity by investigating the associations between PAM scores and positive and negative symptoms of psychosis, remission, depressive symptoms, social cognition, service-engagement and resilience. Previous research suggests that insecure attachment styles are correlated with positive and depressive symptoms but are not associated with negative symptoms<sup>4,9,10,24</sup>. We expected the insecure attachment styles to be negatively correlated with social cognition<sup>31</sup>, service engagement<sup>4,10</sup>, and resilience<sup>32</sup>.

## 2. Method

### SUBJECTS

This study had a cross-sectional design using baseline data from the UP's study: an ongoing Dutch longitudinal multicenter cohort study on recovery from psychotic disorders<sup>33</sup>. The UP's study is a collaboration between the Erasmus University Medical Center and mental health institutions in the Southwestern Netherlands. Clients were recruited from Flexible Assertive Community Treatment (FACT) teams. Eligible participants had to meet the

following criteria: (1) age between 18 and 65 years; (2) fulfilling the DSM 5 criteria for a psychotic disorder: brief psychotic disorder, schizophreniform disorder, schizophrenia, schizoaffective disorder, delusional disorder, psychotic disorder due to substance use, or otherwise unspecified psychotic disorders; (3) an understanding of Dutch sufficient to complete the measurements; and (4) the capacity to provide informed consent. Details of the UP's study are described in the design protocol<sup>33</sup>. The current study included 314 participants (complete cases N=287).

## ASSESSMENTS

### Attachment

Attachment was assessed using the Psychosis Attachment Measure (PAM)<sup>4,25</sup>. The PAM is a self-report questionnaire that contains positively worded items concerning general relationships (not specifically romantic relationships). There are three self-report versions of the PAM (attachment in general relationships, attachment towards a key worker, and attachment in relation to the mental health team) and two informant versions (key worker and team). In this study, the self-report version in general relationships was used. All versions of the PAM consist of 16 items that were derived from other instruments for attachment self-report that refer to thoughts, feelings and behaviors in relationships with important others, with eight avoidance items and eight anxiety items. The items contain 4 answer categories (0 = not at all to 3 = very much). Several validation studies have been realized in clinical samples, reporting Cronbach's alpha coefficients ranging from 0.70-0.86 for the anxiety dimension and 0.55-0.91 for the avoidance dimension<sup>13,27,34</sup>.

### Symptom severity

Severity of symptoms of psychotic disorders was assessed using the PANSS-8, i.e., eight core items selected from the 30-item Positive and Negative Syndrome Scale as criteria for clinical remission<sup>35</sup>. The PANSS-8 defines remission as ratings of mild or less (scores of 3 or < 3) over the past two weeks on all items whose scores range from 1 (absent) to 7 (extreme)<sup>36,37</sup>. Previous studies showed the observer-rated PANSS-8 to be a reliable and valid scale in a population with psychotic disorders: Cronbach's alpha-values were 0.70 or higher and Pearson's correlation coefficients between PANSS-8 and the original 30-items version were > 0.85<sup>38</sup>. In this study internal consistency in the one factor model was acceptable (Cronbach's alpha = 0.76; McDonald's Omega = 0.73). Although reliability estimates for the three-item positive and negative subscales were moderate (0.62 to 0.80), we used

these scores in addition to the PANSS-8 total score and to the remission outcome to explore positive and negative symptoms and their associations with attachment styles.

Depressive symptoms were assessed by the Patient Health Questionnaire PHQ-9, a screening questionnaire developed by Kroenke et al.<sup>39</sup> containing nine questions about the symptoms of major depressive disorder (MDD). Respondents are asked to rate each of the items on a scale of 0 to 3 on the basis of how much a symptom has bothered them over the past 2 weeks (0 = not at all, 1 = several days, 2 = more than half the days, 3 = nearly every day) after which a summed score of the nine questions is calculated<sup>40</sup>. The PHQ-9 is a reliable and valid instrument for screening MDD<sup>39,41</sup>.

### Social cognition

The Hinting Task (HT) was used to examine clients' ability to infer other people's true intentions<sup>42-44</sup>. The ten-items task was developed to express this social-cognitive skill or theory of mind in people with schizophrenia<sup>42</sup>. In our study, the interviewer read passages aloud that presented an interaction between two characters, which ended with one of the characters saying something with an implicit message. Participants were asked what the character hinted at. If the first response provided was correct, two points were scored. One point was scored in case a correct answer was given after a second hint was delivered and 0 points were scored for incorrect responses or unanswered passages. The Hinting Task showed strong psychometric properties regarding test-retest reliability, utility as a repeated measure, relation to functional outcome, and internal consistency<sup>45</sup> and was sensitive to mentalizing deficits in psychosis<sup>46</sup>. Internal consistency of the task in this study was good (Cronbach's Alpha and MacDonaldis Omega = 0.81).

### Service engagement

To assess service engagement we used the Service Engagement Scale (SES), including 14 questions to measure four domains: being available for arranged appointments (availability, 3 items), actively participating in the management of illness (collaboration, 3 items), seeking help when needed (4 items), and the client's attitude toward taking medication (treatment adherence, 4 items)<sup>47</sup>. Clients are rated on a four-point Likert-type scale, with 0 = not at all or rarely, 1 = sometimes, 2 = often, and 3 = most of the time. Positively worded questions are reverse scored so that higher scores reflect clients' greater levels of difficulty engaging with services. In this study, internal consistency for

total scores was good (Cronbach's alpha and MacDonalds omega = 0.86) and was moderate or good for subscales (ranging from 0.615 to 0.817).

### Resilience

Resilience was assessed by the Brief Resilience Scale (BRS), a self-report questionnaire developed to investigate a person's ability to bounce back or recover from stress<sup>48</sup>. An equal number of positively (items 1, 3, and 5) and negatively worded items (2, 4, and 6) were included to reduce the effects of social desirability and positive response bias. Participants were asked to indicate their level of agreement on a five-point scale: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree. After the negatively worded items have been reverse-coded, the total BRS score was calculated by taking the mean of the six items with a higher score indicating greater resilience. The original BRS and the Dutch language version have both demonstrated good psychometric quality and reliability ( $\alpha = 0.80-0.91$ )<sup>49</sup>. In this study, BRS scores were normally distributed and internal consistency estimates were acceptable (Cronbach's Alpha = 0.76 and MacDonalds Omega = 0.75).

### DATA ANALYSIS

#### Structural validity

Using the R statistical package, we explored item response frequencies and means and standard deviations for total scale and anxiety and avoidance subscale scores. To account for the ordinal structure of PAM items, polychoric correlations were calculated to examine first order correlations between items associations. Next, to evaluate the two-factor structure of the attachment concept, we used the Lavaan package<sup>50</sup> to conduct confirmatory factor analysis (CFA). Model fit was assessed using the following: the relative chi-square at a critical value of 2<sup>51</sup>; the Comparative fit index (CFI) and related Tucker Lewis Index (TLI) at the conventional threshold of  $> 0.90$ ; and the Root Mean Square Error of Approximation (RMSEA) with a cutoff value of 0.05, and the Standardized Root Mean Square Residual (SRMR) with a cutoff value of 0.08<sup>52,53</sup>. Internal consistency estimates were calculated as Cronbach's alpha for ordinal items and as McDonald's Omega. In addition to this dimensional approach, Latent Profile Analysis using the Mclust package<sup>54</sup> was used to evaluate a four class model according to the Bartholomew and Horowitz class structure<sup>23</sup>. Additionally, we created

four attachment classes in accordance with methods used by Collins and Feeney et al.<sup>55</sup>, van Dam et al.<sup>56</sup> and Steffanowski et al.<sup>57</sup>, and also created a median split on both PAM dimensions. In view of space limitations, presentation of results is limited to selected tables and graphics; additional information is available on request from the first author.

#### Construct validity

The dimensional and categorical representations of attachment styles were both used to predict a range of outcomes that we expected to vary by dimensional or class position. To assess the relationships of attachment indices and classifications with positive and negative symptoms, remission, depression, social cognition, therapeutic relationship and resilience, we used first-order and partial correlations with 95% bootstrapped confidence intervals and general linear models. We compared the LPA classes with three other attachment categorizations of the PAM, namely the method used by Collins and Feeney<sup>55</sup>, van Dam et al.<sup>56</sup>, and a median split on both PAM dimensions. The categorization method by Steffanowski et al.<sup>57,58</sup> led to a very different division of classes compared to the other methods and was therefore not included in the assessment of construct validity.

## 3. Results

### DEMOGRAPHIC AND CLINICAL CHARACTERISTICS

Table 1 shows the demographic and clinical characteristics of the UP's sample (N=314). In the final analyses, only minor differences were found between the response sample and the complete sample (N=287). At baseline, the mean age of participants was 41 years, 66 % were male and 13% had completed only elementary school. The initial diagnoses were mainly schizophrenia (45.6%) or psychosis not otherwise specified (24.8%). Mean duration of care was 15 years (SD 10.6). The mean score on the PANSS-8 was low (1.97, SD=0.77) with 61.8% of participants in remission. On the PHQ-9, the mean score was below 10 (7.85, SD=5.69), however, 31.8% had a score above 10 which indicates a positive screening for Major Depressive Disorder. The HT was scored at 75% of the maximum value, suggesting good general social cognition overall. Mean SES scores indicate good service engagement, especially concerning collaboration and help seeking. And the mean on the BRS was close to neutral (2.88, SD=0.76).

**Table 1.** Demographic and clinical characteristics of the UP's sample (valid N, Percentages, means and SD)

	<b>Sample</b> Valid N, Percentages, means and SD		<b>Complete PAM cases</b> Valid N, Percentages, means and SD	
<b>Gender (male)</b>	314	66.2%	287	66.8%
<b>Age (mean, SD)</b>	314	41.4 (12.2)	287	41.4 (12.3)
<b>Education</b>	285		278	
- Elementary school	37	13.0%	36	12.9%
- High school	104	36.5%	103	37.1%
- Community college	110	38.6%	106	38.1%
- Higher professional education/ University	32	11.2%	32	11.5%
<b>First diagnosis</b>	298		278	
- Schizophrenia	136	45.6%	127	45.7%
- Brief psychotic disorder	41	13.8%	107	14%
- Psychosis NOS	74	24.8%	68	24.5%
- Other	47	15.8%	44	15.8%
<b>Duration of received care (mean years, SD) &lt; 10 years</b>	292	15.2 (10.6)	271	15.1 (10.5)
	116	36.9%	107	38.1%
<b>PANSS-8</b>	280	1.97 (0.771)	276	1.97 (0.768)
- Positive	279	2.07 (1.043)	275	2.05 (1.042)
- Negative	280	2.10 (1.040)	276	2.09 (1.035)
Remission	280	61.8%	276	62.3%
<b>PHQ-9</b>	299	7.85 (5.692)	287	7.83 (5.755)
<b>HT</b>	287	14.39 (4.199)	282	14.38 (4.224)
<b>SES</b>	248	8.82 (6.546)	239	8.62 (6.449)
- Availability	275	0.98 (1.402)	266	0.95 (1.384)
- Collaboration	272	2.36 (1.954)	263	2.31 (1.948)
- Help seeking	260	3.72 (2.699)	254	3.70 (2.699)
- Adherence	267	1.51 (1.879)	258	1.48 (1.863)
<b>BRS</b>	284	2.88 (0.761)	281	2.86 (0.763)
Total	314		287	

PANSS-8; Positive and Negative Symptom Scale-8, PHQ-9; Patient Health Questionnaire-9, HT; Hinting Task, SES; Service Engagement Scale, BRS; Brief Resilience Scale.

**PAM ITEMS AND INDICES**

Table 2 shows the responses for the items related to anxious attachment and for the avoidant-oriented items; for ease of comparison, response categories for the reversed items have been adjusted. Most indicators of anxious attachment, and the closing item, which was avoidant related, were right skewed. Inter-item correlations showed near zero and small negative correlations between reversed items and other avoidant related items. Mean score for the 8-item avoidance dimension was 1.47

(SD=.47) and for the 5-item version excluding reversed items: 1.24 (SD=.58). These values were slightly higher than the mean score on the 8-item PAM anxiety dimension (0.87, SD=0.61). Total sum scores correlated .83 with the anxiety subscale and .60 with the avoidance subscale. Correlations for Olbert's 6-item scale were .92 with anxious attachment and .46 with avoidant attachment. The correlation between both attachment dimensions was .36 (excluding reversed items).

**Table 2.** Item distribution on the Psychosis Attachment Measure (PAM)

Avoidant attachment	Not	A little	Rather	Very
1. "I prefer not to let other people know my 'true' thoughts and feelings."	22.2%	49.0%	19.4%	9.4%
2. "I find it easy to depend on other people for support with problems or difficult situations (reverse item)."	8.7%	20.8%	36.5%	34.0%
4. "I usually discuss my problems and concerns with other people (reverse item)."	10.1%	27.1%	39.9%	22.9%
8. "I find it hard to accept help from other people when I have problems or difficulties."	37.2%	33.7%	19.8%	9.4%
9. "It helps to turn to other people when I'm stressed (reverse item)."	8.4%	26.2%	39.5%	25.9%
11. "When I'm feeling stressed, I prefer being on my own to being in the company of other people."	18.8%	28.9%	29.3%	23.0%
13. "I try to cope with stressful situations on my own."	15.1%	24.2%	42.5%	18.2%
16. "I feel uncomfortable when other people want to get to know me." *	44.3%	34.5%	15.7%	5.6%
Anxious attachment	Not	A little	Rather	Very
3. "I tend to get upset, anxious or angry if other people are not there when I need them."	49.7%	31.9%	13.2%	5.2%
5. "I worry that key people in my life won't be around in the future."	25.0%	33.7%	25.0%	16.3%
6. "I frequently ask other people to reassure me that they care about me."	60.4%	22.6%	11.8%	5.2%
7. "If other people disapprove of something I do, I get very upset." *	41.7%	39.2%	13.9%	5.2%
10. "I worry that if other people get to know me better, they won't like me." *	57.5%	23.7%	13.9%	4.9%
12. "I worry a lot about my relationships with other people." *	38.7%	38.0%	16.4%	7.0%
14. "I worry that if I displease other people, they won't want to know me anymore." *	49.5%	39.7%	22.0%	9.8%
15. "I worry about having to cope with problems and difficult situations on my own." *	28.6%	39.7%	22.0%	9.8%

\* In Olbert's 6-item scale

### STRUCTURAL VALIDITY

The CFA analysis indicated poor fit indices for the two-factor model with loadings of the reversed questions on the avoidance latent variable in the range of 0.04 to -0.31 (RMSEA= .097, CFI= .911, SRMR= .101, X<sup>2</sup>/df= 3.683). Removing these items improved model fit to conventional threshold values (RMSEA= .045, CFI= .987, SRMR= .063, X<sup>2</sup>/df= 1.572). Internal consistency was adequate for the 8-item "anxious attachment" scale (Cronbach's alpha = 0.87; McDonalds Omega = 0.83), and moderate for the 5-item "avoidant attachment" scale (Cronbach's alpha = 0.63; McDonalds Omega = 0.57).

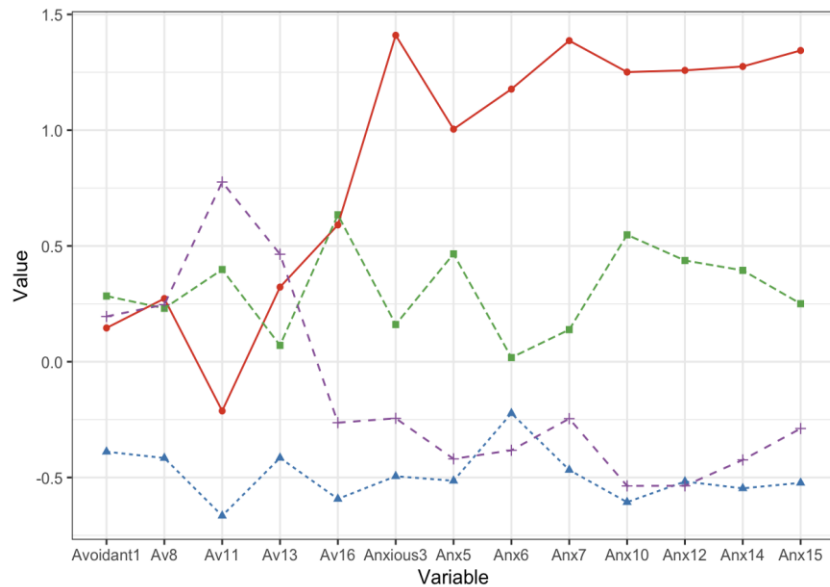
Covariance between standardized latent variables was high and first order correlation between the attachment scales was estimated at 0.36, as expected since secure clients will score low and some clients score high on both dimensions.

Latent Profile Analysis indicated a five-class model that included a small subgroup with a typical pattern for two anxiety items: high scores on "6. I frequently ask other people to reassure me that they care about me."; low scores on "10. I worry that if other people get to know me better, they won't like me." Due both to this inconsistency and to the moderately high sum scores in the four-class model (Figure 2, class 3), which are close to those in the disorganized category, a four-class model seems to fit the data best. The largest group, which had 105 participants (37%), scored below average on all items. This class was labeled as the secure attachment group. A group of 35 participants (12%) scored relatively low on items expressing the avoidance dimension and showed highest scores on all anxiety items. We decided that this class represented the preoccupied category. Another 56 participants (20%) scored above average on most avoidance items and as low as the secure group on the anxiety items. This class was labeled

as the dismissing-avoidant group. The last group of 88 participants (31%), which had scores that were average or somewhat higher on both avoidance and anxiety items, and also had substantial

heterogeneity on some items, was labeled the fearful-avoidant or disorganized attachment group.

**Figure 2.** Average item response on PAM items between four latent classes



Class 1: preoccupied attachment, class 2: secure attachment, class 3: fearful or disorganized attachment, class 4: dismissing attachment. The vertical scale is centered around zero which represents a score of 1.5 on the PAM.

**CONSTRUCT VALIDITY**

Attachment problems showed mild associations to psychotic and moderate associations to depressive symptoms. Partial correlations in Table 3 indicate that clinical problems were more pronounced for anxious attachment, which was also reflected in a negative association with resilience. In contrast, avoidant attachment was associated with better social cognition and problems in service engagement. Table 4 illustrates that the estimated

means follow the same pattern, combining preoccupied and disorganized attachment with clinical problems and less resilience. Disorganized and preoccupied attachment showed lower proportions of clients in remission (57% and 53% respectively), dismissing and secure attachment had similar percentages (70% and 66%, respectively). Overall results for LPA classes and alternative categorizations of attachment were comparable.

**Table 3.** Correlations between attachment scales and positive and negative symptoms and remission, depressive symptoms, social cognition, service engagement and resilience.

	PAM total	CI	PAM* avoidant	CI	PAM* anxious	CI
<b>PANSS-8 total</b>	0.22	(.094 - .333)	0.07	(-.041 - .177)	0.14	(.024- .257)
<b>- Positive</b>	0.20	(.072 - .331)	0.03	(-.098 - .162)	0.18	(.056 - .302)
<b>- Negative</b>	0.16	(.052 - .262)	0.09	(-.017 - .188)	0.04	(-.064 - .151)
<b>Remission</b>	-0.15	(-.258 - -.028)	-0.03	(-.140 - .092)	-0.11	(-.230 - .008)
<b>PHQ-9</b>	0.49	(.384 - .590)	0.17	(.054 - .285)	0.41	(.297 - .523)
<b>HT</b>	0.04	(-.075 - .164)	0.17	(.053 - .293)	-0.09	(-.210 - .023)
<b>SES</b>	0.07	(-.066 - .195)	0.12	(-.010 - .240)	-0.02	(-.146 - .113)
Availability	0.05	(-.077 - .188)	0.08	(-.036 - .221)	-0.01	(-.133 - .125)
Collaboration	0.01	(-.109 - .119)	0.02	(-.109 - .143)	-0.00	(-.112 - .113)
Help seeking	0.04	(-.092 - .165)	0.12	(.002 - .233)	-0.05	(-.167 - .067)
Adherence	0.12	(-.018 - .256)	0.16	(.019 - .280)	0.02	(-.118 - .161)
<b>BRS</b>	-0.32	(-.424 - -.214)	0.00	(-.117 - .122)	-0.34	(-.449 - -.218)

\* Partial correlations

PAM: Psychosis Attachment Measure, PANSS-8: Positive and Negative Symptom Scale-8, PHQ-9: Patient Health Questionnaire-9, HT: Hinting Task, SE: Service Engagement Scale, BRS: Brief Resilience Scale, CI: Bootstrapped 95% confidence intervals, which were based on 5000 samples. Sum scores excluded reversed items.



**Table 4.** Estimated means for psychotic symptoms, depressive symptoms, social cognition, service engagement and resilience on the basis of LPA based attachment categories

Attachment (LPA)	Secure Means (SE)	Preoccupied Means (SE)	Dismissing Means (SE)	Disorganized Means (SE)
PANSS-8 total	1.80 (0.075)	2.16 (0.129)	1.85 (0.102)	2.15 (0.082)
Remission (% , SE)	66.0% (0.047)	52.9% (0.086)	70.4% (0.062)	57.1% (0.054)
PHQ-9	4.97 (0.504)	12.35 (0.872)	7.17 (0.690)	9.97 (0.553)
Hinting Task	14.02 (0.414)	13.55 (0.734)	14.73 (0.569)	14.86 (0.455)
SES	0.21 (0.016)	0.19 (0.025)	0.21 (0.022)	0.21 (0.017)
BRS	3.17 (0.076)	2.47 (0.125)	2.99 (0.101)	2.64 (0.080)

LPA: latent profile analysis, SE: standard error, PANSS-8: Positive and Negative Symptom Scale-8, PHQ-9: Patient Health Questionnaire-9, HT: Hinting Task, SES: Service Engagement Scale, BRS: Brief Resilience Scale.

## 4. Discussion

We examined the structural and construct validity of the dimensional and categorical approaches of the PAM. As in previous studies, factor analysis indicated poor fit indices for the two-factor model, with low loadings of the reversed questions of the PAM on the latent avoidance variable. Removal of the three reversed items in the avoidance dimensional scale, improved model fit to conventional threshold values. Internal consistency was adequate for the 8-item anxiety attachment scale and moderate for the 5-item avoidance attachment scale.

With regard to the categorical approach, a four-class solution was considered the best model, as it distinguished classes labelled as secure, preoccupied, dismissive-avoidant, and fearful-avoidant or disorganized attachment. This supports theoretical models of attachment classification proposed by Bartholomew and Horowitz<sup>23</sup> and Hesse<sup>59</sup>. However, rather than identifying a group with high scores on all items, such as that found by Bucci et al.<sup>3</sup>, our analysis indicated a fourth class with somewhat higher scores on the avoidance and anxiety items. This response pattern is congruent with characterizations of the disorganized group in other studies. Bowlby<sup>20</sup> describes this group as a categorically different state of mind, not simply a high or extreme score on a dimension<sup>60,61</sup>. Main and Solomon<sup>22</sup> define this group in terms of odd, awkward behavior and unusual fluctuations between anxiety and avoidance. The odd behaviors seem to be a consequence of disorganized, unpredictable, and discomfiting behavior on the part of attachment figures in the past who were likely to be suffering from unresolved losses or unresolved attachment-related traumas<sup>62,63</sup>.

We compared LPA-based classes with alternative methods of categorization that can be divided into techniques which include a control group<sup>56,57</sup> and techniques that use simple calculations from the study data (median split and Collins and Feeney<sup>55</sup>).

Including control group information resulted in different class proportions, whereas techniques that only include data from the study showed reasonably comparable groups. This suggests that a categorical approach in the study of attachment problems is feasible without access to complex statistical procedures (median split).

The construct validity of the PAM was found to be adequate. As expected, we found weak associations between insecure attachment and positive psychotic symptoms, not between insecure attachment and negative symptoms. These findings are consistent with previous studies<sup>4,9,10</sup>.

Depressive symptoms had moderate associations with anxious attachment and disorganized attachment, and had a mild association with avoidant attachment, which was also found by Kvrjic et al. (2012) and Dagan et al. (2018).

We found avoidant attachment to be related to a slightly better social cognition. According to Mikulincer and Shaver et al.<sup>16</sup>, both attachment theory and social-cognition theories emphasize the extent to which people subjectively construe social experiences, store representations of these experiences (i.e. working models in attachment theory terms; schemas, prototypes, or scripts in social-cognitive language), and use these representations for understanding new social experiences and formulating action plans<sup>16</sup>. However, attachment working models, especially in adulthood, cannot be equated with most other social cognitions, because they evolve not only from simple memories of actual experiences, but also from the dynamic processes of goal pursuit, emotion regulation, and the psychological defenses that are involved in wishes for proximity and security; and also from fears of separation and helplessness<sup>16</sup>. When the test was administered, it is possible that the theory of mind in our research sample was not affected by more relationally charged emotions. After all, the score on theory of mind in our study was quite high.

Attachment problems seemed not to be related to overall problems in service engagement in our study, but avoidant attachment showed weak correlations with help seeking and adherence, indicating poorer service engagement. Kvirgic et al.<sup>10</sup> also found weak associations with poorer service engagement, but slightly stronger associations with anxious attachment than with avoidant attachment. In the study by Berry et al.<sup>4</sup>, especially avoidant attachment was related to less working alliance. In our study, the average service engagement was quite good (a high mean), which may partly explain the weak to absent associations we found.

Finally, anxious and disorganized attachment problems were moderately associated with less resilience. Attachment and resilience are described as related concepts where insecure attachment associates with less resilience<sup>16,20</sup>. The greater the environmental adversity, the less resilience factors are likely to emerge<sup>64</sup>. One unexpected finding was the lack of an association with avoidant attachment, which was also presented in the categorical approach. It is conceivable that a reasonably intact 'self-model', consistent with the avoidant attachment style, provides a protective effect in favor of resilience.

#### LIMITATIONS

##### **Our findings have to be interpreted in the light of five limitations.**

The first limitation concerns our use of a self-report questionnaire to measure attachment, which may have been liable to social-desirability bias and self-report bias. Further, as self-reports of attachment do not generate detailed descriptions of attachment figures and social relationships, they are seen only as an indicator of attachment<sup>16</sup>. Any indication of the attachment style or class can therefore be supported by using additional questionnaires that ask about the quality of past and present relationships to provide greater insight into the attachment pattern. The use of the informant versions of the PAM (key worker or team) might also be considered, as this may lead to more accuracy in the measurement, especially with regard to the avoidance dimension. Because the Adult Attachment Interview (AAI) finds higher percentages of avoidant attachment in populations with psychosis<sup>11,34,65</sup>, this suggests that self-report measures are less sensitive measures of avoidant attachment in psychosis<sup>3</sup>.

The second limitation concerns the question of whether the degree of insecure attachment in this population may have been influenced by psychotic symptoms. Berry et al. argue not only that insecure attachment can lead to paranoia, but also that

paranoia may lead to insecure attachment<sup>66</sup>. Evidence from studies conducted over more than one time period can help to resolve this question about causality<sup>66</sup>. However, even though questions of causality may be a limitation for interpreting PAM scores, it does not have much impact on assessing the psychometric qualities of the PAM.

Third, our findings are based on cross-sectional data. Although stability of adult attachment dimensions has been demonstrated over periods up to 25 years, an average test-retest correlation of around 0.56 leaves considerable room for change and suggests that adult attachment patterns are still somewhat sensitive to changing life circumstances<sup>16</sup>.

Fourth, the sample in this study was found to be heterogeneous. Only 46% of the sample were found to have been diagnosed with schizophrenia and up to 25% had a diagnosis of psychosis NOS. Even though it reflects the population of people with psychosis in Dutch mental health care, this heterogeneity may make it difficult to generalize the results.

Finally, some groups of clients were less willing or able to participate in the overall cohort study. They included care-avoiding clients, those with severe psychotic symptoms, and those leaving the mental healthcare team<sup>67</sup>. For this reason, our cohort may not provide a complete picture of the attachment styles and patterns that can prevail in a population of clients with psychoses.

#### Conclusions

In recent years, most research on attachment styles in psychosis has applied the dimensional approach<sup>9</sup>. The creation of prototypical categories nonetheless offers an alternative method, as these categories capture characteristics that are associated with combinations of both dimensions<sup>68,69</sup>. In particular, the categorical approach adds value to assessments of disorganized (or fearful-avoidant) attachment, which has been linked with vulnerability to psychosis<sup>26</sup>. Because dimensional and categorical measurement methods each have their own quality, we believe that it is preferable to use both techniques in research<sup>16</sup>. The construct validity of both approaches (dimensional and categorical) was largely in line with expectations. However, we do suggest that the reversed items of the PAM are revised. This is because it is not entirely clear why, whenever reversed items are also used in the other attachment questionnaires that are used in a population with psychosis<sup>9</sup>, these items undermine the validity of the PAM avoidance subscale. Further investigation is recommended.

It is also worth considering the use not only of self-report versions of the PAM, but also the two informant versions (key worker or team), and to bear in mind that in-depth diagnostics are advisable in practice.

### **Data availability statement**

Due to privacy restrictions in the ongoing cohort study, the data are not publicly available.

Data access may be applied for in consultation with the principal investigator.

### **Author contributions.**

All authors contributed to drafting the manuscript and to the conception and design of the study. They also approved the final version.

### **Declaration of conflicting interests**

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

### **Funding**

This study was funded by the mental health institutions participating in the study and by Rotterdam City Council. All funding organizations except for Rotterdam City Council are participants in the Epidemiological and Social Psychiatric Research Institute (ESPRI), a consortium of academic and non-academic research groups.

### **Acknowledgments**

We would like to thank the following mental health care institutes for their funding and their participation in this study: Parnassia Psychiatric Institute (comprising Antes Delta Psychiatric Centre and Parnassia Psychosis Research); Emergis; Dijk & Duin; Fivoor; GGz Breburg; GGz Delfland; GGz Oost-Brabant; and Stichting Pameijer. As well as thanking the governing body of the City of Rotterdam for their funding and cooperation, we would like to thank the panel of peer experts for ensuring that the interests of the clients are always considered and protected.

## References

1. Ainsworth MS. Infant–mother attachment. *American psychologist*. 1979;34(10):932.
2. Bowlby J. The making and breaking of affectional bonds: I. Aetiology and psychopathology in the light of attachment theory. *The British journal of psychiatry*. 1977;130(3):201-210.
3. Bucci S, Emsley R, Berry K. Attachment in psychosis: A latent profile analysis of attachment styles and association with symptoms in a large psychosis cohort. *Psychiatry Research*. 2017;247:243-249.
4. Berry K, Barrowclough C, Wearden A. Attachment theory: a framework for understanding symptoms and interpersonal relationships in psychosis. *Behav Res Ther*. Dec 2008;46(12):1275-82. doi:10.1016/j.brat.2008.08.009
5. Kotov R, Jonas KG, Carpenter WT, et al. Validity and utility of hierarchical taxonomy of psychopathology (HiTOP): I. Psychosis superspectrum. *World Psychiatry*. 2020;19(2):151-172.
6. Read J, & Gumley, A. . Can attachment theory help explain the relationship between childhood adversity and psychosis. *Attachment: New Directions in Psychotherapy and Relational Psychoanalysis*. 2008;2:1-35.
7. Barker V, Gumley A, Schwannauer M, Lawrie SM. An integrated biopsychosocial model of childhood maltreatment and psychosis. *The British Journal of Psychiatry*. 2015;206(3):177-180.
8. Varese F, Smeets F, Drukker M, et al. Childhood adversities increase the risk of psychosis: a meta-analysis of patient-control, prospective- and cross-sectional cohort studies. *Schizophr Bull*. Jun 2012;38(4):661-71. doi:10.1093/schbul/sbs050
9. Van Bussel E, Nguyen N, Wierdsma A, Van Aken B, Willems I, Mulder C. Adult attachment and personal, social, and symptomatic recovery from psychosis: systematic review and meta-analysis. *Frontiers in Psychiatry*. 2021;12:641642.
10. Kvrđić S, Beck EM, Cavelti M, Kossowsky J, Stieglitz RD, Vauth R. Focusing on the adult attachment style in schizophrenia in community mental health centres: validation of the Psychosis Attachment Measure (PAM) in a German-speaking sample. *Int J Soc Psychiatry*. Jul 2012;58(4):362-73. doi:10.1177/0020764011399004
11. Macbeth A, Gumley, A., Schwannauer, M., & Fisher, R. Attachment states of mind, mentalization, and their correlates in a first-episode psychosis sample. *Psychology and Psychotherapy, Theory, Research and Practice*. 2011;84:42-57.
12. Coutu S, Lecomte, T., & Leclerc, C. Personality characteristics and attachment in first episode psychosis. *The Journal of Nervous and Mental Disease*. 2007;195:631-639.
13. Van Bussel E, Wierdsma A, van Aken B, Willems I, Mulder C. Adult attachment and personal recovery in clients with a psychotic disorder. *Schizophrenia Bulletin Open*. 2023:sgad010.
14. Bowlby J. Attachment and loss: Volume II: Separation, anxiety and anger. *Attachment and Loss: Volume II: Separation, Anxiety and Anger*. London: The Hogarth Press and the Institute of Psycho-Analysis; 1973:1-429.
15. Bowlby EJM. *Attachment: Volume one of the attachment and loss trilogy*. Random House; 2008.
16. Mikulincer M, Shaver, P.R. *Attachment in adulthood. Structure, Dynamics, and Change*. The Guilford Press; 2007.
17. Main M, Solomon J. Discovery of an insecure-disorganized/disoriented attachment pattern ISSN 0893913456. 1986;
18. Brennan KA, Clark CL, Shaver PR. Self-report measurement of adult attachment: An integrative overview. 1998;
19. Bartholomew K. Avoidance of intimacy: An attachment perspective. *Journal of Social and Personal relationships*. 1990;7(2):147-178.
20. Bowlby J. Attachment and loss: retrospect and prospect. *American journal of Orthopsychiatry*. 1982;52(4):664.
21. Hazan C, Shaver PR. Love and work: An attachment-theoretical perspective. *Journal of Personality and social Psychology*. 1990;59(2):270.
22. Main M, Solomon J. Procedures for identifying infants as disorganized/disoriented during the Ainsworth Strange Situation. *Attachment in the preschool years: Theory, research, and intervention*. 1990;1:121-160.
23. Bartholomew K, Horowitz LM. Attachment styles among young adults: a test of a four-category model. *Journal of personality and social psychology*. 1991;61(2):226.
24. Korver-Nieberg N, Meijer CJ, Koeter MW, de Haan L. 5Adult attachment in samples of psychotic patients. *Attachment and psychosis*. 2014:89.
25. Berry K, Wearden A, Barrowclough C, Liversidge T. Attachment styles, interpersonal relationships and psychotic phenomena in a non-clinical student sample. *Personality and Individual Differences*. 2006;41(4):707-718.
26. Pollard C, Bucci S, MacBeth A, Berry K. The revised psychosis attachment measure:

- Measuring disorganized attachment. *British Journal of Clinical Psychology*. 2020;59(3):335-353.
27. Olbert CM, Penn DL, Reise SP, et al. Assessment of attachment in psychosis: A psychometric cause for concern. *Psychiatry research*. 2016;246:77-83.
  28. Asendorpf J, Banse R, Wilpers S, Neyer F. Relationship-specific attachment scales for adults and their validation with network and diary procedures. *Diagnostica*. 1997;43(4):289-313.
  29. Banse R. Adult attachment and marital satisfaction: Evidence for dyadic configuration effects. *Journal of Social and Personal Relationships*. 2004;21(2):273-282.
  30. Elizur Y, Mintzer A. Gay males' intimate relationship quality: The roles of attachment security, gay identity, social support, and income. *Personal Relationships*. 2003;10(3):411-435.
  31. Rokita KI, Dauvermann MR, Donohoe G. Early life experiences and social cognition in major psychiatric disorders: a systematic review. *European psychiatry*. 2018;53:123-133.
  32. Darling Rasmussen P, Storebø OJ, Løkkeholt T, et al. Attachment as a core feature of resilience: A systematic review and meta-analysis. *Psychological reports*. 2019;122(4):1259-1296.
  33. van Aken BC, Bakia A, Wierdsma AI, et al. UP'S: A cohort study on recovery in psychotic disorder patients: Design protocol. *Frontiers in psychiatry*. 2021;11:1487.
  34. Gumley AI, Taylor HE, Schwannauer M, MacBeth A. A systematic review of attachment and psychosis: measurement, construct validity and outcomes. *Acta Psychiatr Scand*. Apr 2014;129(4):257-74. doi:10.1111/acps.12172
  35. Andreasen NC, Carpenter Jr WT, Kane JM, Lasser RA, Marder SR, Weinberger DR. Remission in schizophrenia: proposed criteria and rationale for consensus. *American Journal of Psychiatry*. 2005;162(3):441-449.
  36. De Hert M, van Winkel R, Wampers M, Kane J, van Os J, Peuskens J. Remission criteria for schizophrenia: evaluation in a large naturalistic cohort. *Schizophrenia Research*. 2007;92(1-3):68-73.
  37. Van Os J, Kahn R. Remission criteria in schizophrenia. *Tijdschrift voor Psychiatrie*. 2007;49(1):21-26.
  38. Lin CH, Lin HS, Lin SC, Kuo CC, Wang FC, Huang YH. Early improvement in PANSS-30, PANSS-8, and PANSS-6 scores predicts ultimate response and remission during acute treatment of schizophrenia. *Acta Psychiatrica Scandinavica*. 2018;137(2):98-108.
  39. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *Journal of general internal medicine*. 2001;16(9):606-613.
  40. van Steenbergen-Weijnenburg KM, de Vroege L, Ploeger RR, et al. Validation of the PHQ-9 as a screening instrument for depression in diabetes patients in specialized outpatient clinics. *BMC Health Services Research*. 2010;10:1-6.
  41. Gilbody S, Richards D, Brealey S, Hewitt C. Screening for depression in medical settings with the Patient Health Questionnaire (PHQ): a diagnostic meta-analysis. *Journal of general internal medicine*. 2007;22:1596-1602.
  42. Corcoran R, Mercer G, Frith CD. Schizophrenia, symptomatology and social inference: investigating "theory of mind" in people with schizophrenia. *Schizophrenia research*. 1995;17(1):5-13.
  43. Janssen I, Krabbendam L, Jolles J, Van Os J. Alterations in theory of mind in patients with schizophrenia and non-psychotic relatives. *Acta Psychiatrica Scandinavica*. 2003;108(2):110-117.
  44. Versmissen D, Janssen I, Myin-Germeys I, et al. Evidence for a relationship between mentalising deficits and paranoia over the psychosis continuum. *Schizophrenia research*. 2008;99(1-3):103-110.
  45. Pinkham AE, Penn DL, Green MF, Buck B, Healey K, Harvey PD. The social cognition psychometric evaluation study: results of the expert survey and RAND panel. *Schizophrenia bulletin*. 2014;40(4):813-823.
  46. Bell M, Fiszdon J, Greig T, Wexler B, Bryson G. Neurocognitive enhancement therapy with work therapy in schizophrenia: 6-month follow-up of neuropsychological performance. *Journal of Rehabilitation Research & Development*. 2007;44(5)
  47. Tait L, Birchwood M, Trower P. A new scale (SES) to measure engagement with community mental health services. *Journal of mental health*. 2002;11(2):191-198.
  48. Smith BW, Dalen J, Wiggins K, Tooley E, Christopher P, Bernard J. The brief resilience scale: assessing the ability to bounce back. *International journal of behavioral medicine*. 2008;15:194-200.
  49. Soer R, Dijkstra MWS, Bieleman HJ, et al. Measurement properties and implications of the Brief Resilience Scale in healthy workers. *Journal of Occupational Health*. 2019;61(3):242-250.

50. Rosseel Y. lavaan: An R package for structural equation modeling. *Journal of statistical software*. 2012;48:1-36.
51. Byrne BM. Testing for the factorial validity, replication, and invariance of a measuring instrument: A paradigmatic application based on the Maslach Burnout Inventory. *Multivariate Behavioral Research*. 1994;29(3):289-311.
52. MacCallum RC, Browne MW, Sugawara HM. Power analysis and determination of sample size for covariance structure modeling. *Psychological methods*. 1996;1(2):130.
53. Hu Lt, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal*. 1999;6(1):1-55.
54. Wardenaar K. Latent Profile Analysis in R: A tutorial and comparison to Mplus. 2021;
55. Collins NL, Feeney BC. Working models of attachment shape perceptions of social support: evidence from experimental and observational studies. *Journal of personality and social psychology*. 2004;87(3):363.
56. Van Dam D, Korver-Nieberg N, Velthorst E, et al. Childhood maltreatment, adult attachment and psychotic symptomatology: a study in patients, siblings and controls. *Social psychiatry and psychiatric epidemiology*. 2014;49:1759-1767.
57. Steffanowski A, Oppl M, Meyerberg J, Schmidt J, Wittmann WW, Nübling R. Psychometrische Überprüfung einer deutschsprachigen version des relationship scales questionnaire (RSQ). *Störungsspezifische Therapieansätze-Konzepte und Ergebnisse*. 2001:320-42.
58. Pos K, Bartels-Velthuis AA, Simons CJ, et al. Theory of Mind and attachment styles in people with psychotic disorders, their siblings, and controls. *Australian & New Zealand Journal of Psychiatry*. 2015;49(2):171-180.
59. Hesse E. The Adult Attachment Interview: Protocol, method of analysis, and empirical studies. 2008;
60. Thompson RA, Simpson JA, Berlin LJ. *Attachment: The fundamental questions*. Guilford Publications; 2021.
61. Reisz S, Duschinsky R, Siegel DJ. Disorganized attachment and defense: exploring John Bowlby's unpublished reflections. *Attachment & Human Development*. 2018;20(2):107-134.
62. Hesse E, Main M. Second-generation effects of unresolved trauma in nonmaltreating parents: Dissociated, frightened, and threatening parental behavior. *Psychoanalytic inquiry*. 1999;19(4):481-540.
63. Lyons-Ruth K, Jacobvitz D. Attachment disorganization: Unresolved loss, relational violence, and lapses in behavioral and attentional strategies. 1999;
64. Holmes J. Roots and Routes to Resilience: Attachment/Psychodynamic Perspectives. *Psychoanalytic Discourse*. 2017;3(1):20-33.
65. Huguelet P, Mohr S, Rieben I, Hasler R, Perroud N, Brandt P-Y. Attachment and coping in psychosis in relation to spiritual figures. *BMC psychiatry*. 2015;15(1):237.
66. Berry K, Bucci S, Danquah AN. Attachment theory and psychosis: Current perspectives and future directions. 2019;
67. van Aken B, Wierdsma A, Voskes Y, Pijnenborg G, van Weeghel J, Mulder C. The association between executive functioning and personal recovery in people with psychotic disorders. *Schizophrenia Bulletin Open*. 2022;3(1):sgac023.
68. Griffin DW, Bartholomew K. Models of the self and other: Fundamental dimensions underlying measures of adult attachment. *Journal of personality and social psychology*. 1994;67(3):430.
69. Berry K, Barrowclough C, Wearden A. A review of the role of adult attachment style in psychosis: unexplored issues and questions for further research. *Clinical psychology review*. 2007;27(4):458-475.