An Attachment Perspective on the Risk for Psychosis: Clinical Correlates and the Predictive Value of Attachment Patterns and Mentalization

Tommaso Boldrini*^{a,b}, Maria Pontillo^c, Annalisa Tanzilli^a, Guido Giovanardi^{a,d}, Giuseppe Di Cicilia^a, Silvia Salcuni^b, Stefano Vicari^c, Vittorio Lingiardi^a

^aDepartment of Dynamic and Clinical Psychology, Sapienza University of Rome, Via degli Apuli, 1, 00185, Rome, Italy; annalisa.tanzilli@uniroma1.it; guido.giovanardi@uniroma1.it; giuseppe.dicilia@uniroma1.it; vittorio.lingiardi@uniroma1.it;

^b Department of Developmental Psychology and Socialization, University of Padua, Via Venezia, 8, 35131, Padua, Italy; silvia.salcuni@unipd.it;

^c Child and Adolescence Neuropsychiatry Unit, Department of Neuroscience, Children Hospital Bambino Gesù, Piazza Sant'Onofrio 4, 00100 Rome, Italy; maria.pontillo@opbg.net; stefano.vicari@opbg.net;

^d Department of Psychology, University of Campania "Luigi Vanvitelli", Viale Ellittico, 31 - 81100 Caserta, Italy.

* Tommaso Boldrini, Department of Department of Developmental Psychology and Socialization, University of Padova, Via Venezia, 8, 35131, Padova, Italy; phone number: +390649917674. E-mail address: tommaso.boldrini@unipd.it

Abstract

Background: In a longitudinal design, the present study examined: (a) the nature of attachment patterns and reflective functioning (RF) in individuals at ultra-high risk for psychosis (UHR); (b) the association between RF subclinical psychotic symptoms; and (c) the psychosis-predictive value of attachment patterns, RF, and the interaction between these factors.

Method: The sample comprised 57 UHR subjects and 53 clinical controls (non-UHR). UHR subjects were followed over a mean period of 14 months ($SD = 2.7$; range 11–19), during which time 11.5% developed psychosis. Attachment patterns and RF were measured. Hierarchical logistic regression was used to examine the predictive value of variables in the transition to psychosis.

Results: At baseline, significant differences were found between groups in secure attachment patterns and RF. RF was negatively associated with the attenuated psychotic symptoms described by the Unusual Thought Content/Delusional Ideas, Suspiciousness/Persecutory Ideas, and Disorganized Communication subscales. Moreover, poor mentalization was related to an increased likelihood of developing a psychotic disorder ($OR = .427$, 95% CI [.188, .970]); conversely, no predictive effects of the attachment variables and their interaction with RF on the transition to psychosis were found. Notably, an optimal threshold value of $RF = 1.25$ was found to distinguish UHR subjects who made the transition to psychosis from those who did not develop this pathology.

Conclusion: The results suggest that aberrant mentalizing patterns can predict the development of psychosis. Clinical implications of these results for the development of preventive treatments are discussed.

Keywords: ultra-high risk for psychosis, attenuated psychotic symptoms, attenuated psychotic syndrome, attachment patterns, mentalization, reflective functioning

1. Introduction

Schizophrenia has been conceptualized as a neurodevelopmental disorder that emerges during late adolescence and/or early adulthood (Insel, 2010). Although the nature of multifactorial trajectories leading to the onset of the illness is still partially unclear, over the past decade, great interest has been focused on how the vicissitudes of early attachment relationships may influence the development and course of schizophrenia-spectrum disorders (Berry et al., 2008; Berry, Bucci, and Danquah, 2019; Brent et al., 2014). The significant growth in research and clinical interest in this area has been motivated by several factors. First, a large body of evidence suggests that childhood adversity (especially experiences of emotional abuse and neglect; Duhig et al., 2015; Larsson et al., 2013) and maladaptive experiences in the child–caregiver relationship (Cannon et al., 2002; Jones et al., 1994; Wahlberg et al., 1997) confer significant vulnerability to psychosis later in life, by increasing sensitivity to stressful life events (Lardinois et al., 2011; Lataster et al., 2012). Second, all recent reviews on the topic have concluded that attachment insecurity and disorganization (for a summary of inter-individual differences in attachment, see supplementary material S1) in individuals with a diagnosis of schizophrenia are associated with poor outcomes, such as a poor therapeutic alliance and engagement with clinical services, early onset of the disorder, and poor quality of life (Berry et al., 2007; Carr et al., 2018; Gumley et al., 2014; Korver-Nieberg et al., 2014). Third, growing evidence supports several plausible interactions between disturbances of the neural systems mediating attachment (i.e., oxytocinergic/arginine vasopressinergic, dopaminergic and hypothalamic-pituitary-adrenal [HPA] stress-response systems) and the neurobiology of positive symptoms, negative symptoms, and social cognition deficits in individuals with a schizophrenia-spectrum disorder (Brent, Debbané, and Fonagy, 2020; Debbané et al., 2016a). Finally, the quality of early attachment relationships has been demonstrated to be crucial for the development of mentalization (or reflective functioning [RF])—that is, the ability to understand the actions of both others and oneself in terms of intentional mental states—as attachment security helps the child to freely and safely share emotions and thoughts with close others, and to develop *epistemic trust* (i.e.,

74 trust in caregivers as reliable sources of knowledge (e.g., Fonagy, Luyten, and Allison, 2015).
75 Because mentalization theory focuses on the development of social cognitive processes, which are
76 considered a clinical marker of schizophrenia-spectrum disorders, it may offer a relevant contribution
77 to our understanding of psychosis pathogenesis (Weijers et al., 2020).

78 Importantly, attachment disturbance and impaired mentalization should not be considered
79 causal variables in the etiology of schizophrenia-spectrum disorders, but rather as environmental risk
80 factors that likely interact with an underlying genetic and epigenetic predisposition to psychosis
81 (Brent and Fonagy, 2014; Debbané et al., 2016). Attachment theory (Bowlby, 1980; Cassidy and
82 Shaver, 2016) provides a clinically useful framework for understanding a number of neurobiological
83 (e.g., differences in brain anatomy and activity [see Long et al., 2020]) and psychological processes
84 (e.g., interpersonal functioning, resilience, and affect regulation; for a summary of the rationale of
85 the attachment framework in clinical research, see supplementary material S2) involved in adaptation
86 to the long-term impact of early adversity and stressful life events. In this regard, attachment security
87 was found to be a crucial protective factor linked to successful adaptation following life adversity
88 (Rutter et al., 2013); such adaptation strengthens resilience to interpersonal stress, thereby moderating
89 the risk of developing psychosis (Debbané et al., 2016). Conversely, attachment
90 insecurity/disorganization and subsequent impaired mentalization may contribute to the breakdown
91 of psychological mechanisms supporting resilience by undermining the regulation of self-experiences
92 (including bodily experiences, feelings, and thoughts) and hindering the development of a stable and
93 coherent sense of self (Brent et al., 2014; Pallini et al., 2018). In fact, it has been hypothesized that
94 the simultaneous containment and validation by the caregiver of an infant's affects (e.g., distress)
95 communicates to the infant a first sense of the separateness of mental and bodily states between self
96 and other. This provides the infant with an interpersonal context in which to elaborate second-order
97 representations of self-experience (Fonagy et al., 2002; Gergely and Watson, 1996). In particular,
98 during adolescence, sub-optimal mentalization capacities stemming from early attachment
99 disturbances may interact with a psychosis diathesis, undermining the self-regulatory repertoire while

100 individuals are coping with emerging new affects (e.g., sexual and aggressive arousal) and their
101 related bodily experiences (Debbané et al., 2016a). Stressful experiences resulting from a lack of
102 integration between sensory-affective states and high-order cognitions may facilitate the breakdown
103 of reality testing and the emergence of psychotic symptoms (Brent and Fonagy, 2014; Debbané et al.,
104 2016a; Weijers et al., 2020). In this perspective, it has been suggested that mentalization may
105 significantly moderate both the risk of developing a psychotic disorder (Brent et al., 2014; Brent and
106 Fonagy, 2014; Debbané et al., 2016a) and the recovery process subsequent to the first episode of
107 psychosis (Braehler and Schwannauer, 2012; Lysaker et al., 2005).

108 Moving towards the conceptualization of psychosis as a dimensional disorder (Lingiardi and
109 Boldrini, 2019), it is crucial to shed light on the role that attachment and mentalization may play in
110 the prodromal phase of schizophrenia—the subclinical stage of risk symptoms that precedes onset of
111 the disorder (Read and Gumley, 2010). Early detection and intervention in the subclinical stages of
112 psychosis (e.g., the “ultra-high risk” state for psychosis [UHR]) is considered critical for improving
113 the course of the disorder (Yung et al., 2004). To the best of our knowledge, only a handful of
114 investigations (Gajwani et al., 2013; Quijada et al., 2012; Quijada et al., 2015; Russo et al., 2017)
115 have specifically examined attachment among UHR samples. These studies have reported an insecure
116 attachment style in up to 80% of participants, with the fearful style most prevalent (range 43–71%),
117 followed by preoccupied/anxious (16–59%), and dismissing/avoidant (6.4–6%). Moreover, Gajwani
118 et al. (2013) found that insecure attachment styles (specifically fearful and preoccupied/anxious
119 styles) were significantly associated with elevated depression and social anxiety. Quijada et al. (2012)
120 found no relationship between attachment style and the clinical severity of symptoms; however, the
121 researchers reported that UHR subjects with a positive internal representation of their self or others
122 (even in the context of preoccupied or dismissing attachment) tended to demonstrate better clinical
123 outcomes, while those with fearful attachment (which includes negative internal representations of
124 both oneself and others) tended to show worse psychotherapeutic outcomes. Further, Quijada et al.
125 (2015) reported that UHR patients with lower levels of insecure attachment (i.e., a low rate of fearful

126 and dismissing attachment styles) at the beginning of treatment presented a better clinical outcome
127 after 12 months of psychosocial treatment, beyond the effect of baseline symptom severity. These
128 data suggest that UHR individuals with negative internal representations of their self, others, and
129 attachment relationships (i.e., insecure internal working models) may be at greater risk of presenting
130 a poor clinical outcome. It should be underlined that all of the abovementioned studies were based
131 on self-report measures, thus investigating only declarative memory systems with respect to
132 attachment representations; consequently, no procedural memory processes were taken into account
133 by previous studies on attachment in UHR individuals. As self-report tools are susceptible to many
134 biases, the use of narrative-based instruments to assess attachment patterns could produce more
135 accurate results (Roisman et al., 2007), especially in psychopathology research. In particular, the
136 Adult Attachment Interview (AAI; George et al., 1996) explores the narrative coherence of
137 interviewees when recalling memories of attachment relationships. The measure aims at delving
138 beneath the factual nature of these experiences in order to understand the subject's current state of
139 mind regarding attachment and its procedural underpinnings (i.e., internal working models; see
140 Bowlby, 1980, 1988). A narrative-based investigation of attachment patterns could better clarify the
141 psychological mechanisms linking attachment disturbances to emerging psychotic symptoms,
142 improving the diagnostic assessment and contributing to the development of more effective
143 preventive intervention approaches. Moreover, since greater attachment insecurity (particularly the
144 dismissing/avoidant style) has been found to be associated with poorer engagement with mental
145 health services and worse treatment outcomes in patients with chronic psychosis (Gumley et al.,
146 2014a), an attachment perspective on the subclinical stage of the illness could inform clinical
147 practices by offering a comprehensive framework for managing any interpersonal and affective
148 difficulties that emerge during treatment (Bucci et al., 2020; Harder, 2014).

149 With respect to mentalization, there is some evidence that mentalization difficulties precede the
150 onset of psychosis (Debbané et al., 2016). To date, mentalizing difficulties in UHR individuals have
151 been primarily investigated in terms of neurocognition, using theory of mind (ToM; i.e., the ability

152 to infer the mental states of others) tasks; such studies have demonstrated significant moderate deficits
153 in affect recognition and discrimination in faces, voices, and verbal ToM (Bora and Pantelis, 2013;
154 van Donkersgoed et al., 2015). Moreover, ToM impairments seem to be involved in the development
155 of psychotic symptoms. In particular, the so-called *hyper theory of mind* (i.e., hyperToM or
156 *hypermentalization*) refers to the tendency to excessively attribute intentions or self-referential
157 meaning to others and to subsequently predict behavior on the basis of these inaccurate beliefs (Frith,
158 2004). In patients with schizotypal personality disorder or schizophrenia, hyperToM seems to be
159 specifically associated with delusions, in general, and paranoid delusions, in particular, comprising
160 phenomena of persecution, mind reading, and misinterpretation (Fyfe et al., 2008; Montag et al.,
161 2011). ToM impairments have also been longitudinally studied to examine the transition from
162 prodromal psychosis to full-blown clinical disorder, generating mixed results (van Donkersgoed et
163 al., 2015). Nevertheless, ToM tasks are limited to assessing only some aspects of the broader meta-
164 level concept of mentalization.¹ It is reasonable to assume that the dimensions of mentalization that
165 are involved in resilience to psychosis could extend beyond those assessed in ToM tasks, which focus
166 on cognitive and external-based aspects. For example, it was recently suggested by Debbané (2016a,
167 2016b) that mentalization of one's own mental and bodily states (i.e., self-mentalization) may be
168 crucial for the risk of developing psychosis. Specifically, by failing to integrate their own mental
169 states and bodily inner signals with high-order cognitive aspects, individuals on the clinical psychosis
170 continuum may misattribute internal stimuli as external, generating anomalous self-experiences (e.g.,
171 transitivity phenomena) and psychotic symptoms (e.g., passivity delusions, auditory hallucinations).
172 For these reasons, RF, by consolidating a variety of psychological constructs (e.g., ToM, mindfulness,
173 psychological insight) which are related to different dimensions of mentalizing (e.g. self- and other-

¹ Specifically, Fonagy and Luyten (2009) suggested that mentalization is a meta-level concept embracing different psychological constructs regarding “thinking about mind,” which can be organized along four interrelated dimensions/polarities: (1) automatic/controlled, (2) cognitive/affective, (3) internal/external-based, and (4) self-/other-focused. In this regard, ToM taps into the cognitive and other-focused polarities but fails to adequately assess the other dimensions of mentalization.

oriented; Choi-Kain and Gunderson, 2008; Fonagy et al., 2008), may provide a broad evaluation of social cognitive impairments in UHR individuals.

The goal of the present study was to describe the nature of narrative-based attachment patterns and RF in a clinical sample of UHR and non-UHR help-seeking adolescents. In particular, the study aimed at: (1) comparing RF scores and the distribution of attachment patterns in UHR versus non-UHR subjects; (2) exploring the association between RF and dimensional markers of the UHR state (i.e., subclinical psychotic symptoms); and (3) longitudinally examining whether attachment patterns, RF, and the interaction between them predict the transition to psychosis in UHR subjects.

2. Methods

2.1. Participants

The sample included 110 help-seeking inpatients who had consecutively been admitted to the Child and Adolescent Neuropsychiatry Unit of the Bambino Gesù Clinical and Research Hospital in Rome between January 2017 and June 2019. The inclusion criteria were: presence of at least one non-psychotic psychiatric disorder based on the DSM-5, aged 12 to 25 years, fluent in Italian, and IQ > 70. The exclusion criteria were: past or present psychosis, traumatic brain injury or any known neurological disorder, and current drug or alcohol abuse. All patients who met the inclusion criteria were approached and the majority agreed to participate (response rate 82%), resulting in the final sample.

The study was approved by the Ethics Committee of the Bambino Gesù Clinical and Research Hospital and the Ethics Committee of the Department of Dynamic and Clinical Psychology of Sapienza University of Rome (n°44/2017). All participants were drug-naïve patients at the time of the first clinical assessment (T0). All young adult participants (aged ≥ 18 years) provided signed written informed consent, and the parents/legal guardians of all adolescent participants (aged < 18 years) provided signed written informed consent.

200 **2.2. Measures**

201 **2.2.1. Psychological functioning, cognitive functioning, and clinical diagnosis**

202 Level of functioning was measured with the Childhood Global Assessment Scale (CGAS;
203 Shaffer et al., 1983). Baseline verbal IQ was assessed using the Wechsler Intelligence Scale for
204 Children (WISC-III; Wechsler, 1991). Psychiatric diagnoses were made by clinicians according to
205 the Structured Clinical Interview for the DSM-5 (SCID-5; First et al., 2016).

206

207 **2.2.2. Risk for psychosis and the transition to psychotic disorder**

208 UHR status and transition to psychosis were indexed on the Structured Interview for
209 Psychosis-Risk Syndrome (SIPS; McGlashan et al., 2001; Miller et al., 2002). The SIPS consist for
210 four measures: (1) the Scale of Psychosis-Risk Symptoms (SOPS), (2) a DSM-5 schizotypal
211 personality disorder checklist, (3) a questionnaire about family history of mental illness, and (4) the
212 Global Assessment of Functioning scale. SOPS scales include 19 symptom constructs (5 positive, 6
213 negative, 4 disorganized, and 4 general) that are evaluated on the basis of the presence, duration,
214 and severity of specific experiences and behaviors. Each of the five positive items is rated on a
215 scale from 0 (*no symptoms*) to 6 (*extreme or psychotic symptoms*). A score of 3, 4, or 5 on at least
216 one of the positive items indicates the presence of UHR symptoms. The measure contains
217 diagnostic criteria for three *psychosis-risk syndromes*: brief intermittent psychotic syndrome
218 (BIPS); (2) attenuated positive symptom syndrome (APSS); and (3) genetic risk and deterioration
219 syndrome (GRD, which is characterized by schizotypal personality disorder and/or first-degree
220 familiarity with schizophrenia-spectrum disorders and significant global functioning decline over a
221 12-month period). Finally, a score of 6 on any of the five positive items indicates the presence of a
222 (full-blown) psychotic syndrome (POPS).

223

224 **2.2.3. Attachment patterns**

225 The Adult Attachment Interview (AAI; George et al., 1996) is a semi-structured interview
226 used to assess subjects' *state of mind* or internal working model with respect to childhood
227 attachment relationships. The AAI consists of 20 questions asked in a set order using standardized
228 probes. Subjects are asked to describe the general quality of their childhood relationships with their
229 parents as well as any experiences of early separation, loss, rejection, and maltreatment. The
230 interview requires participants to reflect on their parents' styles of parenting and to consider how
231 their childhood experiences with their parents may have influenced their personality development.
232 The traditional AAI scoring system points to an attachment classification of either:
233 *secure/autonomous* (F), *dismissing* (Ds), *enmeshed/preoccupied* (E), or *unresolved/disorganized*
234 (U/d). Subjects classified as F are able to cope effectively with negative feelings about past
235 experiences and are aware of the value of attachment relationships. On the other hand, E subjects
236 are overwhelmed by anxiety and negative emotions arising from childhood memories. Ds subjects
237 deal with painful feelings related to attachment relationships through the "defensive exclusion"
238 (Bowlby, 1973) of attachment-related memories, idealization of painful relationships, or derogation
239 of attachment figures. Finally, the U/d category is assigned a secondary organized classification (F,
240 Ds, or E), denoting that the subject's narrative is incoherent in relation to discussions of trauma and
241 loss. Moreover, a *cannot classify* (CC) classification is assigned to subjects who present a global
242 breakdown in discourse, switching between two or more contradictory attachment strategies (Hesse,
243 1996). Finally, additional criteria (specifically indicated for a clinical sample) were recently
244 proposed to detect the so-called *cannot classify low-coherence category* (CC low coherence;
245 Speranza et al., 2017). This emerging category is assigned to subjects demonstrating very low
246 coherence, with no evidence of contradictory insecure discourse strategies; this pattern indicates a
247 pervasively and globally unintegrated state of mind that may arise from exceptionally harsh and
248 traumatic childhood experiences. Research has shown the AAI to have remarkable stability and
249 predictive validity (for a review, see Hesse, 2010).

250

251 2.2.3. *Reflective functioning*

252 The ability to mentalize was assessed with the Reflective Functioning Scale (RFS; Fonagy
253 et al., 1998)—a quantified index of mentalization ability that is applied to AAI transcripts. The RFS
254 is designed to assess whether subjects understand attachment-related experiences in terms of mental
255 states. The coding system is based on the following dimensions: (a) awareness of the nature of
256 mental states (e.g., the fact that mental states can be disguised); (b) explicit effort made to tease out
257 the mental states underlying one’s own and others’ behavior (e.g., an awareness that different
258 people may experience different feelings and thoughts in response to the same situation); (c)
259 recognition of the developmental aspects of mental states (e.g., an understanding of age-derived
260 changes in mental states); and (d) recognition of mental states in the interviewer (e.g., guessing that
261 an interviewer may be distressed while listening to an emotionally difficult story). RF is assessed
262 through ratings of subjects’ perceived level of reflection in AAI passages. The scores given to
263 subjects’ statements throughout the interview are weighed together to obtain a final RF score on an
264 11-point scale ranging from -1 (*negative reflective capacity or anti-reflective*) to 5 (*ordinary*
265 *reflective capacity*) to 9 (*exceptional reflective capacity*). The RFS was validated on the AAI
266 coherence scale and shows good interrater reliability when administered by trained raters (Fonagy
267 et al., 1998). Psychometric analysis confirmed the one-factor structure, which also showed good
268 reliability and stability over time (Taubner et al., 2013).

269

270 2.3. **Procedure**

271 In the first step, all clinical and demographic data were collected and clinical diagnoses were
272 made according to DSM-5 criteria. Subsequently, all patients were interviewed with the SIPS and, 2
273 to 3 weeks later, with the AAI by three research assistants who had attended a specific training. All
274 AAI interviews were audio-recorded, transcribed, and scored according to the standard
275 classification system (Main, Hesse, and Goldwyn, 2008) by two trained reliable raters (G. G. and T.
276 B.) who were blind to all other study variables except for participants’ gender. The interrater

277 reliabilities (ICC) of the AAI subscales were all in excess of .70 and agreement between the two
278 raters on major attachment classification (four-way classification) was 81.4% (with 100%
279 agreement on insecure vs. secure classification). RF was coded according to the RFS from the
280 verbatim transcripts of the AAI by two raters (G. G. and T. B) who had been trained by H. Steele.
281 The interrater reliability (ICC) of the RF raters was .78.

282 Moreover, UHR participants were followed up over a mean period of 14 months ($SD = 2.7$;
283 range 11–19), using the SIPS, only. In particular, at both T0 (first assessment) and T1 (follow-up
284 assessment), the SIPS was administered to all participants by two UHR-trained and specialized
285 psychologists (M.P. and G.D.C.) with long-standing experience in psychosis risk screening.
286 Patients were considered “converted” when, at T1, they presented a score of 6 on at least one
287 positive item (i.e., presence of a psychotic syndrome, see “Measures” section). Transition rates
288 were longitudinally estimated by calculating the percentage of UHR participants with a psychotic
289 syndrome at the follow-up assessment (T1). Follow-up data for five patients are missing due to the
290 impossibility to contact them for the later evaluation. All interrater reliabilities of the SIPS
291 subscales were in excess of .70 and agreement between the two raters on UHR criteria was 91%.

292

293 **2.4. Data Analysis**

294 An χ^2 analysis was applied to compare the attachment pattern distributions of the UHR
295 versus non-UHR subsamples. A t-test was used to compare the RF mean scores of the UHR and
296 non-UHR subsamples, while correlational analyses between RF and SIPS scores (i.e., positive,
297 negative, disorganization, general symptoms) were conducted on the UHR subsample using the
298 Pearson test.

299 A hierarchical logistic regression analysis was carried out to evaluate the predictive effect of
300 different attachment patterns (i.e., secure vs. insecure, organized vs. disorganized), RF (considered
301 as a continuous variable), and the interaction between these variables, on the transition to psychosis
302 (i.e., presence/absence of a psychotic state at T1, in accordance with SIPS criteria), net the

303 variability accounted for by the follow-up time (which represents a factor strongly associated with
304 transition). Thus, the follow-up time was entered in the first step, attachment patterns were entered
305 in the second step, and RF was entered in the third step. The interaction of attachment patterns with
306 RF was entered in the fourth step, in order to control for the main effects of previous psychological
307 variables.

308 A receiver operating characteristic (ROC) analysis was performed to evaluate the ability of
309 the regression model to accurately distinguish UHR individuals who developed psychosis from
310 those who did not make the transition. The ROC curve charts the relationship between true positive
311 (*sensitivity*) and false positive (*1-specificity*) identification rates for the entire range of possible cut-
312 off points. The area under the curve (AUC) provides measures (in percentage terms) the model's
313 ability to classify individuals correctly. The AUC statistic permits comparison of a model's
314 discriminative ability against chance (where AUC = .50 suggests chance discrimination); overall,
315 the larger the AUC, the more discriminating the model (for further details, see, e.g., Hosmer,
316 Lemeshow, and Sturdivant, 2013). In the present study, the ROC analysis included only variables
317 significantly associated with the transition to psychosis in the logistic regression model. Finally,
318 optimal cut-off values that maximized both sensitivity and specificity were established to enhance
319 the model's clinical utility.

320

321 **3. Results**

322 **3.1. Sample Characteristics**

323 The sample included 110 patients (mean age = 16.85 ± 2.35 ; see Table 1 for other
324 demographic details) with the following DSM-5 main diagnoses: anxiety disorder ($n = 39$; 35.4%),
325 affective disorder ($n = 31$; 28.2%), personality disorder ($n = 22$; 20%), and other diagnosis ($n = 16$;
326 14.5%); 2 patients (1.8%) did not have a DSM-5 diagnosis. Within the larger sample, 57 patients
327 (51.8%) were considered at-risk for schizophrenia (i.e., the UHR subsample); most of these patients
328 ($n = 53$; 84.2%) fulfilled the SIPS criteria for APS. Gender and concomitant diagnoses (see

329 supplementary material S1) were not related to UHR/non-UHR status, whereas patients' age and
330 CGAS scores were significantly higher in non-UHR patients. For further details on clinical
331 diagnoses in the sample, see supplementary material S3. At the follow-up assessment (T1), 11.5%
332 of UHR subjects had developed psychosis according to the SIPS.

333

334 [Table1]

335

336 **3.2. Differences in Attachment Patterns Between UHR and non-UHR groups**

337 Table 2 shows the distribution of AAI classifications for the UHR and non-UHR groups.

338 The three-way distribution of attachment categories (F, Ds, E) differed significantly between UHR
339 and non-UHR patients ($\chi^2[2, N = 100] = 6.98, p = 0.03$). Considering the contribution of each cell
340 to the total χ^2 score, the UHR status was negatively associated with the F attachment pattern ($sr =$
341 -1.4) and positively associated with the Ds attachment pattern ($sr = -1.1$). Conversely, no
342 significant differences emerged with regard to the four-way distribution of attachment patterns (F,
343 Ds, E, U/CC [U and/or CC averaged]), or for the simpler comparison between organized (F, Ds, E)
344 versus disorganized (U/CC) classifications. Nevertheless, a finer-grained analysis of the
345 disorganized classifications (i.e., a comparison between F, Ds, and E; U and CC; and CC low
346 coherence) revealed significantly different distributions between UHR and non-UHR patients ($\chi^2[2,$
347 $N = 110] = 8.12, p = 0.04$). In particular, UHR status was positively associated with CC low
348 coherence ($sr = 1.68$), with 16% of UHR patients presenting this pattern.

349

350 [Table2]

351

352 **3.2. Associations Between RF, UHR Status, and Subclinical Psychotic Symptoms**

353 The t-test revealed that RF mean scores significantly differed between UHR and non-UHR
354 patients ($t[df = 108] = 3.99; p < .001$). In particular, UHR patients showed significantly lower RF

355 scores ($M = 2.02$; $ds = 1.89$) than non-UHR patients ($M = 3.44$; $ds = 1.82$). The Pearson analysis
356 revealed that RF was significantly and negatively correlated with some positive attenuated
357 psychotic symptoms, such as Unusual Thought Content/Delusional Ideas ($r = -.325$; $p = .003$),
358 Suspiciousness/Persecutory Ideas ($r = -.342$; $p = .001$), and Disorganized Communication ($r = -$
359 $.328$; $p = .003$). (See Table 3.)

360

361 [Table3]

362

363 **3.3. Attachment Patterns and Mentalization in Predicting the Transition to Psychosis**

364 The results of the hierarchical logistic regression analysis are depicted in Table 4. Overall, χ^2
365 values indicated goodness-of-fit of the regression models including follow-up time, attachment
366 patterns, RF, and their interaction, respectively. It is important to note that the addition of RF as a
367 predictor significantly increased the fit of the model including follow-up time and attachment
368 patterns, while the likelihood ratio test after the interaction term (attachment variables x RF) was
369 included did not result in any significant improvement of predictive power. Nagelkerke's R^2
370 showed that attachment patterns accounted for 16.8% of the variance (net the variability explained
371 by the follow-up time), but had no significant effect on the transition to psychosis (see the Wald
372 tests). These results indicate that the likelihood that UHR patients would develop psychosis
373 depended less on their security/insecurity or organization/disorganization of attachment, regardless
374 of the follow-up time. Conversely, the analysis showed a significant effect of RF on the transition to
375 psychosis. Moreover, this variable accounted for an additional 17.3% of the variance
376 (approximately twice the variance explained by the previous model of attachment patterns).
377 Notably, poor mentalization was associated with an increased likelihood of developing psychosis
378 ($OR = .427$, 95% CI [.188, .970]). Finally, there was no effect of the interaction between
379 secure/insecure and organized/disorganized attachment variables and RF on the transition to

380 psychosis. Hence, the findings demonstrate that RF was the only dimension able to predict the
381 transition to psychosis of UHR patients amongst the studied variables.

382 The ROC analysis revealed that RF showed high accuracy in distinguishing UHR
383 individuals who had made the transition to psychosis from those who had not developed this
384 pathology. The computed AUC was 78.4% (95% CI 62.1–94.8)—well above a chance association
385 (50.0%)—indicating adequate discriminatory power (cfr., Hosmer, Lemeshow and Sturdivant,
386 2013). Moreover, differentiation of UHR individuals based on their clinical outcomes was related to
387 the presence of 83.0% sensitivity (true positive rate) and 44% 1-specificity (false positive rate),
388 using the optimal threshold (i.e., cut-off) score of RF = 1.25.

389

390

391 [Table3]

392 **4. Discussion**

393 The present investigation represented the first attempt to measure attachment patterns and
394 RF in UHR individuals using a narrative-based approach. The results showed that UHR patients
395 presented low attachment security, with a high prevalence of dismissing attachment patterns.

396 Individuals with a dismissing attachment pattern tend to devalue the importance of
397 attachment relationships, restrain their emotional states, and use defensive processes (related to the
398 concept of defensive exclusion; Bowlby, 1980) such as the idealization/derogation of parents and
399 the denial, dissociation, and repression of memory, with the aim of guarding against negative
400 emotions related to these memories and keeping childhood attachment experiences of rejection or
401 neglect out of conscious awareness. The high prevalence of insecure—mostly dismissing—
402 attachment patterns in the present sample suggests that the psychological features of UHR youths
403 should be carefully considered in the selection and planning of preventive psychotherapeutic
404 treatments. Indeed, insecure and disorganized attachment patterns may significantly affect the
405 therapeutic process by damaging the therapeutic alliance, negatively affecting transference—

406 countertransference and worsening the treatment outcome (see Slade, 2016, for a review). More
407 specifically, dismissing patients are usually affectively constrained and less engaged in the
408 therapeutic relationship (Eames and Roth, 2000), engendering boredom and disinterest in the
409 therapist (Daniel et al., 2015); they also tend to communicate in a distinct way during therapy
410 sessions, appearing to talk to themselves and providing scant cues for support, as if releasing the
411 therapist from getting overly involved (Talia et al., 2014). Therapists working with UHR youths
412 should address these negative therapeutic processes in their work.

413 On the other hand, no differences were found between UHR and non-UHR participants with
414 respect to the global category of disorganized attachment (i.e., U/CC classifications). Nevertheless,
415 a high rate of CC low-coherence was found in only UHR patients, indicating that almost half of the
416 disorganized UHR subsample were classified as “low-coherence,” corresponding to a globally and
417 severely disorganized state of mind with respect to attachment. This particular classification is
418 extremely rare, even in severely impaired clinical samples (e.g., in a sample of severely maltreated
419 children, only 5% of parents were classified as CC low-coherence [Speranza et al., 2016]). From a
420 clinical standpoint, CC low-coherence persons exhibit odd or no descriptions of their primary
421 relationships, collapsed reasoning and discourse, and unusual behavioral reactions. It has been
422 proposed that such characteristics, as expressed in the AAI, could be linked to an absence of
423 significant attachment experiences during childhood or to grossly traumatic attachment
424 relationships at that time (Lyons-Ruth et al., 2005; Speranza et al., 2016). Consequently, the
425 surprisingly high rate of CC low-coherence classifications in the present sample may indirectly
426 suggest a putative developmental pathway linking trauma-related disorders in childhood (e.g.,
427 reactive attachment and disinhibited social engagement disorders) to psychotic manifestations in
428 adolescence. This provides—albeit indirectly—further evidence of the putative role of childhood
429 attachment disorganization in the multifactorial etiology of schizophrenia-spectrum disorders (Liotti
430 and Gumley, 2008).

431 With respect to mentalization, UHR patients exhibited significantly lower RF relative to
432 controls, providing further evidence of impaired social cognition in high-risk samples (Bora and
433 Pantelis, 2013; Piskulic et al., 2016; van Donkersgoed et al., 2015). Moreover, RF was negatively
434 associated with attenuated psychotic symptoms—in particular with the SISP items of
435 Suspiciousness/Persecutory Ideas and Unusual Thought Content/Delusional Ideas, which describe a
436 wide array of symptoms such as perplexity and delusional mood, ideas of reference, and delusional
437 ideas. Overall, it seems that impaired RF is associated with an inclination to develop delusional
438 ideas and paranoid symptoms. This evidence seems to support certain hypotheses that guide the
439 routine work of many clinicians. For instance, clinicians who are familiar with the theoretical
440 framework of mentalization-based therapy (MBT) hold that one of the consequences of impaired
441 mentalization is the emergence of *pre-mentalistic* forms of thinking in stressful situations. One form
442 of pre-mentalistic thinking is *psychic equivalence thinking*, in which the ability to consider outside
443 perspectives is lost and one's thoughts and/or feelings are assumed to be unequivocally real
444 (Bateman and Fonagy, 2016; Nazzaro et al., 2017). The results of the present study suggest that
445 preventive treatments aimed at fostering mentalization may help UHR individuals deal with
446 attenuated psychotic symptoms and protect them from developing severe psychotic phenomena.

447 Finally, in line with evidence previously observed in high-risk samples about the psychosis-
448 predictive value of partially overlapping constructs, such as impaired ToM (Kim et al., 2011) and
449 social functioning (Jang et al., 2011), the present study also found that RF was a significant
450 predictor of the transition to psychosis. Moreover, the results of the ROC analysis suggested that the
451 RF threshold (or cut-off) value of 1.25 could have great clinical utility in discriminating UHR
452 individuals who are more likely to develop psychosis. Since the study found that impaired
453 mentalization characterized UHR individuals and predicted the transition to psychosis, it could be
454 held that the association between impaired social cognition and psychosis does not derive from
455 secondary deficits associated with chronic psychotic disorders, and is not a consequence of the first
456 episode of psychosis (Armando et al., 2019). Debbané et al. (2016a) proposed that impaired

457 mentalization, which is often found in the context of insecure attachment, may be a moderator of
458 psychotic phenotypical expression. Therefore, impaired mentalization, rather than being an actual
459 predictor of transition, might be better understood as a breakdown in the resilience factors that
460 protect against the emergence of psychosis (Debbané et al., 2016a). Looking at the relationship
461 between mentalization and psychosis from this perspective provides valuable insights regarding
462 preventive treatment strategies. Clinical strategies aimed at improving mentalizing abilities—and
463 consequently fostering resilience—may better respond to the clinical needs of UHR youths.
464 Notably, the mentalization theoretical framework has been widely applied in psychotherapy
465 research (e.g., Boldrini et al., 2017; Katznelson, 2014) and has the advantage of being articulated in
466 a therapy model (i.e., MBT; Bateman and Fonagy, 2016) that has been specifically adapted for
467 schizophrenia-spectrum disorders (Brent, 2009; Brent and Fonagy, 2014). It has recently been
468 proposed that both individual and family MBT (Rossouw and Fonagy, 2012) may constitute a
469 preventive treatment for UHR persons by reducing the intensity of attenuated psychotic symptoms,
470 treating non-psychotic comorbidity (e.g., approximately 40% of the UHR population presents a
471 personality disorder [Boldrini et al., 2019]), preventing the first episode of psychosis, and
472 ameliorating social functioning over the long term (Armando et al., 2019; Debbané and Bateman,
473 2019; Debbané et al., 2016b).

474 It is important to note that attachment variables and their interaction with RF were not
475 predictive of psychosis in our sample. It is conceivable that RF impairment may interact with other
476 psychosis-relevant risk factors in predicting transition, such as variant genes, aberrant activity along
477 the hypothalamic–pituitary–adrenal axis (HPA-axis), dopamine and oxytocin dysregulation,
478 oxidative stress, neuroinflammation, and pre/perinatal complications (Debbané et al., 2016a; Howes
479 and Murray, 2014). Specifically, in the presence of genetic susceptibility to psychosis, early social
480 adversities and concomitant distress could produce a series of aberrant neurobiological processes
481 (e.g., HPA-axis hyperactivity, dopamine system sensitization, release dysregulation) that could
482 undermine high-order cognition (i.e., mentalization), ranging from sensory-gating processes and

483 bodily experiences to feelings and thoughts (Debbané et al., 2016a). Interacting with such disrupted
484 neurobiological patterns, the resulting impaired mentalization could be consequently more directly
485 involved (compared to attachment insecurity/disorganization) in the phenotypic expression of
486 psychotic disorders, accounting for the idiosyncratic and rigid interpretations of self-experiences
487 and one's social environment that may develop into psychotic symptomatology (Weijers et al.,
488 2020).

489 The present study had several limitations. First, there may have been methodological
490 limitations in measuring the attachment patterns of subjects with psychotic symptoms. In these
491 subjects, an unresolved attachment classification may have resulted from their general deficit in
492 monitoring reasoning and discourse and been more attributable to their clinical condition than to
493 early attachment relationships. However, assessment of attachment may be more reliable in UHR
494 persons relative to those with chronic psychosis, due to their less severe psychotic symptoms and
495 cognitive impairments (Carr et al., 2018; Gumley et al., 2014a; Korver-Nieberg et al., 2014).
496 Second, differences in cognitive domains were not controlled for in the regression model, despite
497 having been shown to be psychosis-predictive in previous studies (Addington et al., 2019).
498 Nevertheless, in the present study, verbal IQ < 70 was used as an exclusion criterion, thereby
499 reducing variability within the sample. Third, it is essential to note that follow-up assessment was
500 limited to investigating the transition to psychosis, only. Future studies may benefit from
501 investigating the role of attachment and mentalization in predicting other outcomes, such as role
502 and social functioning, engagement with mental health services, and psychotherapeutic treatment
503 process variables. Finally, the mean age of the UHR subsample ($m = 15.8$) was lower than that
504 reported in most UHR studies, and the clinical significance and prognostic value of UHR criteria in
505 younger populations has been questioned by many scholars (Schultze-Lutter et al., 2015; Tiffin et
506 al., 2013). In fact, in samples of adolescents—compared to adults—higher frequency of psychotic
507 like experiences has been observed (Schimmelmann et al., 2013; Shultze-Lutter et al. 2017). In
508 most cases, such experiences have been found to enter spontaneous remission (e.g., Bartels-

509 Velthuis et al., 2011). Nevertheless, the transition rate observed in our investigation (i.e., 11.5% in a
510 14-month mean follow-up period) was in line with recent meta-analytic findings on the psychosis-
511 predictive value of UHR criteria in young adults (e.g., 20% over 2 years; Fusar-Poli et al., 2016),
512 and higher than that observed in an unselected psychiatric adolescent sample (e.g., 3.1% over 12
513 months; Lindgren et al., 2014). To understand this relatively high transition rate, it is important to
514 contextualize the recruitment strategy adopted in the present study. Specifically, participants were
515 recruited from a hospital that is a leading Italian institution for the assessment and treatment of
516 psychosis (Armando et al., 2015). Therefore, many of our patients were referred to us by clinicians
517 within general psychiatric services on the suspicion that the patients were at risk of developing
518 psychosis. This might have resulted in a “pre-assessment enrichment,” similar to that observed
519 among UHR samples recruited from specialized clinical services for psychosis prevention (Fusar-
520 Poli et al., 2015; Fusar-Poli and Shultze-Lutter, 2016). Caution is thus warranted when generalizing
521 the prognostic value of the UHR criteria observed in the present study to unselected adolescent
522 psychiatric samples.

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526 **Authors disclosure**

527

528 **Contributors**

529 Dr. Boldrini conceived the research study, coded the interview transcripts, analyzed the data, and
530 wrote the first draft of the manuscript. Dr. Pontillo assisted with data collection and contributed to
531 the study design. Dr. Tanzilli contributed to data analysis/interpretation and the writing of the
532 manuscript. Dr. Giovanardi coded the interview transcripts and contributed to the writing of the
533 manuscript. Dr. Di Cicilia collected data and contributed to the writing of the manuscript. Drs.
534 Salcuni, Vicari, and Lingiardi contributed to the interpretation of the results and critically reviewed
535 the final draft of the manuscript.

536

537 **Conflict of Interest**

538 The authors declare that they have no competing interests.

539

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812 **Table 1.** Socio-demographic features and CGAS mean scores

	Entire sample (<i>N</i> = 110)	Non-UHR (<i>n</i> = 53)	UHR (<i>n</i> = 57)	
Age (years ± <i>SD</i>)	16.85 ± 2.35	18 ± 2.21	15.79 ± 1.96	<i>t</i> = 5.56**
Gender (M/F)	44 (40%)/66 (60%)	18 (34%)/35 (66%)	26 (45.6%)/31 (54.4%)	p<.01 X ₂ = 1.54 (<i>p</i> = .21)
CGAS (mean ± <i>SD</i>)	52.53 ± 5.46	56.11 ± 4.16	49.21 ± 4.31	<i>t</i> = 8.53** <i>p</i> < .01

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Table 2. AAI classification distribution (three-way, four-way, organized vs. disorganized, and type of disorganization) for non-UHR and UHR patients

Note. F = free/autonomous; Ds = dismissing; E = entangled/preoccupied; U = unresolved; CC = cannot classify. ¹ CC low coherence transcripts were excluded from the three-way distribution. ² The CC category included both CC and U/CC transcripts. ³ The CC low coherence category included both CC and U/CC low coherence transcripts.

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825 **Table 3.** Correlations between RF, putative prodromal psychopathology, and global functioning

	SIPS P1	SIPS P2	SIPS P3	SIPS P4	SIPS P5	CGAS
	Unusual Thought Content/ Delusional Ideas	Suspiciousnes/ Persecutory Ideas	Grandiosity	Perceptual Abnormalities	Disorganized Communicatio n	Global functioning
RF	-.325**	-.342**	-.092	-.184	-.328*	.259**

826 * $p < .05$; ** $p < .01$.

827 **Table 4.** Logistic regression for follow-up time, attachment style, reflective functioning, and the interaction of previous psychological variables in
828 predicting the transition to psychosis

	$\chi^2(df)$	Nagelkerke's R^2	$B(SE)$	Wald(df)	Exp(β) or OR [95% CI]
Step 1	.296(1)	.011			
Follow-up time			.084 (.151)	.307(1)	1.087[.808-1.463]
Step 2	4.955(3)	.178			
Follow-up time			.057(.156)	.132(1)	1.058[.780-1.436]
Secure/insecure attachment (0 = insecure; 1 = secure)			-19.689(11532.316)	.000(1)	.000[.000- -]
Organized/disorganized attachment (0 = disorganized; 1 = organized)			-1.256(1.151)	1.191(1)	.285[.030-2.718]
Step 3	10.264*(4)	.351			
Follow-up time			-.028(.174)	.025(1)	.973[.692-1.368]
Secure/insecure attachment (0 = insecure; 1 = secure)			-17.667(10877.504)	.000(1)	.000[.000- -]
Organized/disorganized attachment (0 = disorganized; 1 = organized)			-2.121(1.292)	2.695(1)	.120[.010-1.508]
RF			-.852(.419)	4.135(1)*	.427[.188-.970]
Step 4	10.264(5)	.351			
Follow-up time			-.028(.174)	.025(1)	.973[.692-1.368]
Secure/insecure attachment (0 = insecure; 1 = secure)			-17.787(11564.739)	.000(1)	.000[.000- -]

Organized/disorganized attachment (0 = disorganized; 1 = organized)	–2.121(1.292)	2.695(1)	.120[.010-1.508]
RF	–.852(.419)	4.135(1)*	.427[.188-.970]
Secure/insecure attachment x organized/disorganized attachment x RF	.695(8364.731)	.000(1)	2.005[.000- –]

829 *Note.* Nagelkerke's R^2 indicates the proportion of variation explained by the model. * $p \leq .05$.

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