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Article type : Original Article

Attachment insecurity partially mediates the relationship between childhood trauma and depression severity in bipolar disorder

Running title: TRAUMA, ATTACHMENT, AND DEPRESSION IN BIPOLAR DISORDER

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This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/ACPS.13419](https://doi.org/10.1111/ACPS.13419)

31

32 **Word count:** 3748 (excluding title page, abstract, references, and tables)

33

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37

38 **Acknowledgements:** With gratitude, we acknowledge the Prechter Longitudinal Study of Bipolar
39 Disorder research participants for their contributions and the research staff for their dedication in the
40 collection and stewardship of the data used in this publication.

41

42 **Author contributions:** **ALW** developed the research question, completed all quantitative analyses, and
43 drafted/edited/approved the final version of the manuscript. **ML** assisted with the quantitative analyses
44 and edited/approved the final version of the manuscript. **AT**, **OMD**, **SMC**, **MB**, and **MGM** developed
45 the research question and edited/approved the final version of the manuscript. All other authors
46 edited/approved the final version of the manuscript.

47

48 **Funding:** **ALW** is supported by a Deakin University Centre of Research Excellence in Psychiatric
49 Treatment Postgraduate Research Scholarship. **SER** is supported by an Australian Government
50 Research Training Program Scholarship. **AJ** is supported by a Deakin University Research Training
51 Program Scholarship. **ML** is supported by an Alfred Deakin Post-Doctorate Research Fellowship
52 (ADPRF). **OMD** is supported by a NHMRC R.D. Wright Biomedical Career Development Fellowship
53 (APP1145634). **SMC** is supported by a NHMRC Senior Research Fellowship (APP1136344). **ERD** is
54 supported by the National Institutes of Mental Health (K23MH109762). **MB** is supported by a NHMRC
55 Senior Principal Research Fellowship (APP1156072). Data collection for the Prechter Longitudinal
56 Study of Bipolar Disorder is supported by Heinz C Prechter Bipolar Program, the Richard Tam
57 Foundation, the Department of Psychiatry and the Eisenberg Family Depression Center at the
58 University of Michigan.

59

60 **Competing interests:** **ALW** has received grant/research support from Deakin University and the
61 Rotary Club of Geelong. **SER** has received grant/research support from Deakin University. **AJ** has
62 received grant/research support from Deakin University. **ML** has received grant/research support from
63 Deakin University. **AT** has received travel/grant support from NHMRC, AMP Foundation, Stroke
64 Foundation, Hunter Medical Research Institute, Helen Macpherson Smith Trust, Schizophrenia
65 Fellowship NSW, SMHR, ISAD, the University of Newcastle, and Deakin University. **OMD** has
66 received grant/research support from the Brain and Behavior Foundation, Simons Autism Foundation,
67 Stanley Medical Research Institute, Deakin University, Lilly, NHMRC, and Australasian Society for

68 Bipolar and Depressive Disorders (ASBDD)/Servier. **OMD** has also received in kind support from
69 BioMedica Nutraceuticals, NutritionCare, and Bioceuticals. **MB** has received grant/research support
70 from the NIH, Cooperative Research Centre, Simons Autism Foundation, Cancer Council of Victoria,
71 Stanley Medical Research Foundation, Medical Benefits Fund, National Health and Medical Research
72 Council, Medical Research Futures Fund, Beyond Blue, Rotary Health, A2 milk company, Meat and
73 Livestock Board, Woolworths, Avant, and the Harry Windsor Foundation, has been a speaker for Astra
74 Zeneca, Lundbeck, Merck, Pfizer, and served as a consultant to Allergan, Astra Zeneca, Bioadvantex,
75 Bionomics, Collaborative Medicinal Development, Lundbeck Merck, Pfizer and Servier. **MGM** has
76 consulted for Otsuka and Janssen Pharmaceuticals and has received grant/research support from Janssen
77 Pharmaceuticals in the past 3 years.

78

79 **Ethical standards:** The authors assert that all procedures contributing to this work comply with the
80 ethical standards of the relevant national and institutional committees on human experimentation and
81 with the Helsinki Declaration of 1975, as revised in 2008.

82 **ABSTRACT**

83 **Background:** Childhood trauma is associated with greater depression severity among individuals with
84 bipolar disorder. However, the mechanisms that explain the link between childhood trauma and
85 depression severity in bipolar disorder remain poorly understood. The mediational role of attachment
86 insecurity in childhood and adulthood was assessed in the current study.

87 **Methods:** Participants with bipolar disorder ($N = 143$) completed measures of childhood trauma
88 (Childhood Trauma Questionnaire), attachment insecurity (Experiences in Close Relationships Scale),
89 and depression severity (Hamilton Depression Rating Scale) as part of the Prechter Longitudinal Study
90 of Bipolar Disorder. A sequential mediation model was tested using path analysis: the direct and indirect
91 effects of childhood trauma on depression severity with attachment insecurity (attachment anxiety and
92 avoidance) in childhood (mother and father) and adulthood (partner) as mediators were estimated.

93 **Results:** The final path model demonstrated an excellent fit to the data (comparative fit index = 0.996;
94 root mean square error of approximation = 0.021 [90% confidence interval = 0.000-0.073]). Supporting
95 the hypothesised sequential mediation model, maternal attachment anxiety in childhood and romantic
96 attachment avoidance in adulthood partially mediated the relationship between childhood trauma and
97 depression severity; this effect accounted for 12% of the total effect of childhood trauma on depression
98 severity.

99 **Conclusion:** Attachment insecurity in childhood and adulthood form part of the complex mechanism
100 informing why people with bipolar disorder who have a history of childhood trauma experience greater
101 depression severity. Addressing attachment insecurity represents a valuable psychotherapeutic
102 treatment target for bipolar disorder.

103

104 **Keywords:** bipolar disorder, depression, childhood abuse, attachment, treatment outcomes

105 **SIGNIFICANT OUTCOMES AND LIMITATIONS**

Significant outcomes This study provides a complex and clinically meaningful model of the interrelations between childhood trauma, attachment insecurity, and depression severity in bipolar disorder.

The present findings suggest that maternal attachment anxiety in childhood and romantic attachment avoidance in adulthood may work to explain why individuals with a history of childhood trauma experience greater depression severity.

However, the results pertaining to the mediational role of attachment insecurity are preliminary; future research is needed to indicate whether the results of the current study can be generalised to other samples.

Limitations Childhood trauma and attachment insecurity in childhood were retrospectively assessed; potentially introducing recall bias.

Childhood trauma and attachment insecurity were measured simultaneously; hence, the possibility of reverse causation cannot be excluded.

There is a potential for overfitting; this calls for replication of the present findings in larger samples.

106

107 **DATA AVAILABILITY STATEMENT**

108 The datasets generated and/or analysed during the current study are not publicly available due to privacy
109 restrictions, but are available from the Prechter Longitudinal Study of Bipolar Disorder ([prechter-data-
110 request@med.umich.edu](mailto:prechter-data-request@med.umich.edu)) on reasonable request.

111 **INTRODUCTION**

112 Bipolar disorder is globally among the ten leading causes of disability ¹. Despite treatment strategies
113 for bipolar disorder being available, treatment outcomes remain suboptimal ^{2,3}. Many patients do not
114 achieve complete remission but continue to have residual symptoms, with almost 70% reporting an
115 affective relapse within two to four years after a previous episode ⁴⁻⁶. As such, novel treatment targets
116 are urgently needed. Childhood trauma is related to a poorer illness course – indicated by greater
117 severity and complexity – of various psychiatric disorders, including bipolar disorder ^{7,8}. In a recent
118 meta-analysis, childhood trauma was linked to more severe depressive symptoms – among other
119 indicators of a worse course of bipolar disorder ⁹. This link persists even in those receiving treatment
120 (A. L. Wrobel, unpublished data, 2021). The underlying mechanisms, however, remain poorly
121 understood.

122

123 **Attachment theory**

124 Attachment theory presents a valuable framework to elucidate the pathways by which childhood trauma
125 may affect the severity of depression in bipolar disorder ¹⁰⁻¹². Attachment refers to an individual's
126 "internal working models" of self and others that are primarily based on interpersonal interactions with
127 caregivers in childhood and shape relationships across the lifespan ¹³. Secure attachments are based on
128 consistent interpersonal experiences with a caregiver who is responsive, accessible, and trustworthy ¹⁴.
129 Conversely, insecure attachments – comprised of attachment anxiety and attachment avoidance – may
130 result from early adverse experiences, an unavailable or inconsistently responsive caregiver ¹⁴.
131 Attachment anxiety is characterised by a strong desire for closeness and fears of rejection or
132 abandonment. Attachment avoidance, on the other hand, is characterised by a strong need for self-
133 reliance and discomfort with intimacy ¹⁴.

134

135 **Childhood trauma and attachment insecurity**

136 Childhood trauma is a risk factor for developing attachment insecurity both in childhood ^{15, 16} and in
137 adulthood ¹⁷⁻¹⁹. For instance, an early meta-analysis of almost 800 infants showed that 80% of infants
138 who were exposed to childhood trauma demonstrated attachment insecurity, compared to only 36% of
139 infants in the control groups ¹⁵. Similarly, using data from a large prospective study ($N = 605$), Dion et
140 al. ¹⁹ highlighted a significant association between childhood trauma and attachment insecurity in
141 adulthood – specifically, attachment anxiety. Notably, these observations align with the notion of
142 attachment continuity across the lifespan implying that attachment insecurity in childhood drives
143 attachment insecurity in adulthood ²⁰⁻²⁴. For example, in their longitudinal study, Nosko et al. ²⁰
144 indicated that good parent-child relationships in adolescence were positively correlated with attachment
145 security and negatively correlated with both attachment anxiety and attachment avoidance later in life.

146

147 **Childhood trauma, attachment insecurity, and depression severity**

148 Relationships between childhood trauma, attachment insecurity in adulthood, and current psychiatric
149 symptoms – including depressive symptomatology – have been highlighted in non-clinical and clinical
150 samples ²⁵⁻²⁹. For instance, Struck et al. ²⁹, in a large sample of participants with major depressive
151 disorder ($N = 580$), demonstrated that both attachment anxiety and attachment avoidance partially
152 mediated the association between childhood trauma and the severity of depressive symptoms. However,
153 there is a lack of research that has explored the mediational role of attachment insecurity in the
154 relationship between childhood trauma and the severity of depression in bipolar disorder. Neither
155 attachment insecurity in childhood nor adulthood has been sufficiently investigated in this context. This
156 is surprising as individuals with bipolar disorder not only frequently report attachment insecurity ³⁰⁻³²
157 but also as attachment insecurity has been implicated as a mediator in the relationship between
158 childhood trauma and other clinical outcomes in this population ³³.

159

160 **Aims of the study**

161 Building on the assumptions of attachment theory and the presented research, attachment insecurity –
162 in childhood and adulthood, respectively – may mediate the association between childhood trauma and
163 the severity of current depressive symptoms among persons with bipolar disorder. To evaluate this
164 hypothesis, we used path modelling and assessed the relationships between childhood trauma,
165 attachment insecurity in childhood, attachment insecurity in adulthood, and depression severity in a
166 sample of participants with bipolar disorder receiving treatment. Here, we considered both attachment
167 anxiety and attachment avoidance as potential mediators. To note, we explicitly tested a sequential
168 mediation model with attachment insecurity in childhood and attachment insecurity in adulthood as
169 sequential mediators of the association between childhood trauma and depression severity. Figure 1
170 displays a simplified representation of our hypothesised model.

171

172 **METHODS**

173 Data from the Prechter Longitudinal Study of Bipolar Disorder (Prechter Study) were utilised for the
174 current study³⁴. The Prechter Study is an open cohort study of people with any bipolar disorder and
175 healthy controls for which data collection started in 2005 and continues. The Institutional Review Board
176 of the University of Michigan provided ethical approval for the Prechter Study; participants were
177 required to give written informed consent prior to completing any research assessments. Comprehensive
178 information pertaining to the design of the Prechter Study has been reported elsewhere³⁴.

179

180 **Participants**

181 For the present study, a subsample of participants with diagnoses of bipolar I disorder, bipolar II
182 disorder, bipolar disorder not otherwise specified (NOS), and schizoaffective disorder (bipolar type)
183 who reported receiving treatment (e.g., outpatient, inpatient, day treatment) at the 2-year follow-up
184 assessment of the Prechter Study was investigated. To be eligible for entry into the Prechter Study,
185 people with bipolar II disorder had to have a history of recurrent depression as well as hypomania.
186 Diagnostic assessments were guided by the Diagnostic Interview for Genetic Studies (DIGS)³⁵. Using
187 a best estimate process – which was completed by at least two doctoral-level clinicians – these diagnoses
188 were validated (i.e., in concordance with the criteria set out in the Diagnostic and Statistical Manual of
189 Mental Disorders, fourth edition [DSM-IV])³⁶. In addition, included participants had provided
190 information on childhood trauma, attachment insecurity, and the severity of their current depressive
191 symptoms.

192

193 **Measures**

194 Participants completed the diagnostic assessment and the measures of childhood trauma and attachment
195 insecurity on entry to the Prechter Study. Depression severity was evaluated at the 2-year follow-up
196 assessment.

197

198 **Diagnosis and demographics.** The DIGS ³⁵ is a well-validated semi-structured clinical interview
199 designed to assess major psychiatric disorders and covers mood as well as psychotic disorders. In
200 addition, demographic information was collected during the clinical interview.

201

202 **Childhood trauma.** Childhood trauma was evaluated with the Childhood Trauma Questionnaire (CTQ)
203 ³⁷. The CTQ, a 28-item self-report questionnaire, is rated on a five-point Likert scale ranging from 1
204 (“never true”) to 5 (“very often true”). The items are responded to in the context of “when you were
205 growing up”. The measure consists of five subscales: physical abuse, sexual abuse, emotional abuse,
206 physical neglect, and emotional neglect (see below for relevant cut-off scores). Although it is a
207 retrospective instrument, evidence of reasonable correlations between the CTQ and prospective
208 measures of childhood trauma is emerging ³⁸. Consistent with previous research ³⁹⁻⁴¹, participants with
209 a score of moderate severity on at least one subscale of the CTQ (physical abuse \geq 10, sexual abuse \geq
210 8, emotional abuse \geq 13, physical neglect \geq 10, emotional neglect \geq 15) ⁴² were coded as having a
211 history of childhood trauma.

212

213 **Attachment insecurity.** Attachment insecurity was assessed with the Experiences in Close
214 Relationships Scale (ECR) ⁴³. The ECR, a 36-item self-report questionnaire, is rated on a seven-point
215 Likert scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). The instrument consists of
216 two subscales: attachment anxiety and attachment avoidance. To obtain a score for the two subscales,
217 the participant’s responses were averaged (score range: 1-7), with higher scores implying greater
218 attachment *insecurity* (i.e., lower attachment security). The ECR was initially developed to assess
219 attachment insecurity in one’s relationships with romantic partner(s) (participants “general experience
220 [of emotionally intimate] relationships”; i.e., attachment in adulthood). For the Prechter Study, the ECR
221 was adapted to retrospectively evaluate participants’ relationships with their mother and father during
222 childhood (“when you were younger”; i.e., attachment in childhood). The 36 items of the ECR were
223 administered three times, each time relating to a different relationship (i.e., partner, mother, father).

224

225 **Depression severity.** Current depression severity was evaluated with the Hamilton Depression Rating
226 Scale (HAM-D) ⁴⁴. The HAM-D, a 17-item clinician-rated scale, measures depressive symptoms
227 experienced during the past week. For the HAM-D, an overall severity score is derived (score range: 0-
228 54), with higher scores indicating greater symptom severity.

229

230 **Treatment status.** Treatment status was determined with information collected during the Longitudinal
231 Interval Follow-up Evaluation (LIFE) ⁴⁵. The LIFE is a semi-structured clinical interview designed to
232 evaluate the longitudinal course of psychiatric disorders. Here it was recorded whether participants
233 reported to currently receive treatment (e.g., outpatient, inpatient, day treatment) and what medications
234 they were taking (e.g., lithium, anticonvulsant, antipsychotic).

235

236 **Statistical analysis**

237 The statistical open-source program R Version 4.1.0⁴⁶ and RStudio⁴⁷ were used to conduct all statistical
238 analyses. We used descriptive statistics (N [%], Mean [SD]) to explore the characteristics of the total
239 sample. We utilised a step-by-step approach to develop our model of how childhood trauma may affect
240 depression severity mediated by attachment insecurity in childhood and adulthood. In all analyses, we
241 distinguished between the two dimensions of attachment insecurity: attachment anxiety and attachment
242 avoidance.

243

244 **Multivariate linear regressions.** First, we fitted a series of multivariate linear regressions to
245 individually assess the relationship between depression severity (i.e., continuous score) and each of the
246 following predictors: childhood trauma (i.e., presence/absence), attachment insecurity in childhood
247 (i.e., attachment anxiety [mother, father], attachment avoidance [mother, father]), attachment insecurity
248 in adulthood (i.e., attachment anxiety [partner], attachment avoidance [partner]); these models were all
249 adjusted for age and gender. Second, we entered the aforementioned variables as predictors of
250 depression severity into one comprehensive model (also adjusted for age and gender).

251

252 **Path analysis.** For the path analysis, we used the 'lavaan' package in R⁴⁸. We entered childhood trauma
253 (i.e., presence/absence), attachment insecurity in childhood (i.e., attachment anxiety [mother, father],
254 attachment avoidance [mother, father]), and attachment insecurity in adulthood (i.e., attachment anxiety
255 [partner], attachment avoidance [partner]) as predictors. In addition to the primary path analysis, we ran
256 similar (exploratory) models using each of the subtypes of childhood trauma (i.e., physical abuse, sexual
257 abuse, emotional abuse, physical neglect, emotional neglect) as a predictor. Childhood trauma (or its
258 subtypes) was entered with a direct effect on depression severity and indirect effects via attachment
259 insecurity. Paths from age and gender to depression severity as well as to all predictors were additionally
260 included. Upon model estimation, we removed non-significant ($p > .050$) paths and re-estimated the
261 model. The covariances between attachment anxiety (mother, father) and avoidance (mother, father) in
262 childhood and the covariance between attachment anxiety (partner) and avoidance (partner) in
263 adulthood were added. Standardised estimates (including their 95% confidence intervals [CI]) were
264 calculated for all path coefficients.

265

266 The comparative fit index (CFI) and the root mean square error of approximation (RMSEA), standard
267 fit indices, were used to evaluate goodness of fit of the final path model⁴⁹. A CFI of 0.90 or above and
268 a RMSEA of less than 0.08 are widely recognised as indicators of a good model fit^{50, 51}. For the
269 RMSEA, we additionally report the 90% CI, indicating the precision of the estimate⁵²; a CI upper
270 bound below 0.08 suggests a good fit⁵².

271

272 **Direct and indirect effects.** To investigate the mediational role of attachment insecurity, we computed
273 direct and indirect effects with the ‘lavaan’ package⁴⁸. In ‘lavaan’, indirect effects are calculated by
274 taking the product of the path coefficients that constitute the effect. To evaluate the significance of the
275 direct and indirect effects, we used 95% bootstrapped CIs with 1000 random re-samples. Additionally,
276 we computed the proportion of the total effect mediated through attachment insecurity (indirect
277 effects/total effect).

278

279 RESULTS

280 Sample description

281 Our sample comprised 143 participants with bipolar disorder of whom 53% ($n = 76$) reported a history
282 of childhood trauma (with a mean CTQ total score of 45.2 [$SD = 18.0$]). More specifically, 18.3%
283 reported a history of physical abuse, 29.6% of sexual abuse, 34.0% of emotional abuse, 18.9% of
284 physical neglect, and 26.2% of emotional neglect. The mean scores on the CTQ subscales ranged from
285 7.5 ($SD = 4.0$; for physical abuse) to 11.6 ($SD = 5.3$; for emotional neglect). The mean scores on the
286 ECR subscales ranged from 2.6 ($SD = 1.5$; for anxiety [mother]) to 4.3 ($SD = 1.6$; for avoidance
287 [father]). The mean ECR scores for attachment anxiety in adulthood (partner; $M = 3.7$, $SD = 1.5$) and
288 attachment avoidance in adulthood (partner; $M = 3.3$, $SD = 1.3$) are comparable to reported non-clinical
289 population norms (anxiety: $M = 3.6$, $SD = 1.1$; avoidance: $M = 2.9$, $SD = 1.2$)⁵³. The mean HAM-D
290 total score was 8.7 ($SD = 7.6$), reflecting mild depression severity. Table 1 shows further details of the
291 descriptive characteristics of the sample included in our analyses.

292

293 Relationships between childhood trauma, attachment insecurity, and depression severity

294 **Multivariate linear regressions – individual models.** Table 2a shows the results from the individual
295 multivariate linear regressions. Childhood trauma, increased attachment anxiety in childhood (mother),
296 increased attachment avoidance in childhood (mother), and increased attachment avoidance in
297 adulthood (partner) were significantly related to depression severity.

298

299 **Multivariate linear regression – comprehensive model.** Table 2b shows the results from the
300 comprehensive multivariate linear regression. The association between childhood trauma and
301 depression severity as well as the association between increased attachment avoidance in adulthood
302 (partner) and depression severity remained significant. Increased attachment anxiety in childhood
303 (mother) and increased attachment avoidance in childhood (mother) were no longer significantly related
304 to the severity of depressive symptoms.

305

306 **Path analysis.** Figure 2 displays our final path model. There was a significant path from childhood
307 trauma to depression severity ($p = .001$) as well as significant paths from childhood trauma to
308 attachment anxiety in childhood (mother, father) and attachment avoidance in childhood (mother,

309 father) (all $p < .001$). In turn, the paths from attachment anxiety in childhood (mother) to attachment
310 anxiety in adulthood (partner) and attachment avoidance in adulthood (partner) (all $p < .001$) were
311 significant as well as the path from attachment avoidance in childhood (mother) to attachment anxiety
312 in adulthood (partner) ($p = .006$). Finally, there was a significant path from attachment avoidance in
313 adulthood (partner) – but not from attachment anxiety in adulthood (partner) – to depression severity (p
314 $< .001$). This model demonstrated excellent fit to the data (CFI = 0.996; RMSEA = 0.021 [90% CI =
315 0.000 – 0.073]). The exploratory path models showed similar relationships between the subtypes of
316 childhood trauma, attachment insecurity in childhood, attachment insecurity in adulthood, and
317 depression severity; however, there were no significant paths from physical or emotional abuse to
318 depression severity (for further details, see the Supplementary Material).

319

320 **Direct and indirect effects.** Considering the mediational role of attachment insecurity, our model
321 shows a significant direct effect of childhood trauma on depression severity (standardised $\beta = 0.24$, 95%
322 bootstrap CI = 0.10 – 0.39, $p = .001$) as well as an indirect effect via attachment anxiety in childhood
323 (mother) and attachment avoidance in adulthood (partner), respectively (standardised $\beta = 0.03$, 95%
324 bootstrap CI = 0.01 – 0.06, $p = .019$); suggesting a partial mediation model (Figure 2). The indirect
325 effect accounted for 12% of the total effect of childhood trauma on depression severity (standardised β
326 = 0.12, 95% bootstrap CI = 0.003 – 0.23, $p = .044$). The final path model explained 15% of the variance
327 in depression severity.

328

329 DISCUSSION

330 The purpose of this study was to examine attachment insecurity – including attachment anxiety and
331 attachment avoidance – in childhood and adulthood as plausible mechanistic pathways underlying the
332 link between childhood trauma and current depression severity in a sample of individuals with bipolar
333 disorder receiving treatment. Our results suggest that maternal attachment anxiety in childhood and
334 romantic attachment avoidance in adulthood, respectively, partially mediate the relationship between
335 childhood trauma and depression severity in bipolar disorder. Importantly, this indirect link between
336 childhood trauma and depression severity via attachment insecurity was supported by our exploratory
337 analyses of the subtypes of childhood trauma. These factors may thus represent salient psychological
338 mechanisms that influence the clinical outcomes of bipolar disorder.

339

340 The current findings are in line with the assumptions of attachment theory. Multiple attachments are
341 assumed to be organised in an “attachment hierarchy”, with the person at the top being favoured for the
342 fulfilment of attachment needs; in childhood, this is often the mother^{54, 55}. Regarding the attachment
343 hierarchy, the mother continues to be a significant figure across the lifespan⁵⁶⁻⁵⁸; likely playing a distinct
344 role in determining the quality of future attachments. For example, in their longitudinal study, Doyle et
345 al.²² indicated links between maternal attachment insecurity – but not paternal attachment insecurity –

346 and romantic attachment insecurity in adolescence. Additionally, maternal attachment insecurity was a
347 unique predictor of increases in romantic attachment insecurity over time; informing the mediational
348 role of maternal attachment anxiety highlighted in the present model.

349

350 Within the attachment framework, attachment insecurity is postulated to encourage interpersonal
351 behaviours which hamper the development of positive, satisfying, and healthy relationships in
352 adulthood⁵⁹. More specifically, by avoiding intimacy and self-disclosure, avoidantly attached
353 individuals are likely to have largely superficial relationships and frequently experience relationship
354 dissolution⁵⁹. This may lead to a perceived lack of social support, which, in turn, is associated with
355 greater symptom severity among persons with psychiatric disorders⁶⁰⁻⁶³.

356

357 Supporting this hypothesis, attachment insecurity in adulthood and low social support have recently
358 been shown to sequentially mediate the relationship between childhood trauma and depression severity
359 in a sample of participants with major depressive disorder²⁹. Using a non-clinical sample, Pascuzzo et
360 al.²¹ also highlighted a negative association between attachment avoidance in adulthood and support-
361 seeking behaviour during stressful situations. As such, avoidantly attached individuals may be less
362 likely to openly communicate their emotions or ask others for help with managing psychological
363 distress and other negative emotional states, such as depression^{64, 65}; explaining why romantic
364 attachment avoidance may act as a mediator in the current study.

365

366 **The mechanism underlying the effect of childhood trauma: insights from the broader literature**

367 Overall, our findings are consistent with the broader literature: for other psychiatric disorders, there is
368 a demonstrated pathway from childhood trauma through attachment insecurity to psychopathology.
369 Although the body of evidence is limited, attachment insecurity in adulthood has been shown to mediate
370 the association between childhood trauma and symptom severity in both major depressive disorder²⁹
371 and psychosis⁶⁶⁻⁶⁸. Interestingly, these studies identified both attachment anxiety and attachment
372 avoidance as promising mediators, contrasting with our findings. Unlike these studies, however, we
373 considered attachment insecurity both in childhood and adulthood in our path model. Hence, our
374 research may provide a more complete picture of the relationships between childhood trauma,
375 attachment insecurity, and symptom severity.

376

377 Whilst this study suggests that attachment insecurity might mediate the association between childhood
378 trauma and symptom severity in bipolar disorder, other psychological mechanisms have been
379 considered in this population^{69, 70}. For example, affective lability, impulsivity, and hostility have
380 previously been established as crucial mediators that partially explain the link between childhood
381 trauma and several clinical characteristics of bipolar disorder; this includes the number of mood
382 episodes as well as rates of suicide attempts and comorbidities⁷¹⁻⁷³. Interestingly, not only these trait-

383 like features but also childhood trauma and attachment insecurity are core elements of borderline
384 personality disorder⁷⁴. This is noteworthy as even the presence of one feature of borderline personality
385 disorder has a meaningfully adverse impact on the outcome of mood disorders⁷⁵.

386

387 **Strengths, limitations, and future directions**

388 The present study builds on prior work and provides a comprehensive assessment of the relationships
389 between childhood trauma, attachment insecurity, and depression severity in a sample of participants
390 with bipolar disorder. By exploring the subtypes of childhood trauma as well as by examining
391 attachment insecurity in childhood and adulthood, we obtained an inclusive, nuanced, and multifaceted
392 understanding of the mediational role of attachment insecurity. To date, only a small number of path
393 analyses that focus specifically on samples of participants diagnosed with bipolar disorder have been
394 conducted. As such, the identification of mechanistic models that clarify the relationship between
395 childhood trauma and clinical outcomes in bipolar disorder is still in its infancy. Therefore, the current
396 study is of significant theoretical and clinical relevance.

397

398 Several limitations need to be noted. First, childhood trauma and attachment insecurity in childhood
399 were retrospectively assessed; thus, participants' responses may have been influenced by recall bias.
400 Then, childhood trauma and attachment insecurity (both in childhood and adulthood) were measured
401 simultaneously; hence, the possibility of reverse causation (e.g., behaviours related to attachment
402 insecurity in childhood result in childhood trauma) cannot be excluded. Depression severity was
403 prospectively assessed, which represents a significant strength of the present path analysis.
404 Nevertheless, these limitations highlight the need for long-term cohort studies that would allow for a
405 better evaluation of the directionality of the effects. Additionally, there is a potential for overfitting in
406 our path model, which calls for replication of the present findings in larger samples. Furthermore, the
407 average age of our sample was 47.6: due to the changes in the caregiving role of mothers and fathers in
408 more contemporary family dynamics^{76,77}, our results may not apply to younger samples.

409

410 Finally, the present model only explained a relatively small (15%) proportion of the total variance in
411 depression severity, suggesting the existence of other vital processes. For example, investigating the
412 role of participants' demographic characteristics (e.g., gender, current relationship status, childhood
413 family structure) in the link between childhood trauma, attachment insecurity, and depression severity
414 may represent a valuable avenue for future research. Also, the CTQ does not collect data on
415 characteristics that provide greater detail about a participant's history of childhood trauma. Age at
416 exposure, for instance, has been shown to moderate the effect of childhood trauma on symptom severity
417 and functional outcomes in participants with early psychosis^{78, 79}. Relevant characteristics of
418 participants' childhood trauma should be considered in future studies that examine the link between
419 childhood trauma and the clinical outcomes of bipolar disorder.

420

421 **Implications**

422 Even when receiving guideline-recommended treatments for bipolar disorder, patients with a history of
423 childhood trauma experience worse treatment outcomes, including greater severity of depressive
424 symptoms (A. L. Wrobel, unpublished data, 2021). The current results suggest that identifying and
425 addressing operative pathways like attachment insecurity during treatment may be a worthy therapeutic
426 goal – especially during psychotherapy. Previous research demonstrated that attachment insecurity
427 might result in weaker therapeutic alliances⁸⁰ which can reduce adherence to pharmacotherapy⁸¹⁻⁸³ and
428 negatively impact the success of psychotherapy⁸⁴⁻⁸⁷. However, a growing body of research stresses that
429 attachment security is increased by psychological interventions^{84, 88}; notably, several psychological
430 interventions, including Schema Therapy⁸⁹ and Compassion Focused Therapy⁹⁰, specifically target
431 attachment insecurity. Individualising the treatment plan, and considering relevant contextual factors,
432 such as childhood trauma and attachment insecurity, may significantly facilitate treatment success in
433 bipolar disorder.

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675

Table 1. Descriptive characteristics of the total sample ($N = 143$).

Gender (female)	<i>n</i> (%)	97 (67.8)
Age	Mean (<i>SD</i>)	47.6 (14.1)
Ethnicity	<i>n</i> (%)	
Caucasian		130 (90.9)
African-American		9 (6.3)
Asian		2 (1.4)
Multiracial		1 (0.7)
Unknown/not reported		1 (0.7)
Marital status	<i>n</i> (%)	
Never married		61 (42.7)
Married		57 (39.9)
Divorced/separated		23 (16.1)
Widowed		2 (1.4)
Type of bipolar disorder	<i>n</i> (%)	
Bipolar I disorder		94 (65.7)
Bipolar II disorder		34 (23.8)
Bipolar NOS		10 (7.0)
Schizoaffective disorder (bipolar type)		5 (3.5)
Childhood trauma (CTQ)	Mean (<i>SD</i>)	
Any childhood trauma		45.2 (18.0)
Physical abuse		7.5 (4.0)
Sexual abuse		7.9 (5.4)
Emotional abuse		10.7 (5.0)
Physical neglect		7.6 (3.3)
Emotional neglect		11.6 (5.3)
Attachment insecurity in childhood (ECR)	Mean (<i>SD</i>)	
Anxiety (mother)		2.6 (1.5)
Anxiety (father)		2.9 (1.5)
Avoidance (mother)		3.8 (1.7)
Avoidance (father)		4.3 (1.6)
Attachment insecurity in adulthood (ECR)	Mean (<i>SD</i>)	
Anxiety (partner)		3.7 (1.5)
Avoidance (partner)		3.3 (1.3)
Depression severity (HAM-D)	Mean (<i>SD</i>)	8.7 (7.6)

Medications (LIFE)	<i>n</i> (%)
Lithium	30 (21.1)
Anticonvulsant	79 (55.6)
Antipsychotic	64 (45.1)
Antidepressant	77 (54.2)
Sedative	48 (33.8)
Stimulant	15 (10.6)

Abbreviations. CTQ = Childhood Trauma Questionnaire; ECR = Experiences in Close Relationships Scale; HAM-D = Hamilton Depression Rating Scale; LIFE = Longitudinal Interval Follow-up Evaluation; SD = Standard Deviation.

Note. CTQ subscale scores can range from 5 to 25. ECR subscale scores can range from 1 to 7. HAM-D total scores can range from 0 to 54.

676

Table 2a. Relationships between childhood trauma, attachment insecurity, and depression severity, adjusted for age and gender – results from the individual models.

Predictor	Expected mean change in depression severity (β , 95% CI)	<i>p</i> -value
Childhood trauma	4.48 (1.98 – 6.98)	.001
Attachment insecurity in childhood		
Anxiety (mother)	1.33 (0.49 – 2.16)	.002
Anxiety (father)	0.48 (-0.39 – 1.34)	.277
Avoidance (mother)	1.15 (0.45 – 1.86)	.001
Avoidance (father)	0.35 (-0.43 – 1.13)	.375
Attachment insecurity in adulthood		
Anxiety (partner)	0.72 (-0.15 – 1.59)	.102
Avoidance (partner)	1.82 (0.89 – 2.75)	<.001

Abbreviations. CI = Confidence Interval.

Note. Estimates in bold are significant at $p < .050$.

677

Table 2b. Relationships between childhood trauma, attachment insecurity, and depression severity, adjusted for age and gender – results from the comprehensive model.

Predictor	Expected mean change in depression severity (β , 95% CI)	<i>p</i> -value
Childhood trauma	3.15 (0.34 – 5.97)	.029
Attachment insecurity in childhood		
Anxiety (mother)	0.49 (-0.83 – 1.82)	.464
Anxiety (father)	-0.30 (-1.60 – 1.00)	.650
Avoidance (mother)	0.33 (-0.71 – 1.38)	.531

Avoidance (father)	-0.15 (-1.24 – 0.95)	.791
Attachment insecurity in adulthood		
Anxiety (partner)	-0.17 (-1.20 – 0.86)	.744
Avoidance (partner)	1.55 (0.44 – 2.66)	.007

Abbreviations. CI = Confidence Interval.

Note. Estimates in bold are significant at $p < .050$.

678

679 **Figure 1.** Hypothesised model of childhood trauma, attachment insecurity, and depression severity.

680 **Figure 2.** Path model of childhood trauma, attachment insecurity in childhood, attachment insecurity
681 in adulthood, and depression severity.

682 Standardised estimates for all path coefficients are reported.

683 The paths with p -values $> .050$, the paths from age and gender, and the covariances were omitted for visual clarity.

Table 1. Descriptive characteristics of the total sample (N = 143).

Gender (female)	n (%)	97 (67.8)
Age	Mean (SD)	47.6 (14.1)
Ethnicity	n (%)	
Caucasian		130 (90.9)
African-American		9 (6.3)
Asian		2 (1.4)
Multiracial		1 (0.7)
Unknown/not reported		1 (0.7)
Marital status	n (%)	
Never married		61 (42.7)
Married		57 (39.9)
Divorced/separated		23 (16.1)
Widowed		2 (1.4)
Type of bipolar disorder	n (%)	
Bipolar I disorder		94 (65.7)
Bipolar II disorder		34 (23.8)
Bipolar NOS		10 (7.0)
Schizoaffective disorder (bipolar type)		5 (3.5)
Childhood trauma (CTQ)	Mean (SD)	
Any childhood trauma		45.2 (18.0)
Physical abuse		7.5 (4.0)
Sexual abuse		7.9 (5.4)
Emotional abuse		10.7 (5.0)
Physical neglect		7.6 (3.3)
Emotional neglect		11.6 (5.3)
Attachment insecurity in childhood (ECR)	Mean (SD)	
Anxiety (mother)		2.6 (1.5)
Anxiety (father)		2.9 (1.5)
Avoidance (mother)		3.8 (1.7)
Avoidance (father)		4.3 (1.6)
Attachment insecurity in adulthood (ECR)	Mean (SD)	
Anxiety (partner)		3.7 (1.5)
Avoidance (partner)		3.3 (1.3)
Depression severity (HAM-D)	Mean (SD)	8.7 (7.6)
Medications (LIFE)	n (%)	
Lithium		30 (21.1)
Anticonvulsant		79 (55.6)
Antipsychotic		64 (45.1)
Antidepressant		77 (54.2)

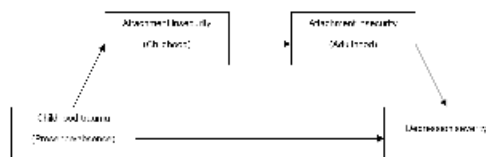
Sedative	48 (33.8)
Stimulant	15 (10.6)

Abbreviations. CTQ = Childhood Trauma Questionnaire; ECR = Experiences in Close Relationships Scale; HAM-D = Hamilton Depression Rating Scale; LIFE = Longitudinal Interval Follow-up Evaluation; SD = Standard Deviation.

Note. CTQ subscale scores can range from 5 to 25. ECR subscale scores can range from 1 to 7. HAM-D total scores can range from 0 to 54.

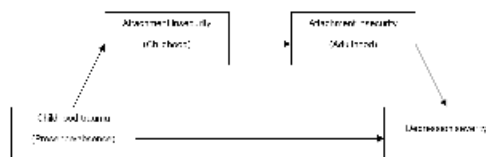
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