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Risk Factor "Mentally Ill Mother": Transgenerational Transmission of Mental Disorders in Children until Emerging Adulthood

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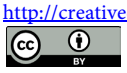

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Abstract

Background: Children of mentally ill parents are at an increased risk of developing mental disorders themselves. Whether this risk is consistently higher or varies from childhood until emerging adulthood, and which specific mental disorders children of mentally ill parents are susceptible to, has not yet been sufficiently investigated. **Method:** A sample of $N = 216$ mother-child dyads with children in emerging adulthood ($M = 22.2$ years) who participated in a longitudinal prevention study (18-year follow-up) were assessed using a half-structured clinical interview on mental disorders including current and lifetime diagnoses. Survival analyses were employed to examine whether the risk factor "mentally ill mother" is associated with a consistently higher (vs. time-varying) risk of mental disorders in children regarding any mental disorder, depressive, and anxiety disorders. **Results:** The risk factor "mentally ill mother" was associated with a consistently increased risk for children to develop a mental disorder (OR = 1.49), but not with an increased risk for depressive (OR = 1.35) or anxiety disorders (OR = 1.05). Maternal depressive disorders were not associated with an increased risk for child mental disorders (OR = 1.00 to 1.26). Maternal anxiety disorders were associated with a consistently increased risk for children to develop any mental health disorder (OR = 1.93) and anxiety disorders specifically (OR = 1.88). **Conclusions:** The risk associated with a mentally ill mother seems to be constant throughout childhood, adolescence, and emerging adulthood. Maternal anxiety disorders particularly increase the risk for child psychopathology. Further research on the temporal progression of this particular risk factor until emerging adulthood is needed, including a wider range of disorder domains.

Keywords

Mental Disorders, Depressive Disorders, Anxiety Disorders, Transgenerational Transmission, Emerging Adulthood

1. Introduction

Approximately 970 million people worldwide live with mental disorders (World Health Organization, 2022). Children of parents with mental disorders have an increased risk to develop mental disorders themselves (van Santvoort et al., 2015). According to a meta-analysis by Rasic, Hajek, Alda, & Uher (2014), more than half of the offspring of parents with severe mental disorders also have a mental disorder. Children of mentally ill parents are almost three times more likely to report mental health problems than children of parents with no mental health problems (Plass-Christl et al., 2017). The number of children in this at-risk group is large because many people with mental disorders are parents. According to a meta-analysis by Maybery & Reupert (2018), between 12 and 45% of adults receiving psychiatric treatment have minor children.

Mental disorders in childhood and adolescence are of particular importance, as these are critical developmental stages in which the foundation for cognitive, social, and emotional skills are laid (Paus, Keshavan & Giedd, 2008; World Health Organization, n.d.). The consequences of non-treatment extend into adulthood (Fryers & Brugha, 2013; World Health Organization, n.d.). In their longitudinal study, Patton et al. (2014) showed that persistent mental disorders in adolescence are a strong predictor of mental illness in emerging adulthood. However, approximately 15% of those affected only develop a first mental disorder between the ages of 18 and 25 (Solmi et al., 2022). This highlights the relevance of including this age group in research on disorder onset, which has previously often been neglected. Mental disorders furthermore cause a high burden of disease (Vigo, Thornicroft, & Atun, 2016; World Health Organization, 2022) and are cost intensive (Trautmann, Rehm, & Wittchen, 2016). Accordingly, research on risk factors for mental disorders, especially among young people, is highly relevant. The current study addresses this relevance by examining the risk factor of a mentally ill mother, with an emphasis on the temporal progression of the risk from childhood to emerging adulthood.

1.1. Theoretical Background

In recent decades it has extensively been demonstrated that children of mentally ill parents have an increased risk of developing mental disorders themselves, as shown by many reviews and meta-analyses (Lawrence, Murayama, & Creswell, 2019; Leijdesdorff, van Doesum, Popma, Klaassen, & Van Amelsvoort, 2017; Rasic et al., 2014; van Santvoort et al., 2015). The size of the reported risk differs

considerably between studies. In their systematic review, van Santvoort et al. (2015) examined the prevalences of mental disorders in children of parents with depression, bipolar disorder, and anxiety disorders from 76 studies. For children of a depressed parent, the odds ratio for depression, for example, ranged from 1.9 to 42.1. On average, children had a 4.4 to 8.7-fold increased risk for depression and a 3.3 to 5.0-fold increased risk for anxiety disorders, depending on the parental diagnosis. Dean et al. (2010) examined a wide range of mental disorders in parents and children on a data set that included all children born in Denmark between 1980 and 1994. In families in which one parent had a mental disorder, the incidence of mental disorder in children was 1.8 to 2.8 times higher in subsequent years than in unaffected families. In a study with more than 6000 families in Australia, a 2.6-fold increased risk of child mental disorders was reported if one parent had at least one lifetime diagnosis (Johnson, Lawrence, Perales, Baxter, & Zubrick, 2018). If both parents are affected by mental health problems, the risk for children appears to be even higher (Bijl, Cuijpers, & Smit, 2002; Dean et al., 2010; Gottesman, Laursen, Bertelsen, & Mortensen, 2010; McLaughlin et al., 2012; Suess et al., 2022). The same is true for higher symptom severity in parents (Elbracht et al., 2023; Johnson et al., 2018; Johnston, Schurer, & Shields, 2013) and comorbidity (Johnson et al., 2018; McLaughlin et al., 2012; van Santvoort, Hosman, van Doesum, & Janssens, 2014).

In addition to the question of how often children of mentally ill parents become mentally ill themselves, there have also been a few investigations on whether children develop the same disorders as their parents or not. Leijdesdorff et al. (2017) summarize that parental anxiety disorders are particularly often associated with anxiety disorders in the offspring. In contrast, other parental mental illnesses seem to be associated with a wider range of mental illnesses in the children (Leijdesdorff et al., 2017). A similar conclusion was drawn by van Santvoort et al. (2015), the authors, however, add that parental depression and bipolar disorders are also partly associated with specific risks, as children often develop the same disorders. A review of the WHO World Mental Health Surveys results by McLaughlin et al. (2012) supports this finding. They report that associations between parental and child mental disorders are generally slightly higher within a disorder domain than between different disorder domains. Each of the parental mental disorders studied, however, was also associated with an increased risk of other mental disorders in children. In summary, some specificity can usually be found in the transmission of mental disorders, but the offspring of parents with mental disorders also have an increased risk for mental disorders in general. Thorup et al. (2018), for example, suggest a disorder-unspecific transmission considering a general psychopathology factor, which describes a generally higher vulnerability to psychopathology (Caspi et al., 2014).

Despite the numerous investigations, insufficient research has been conducted to determine *when* the risk posed by mentally ill parents is at its highest. It can be assumed that, regardless of age, the risk is increased compared to children of

mentally healthy parents (Ertem, 2011). Nevertheless, there is still a possibility that the risk varies over time relative to the risk of disorder onset in children of mentally healthy parents, meaning that the risk for disorder onset is larger in certain age groups than in others. Knowledge of particularly vulnerable age groups would enable the targeted use of selective preventive interventions before disorder onset. Circumstantial evidence for time-varying risks is provided by studies showing that children of mentally ill parents develop disorders earlier than children of mentally healthy parents. Early age of onset, in turn, is associated with longer time to treatment and more chronic courses (De Girolamo, Dagani, Purcell, Cocchi, & McGorry, 2012; Kessler et al., 2007). A significantly increased risk of earlier onset was found, for example, by Weissman et al. (2016). They reported a low overall prevalence rate but also a 10-fold increased risk of prepubertal onset of depression among offspring of depressed parents compared to offspring of nondepressed parents. Rep et al. (2022) and Nierenberg et al. (2007) found a significant association between family history of psychological distress and onset of a depressive episode before age 18. Earlier onset of bipolar disorder is also associated with parental as well as grandparental exposure to psychiatric difficulties (Post et al., 2016). Benatti et al. (2016) also found an earlier age of onset in patients with generalized anxiety disorder, panic disorder, or obsessive-compulsive disorder when mental disorders in the family were reported. However, the findings are heterogeneous and there are also studies yielding no significant associations. Schreier, Wittchen, Höfler, & Lieb (2008), for example, found that anxiety disorders did not begin earlier in children of mothers with anxiety disorders than in children of mothers without anxiety disorders. Birmaher et al. (2004) found no association between earlier onset of depression in children and parental psychiatric history. Similarly, in a study by Milne et al. (2009), a family history of mental illness in depression, anxiety disorders, and alcohol and drug dependence was not associated with an earlier age of onset. In addition to these studies of age of onset of mental disorders, there is sporadic evidence of the possibility of variation in the risk to which children of mentally ill parents are exposed. Paananen, Tuulio-Henriksson, Merikukka, & Gissler (2021) reported a high risk throughout childhood until emerging adulthood, but risk based on maternal psychopathology appeared to be highest in children's teenage years. In addition, Roetner et al. (2022) found that children's mental health problems were not related to maternal depression scores in elementary school age but had a significant association in adolescence. Evidence for temporal variation in risk is also found at the level of individual mechanisms. For example, the influences of genetics and environment on the development of mental disorders vary by age (Bergen, Gardner, & Kendler, 2007; Patterson et al., 2018). Examining the time dependence of the risk posed by mentally ill parents can provide insight into when the complex interplay of different transmission mechanisms has the greatest impact on children.

A bibliometric analysis by Andersen & Lund (2020) concludes that most studies on parental mental disorders have focused on specific diagnoses. In fact,

many studies are limited to specific parental and/or child disorders (Leis & Mendelson, 2010; Liang et al., 2023; Manczak, Williams, & Chen, 2017; Roetner et al., 2022). To the best of the authors' knowledge, there has not yet been a study examining the risk of maternal mental health history over time in offspring, taking into account a wider range of parental and child mental disorders. In addition, many studies have used collateral informants' reports to assess parents' or children's psychopathology instead of collecting self-reports from parent-child dyads (Kang et al., 2022; Leis & Mendelson, 2010; McLaughlin et al., 2012). Children's mental health problems were also often assessed by using questionnaires rather than structured clinical interviews (Elbracht et al., 2023; Hancock et al., 2013; Suess et al., 2022). Structured clinical interviews, however, allow for a valid and reliable diagnosis and additionally leave room for the clinical judgment of experienced diagnosticians (Margraf & Schneider, 2018). In addition, studies examining the prevalence of mental health disorders in families have so far often surveyed children or adolescents (Hancock, Mitrou, Shipley, Lawrence, & Zubrick, 2013; Jaffee et al., 2021; Johnco et al., 2021; Johnson et al., 2018; Thorup et al., 2018), thereby failing to observe the onset of mental health disorders in *emerging adults* (*EA*). Emerging adulthood describes the age range from 18 years old to the mid-/late twenties and is considered a separate and important developmental period (Arnett, 2007). Development in this period is very heterogeneous and can be challenging, as it is characterized by identity exploration, important decisions, and experiences, e.g., regarding romantic relationships and work life (Arnett, 2007). The relevance of this period is emphasized by the prevalence rate of mental health problems in this age group: More than 50 percent of EA meet the criteria for at least one lifetime mental disorder (Kessler & Wang, 2008), and the 12-month prevalence rate is higher than that in any other age group (Jacobi & Groß, 2014). A meta-analysis furthermore showed that worldwide, the first mental disorder occurs before the age of 18 years in 48% of those affected, and before the age of 25 in 63% (Solmi et al., 2022). Consequently, it seems reasonable to take EA into account when investigating the prevalence rates and the transgenerational transmission of mental disorders.

1.2. Aims

The study at hand aimed to advance the existing research literature by investigating the risk factor "mentally ill mother" for mental disorders in their offspring from childhood to emerging adulthood. No restriction was made to specific diagnoses in mothers or children, and both mothers and children were interviewed individually regarding their mental disorders using a structured clinical interview. Besides the general risk for mental disorders, to detect differences between disorder domains, two of the domains with the highest prevalence rates—anxiety disorders and depressive disorders (Jacobi et al., 2014; Polanczyk, Salum, Sugaya, Caye, & Rohde, 2015)—were analyzed separately. First, we examined 1) whether maternal mental disorders represent a consistent vs. time-varying risk for (a) all

mental disorders, (b) depressive disorders, and (c) anxiety disorders in EA children. Second, we analyzed 2) whether the risk associated with maternal depressive disorders on EA children's (a) mental disorders in general as well as (b) depressive disorders specifically varies over time. Third, we 3) analyzed whether maternal anxiety disorders are associated with a consistent or time-varying risk for (a) any mental disorder and (b) anxiety disorders in EA children.

2. Method

2.1. Procedure

Data were collected as part of the German DFG-funded project (German Research Foundation) *Future Family IV* (FF-IV, funding Code: JO 1632/1-1), which is the 18-year catamnesis of the longitudinal prevention study *Future Family* (FF (Heinrichs, Bertram, Kuschel, & Hahlweg, 2005; Heinrichs & Jensen-Doss, 2010; Supke, Ferling, Hahlweg, & Schulz, 2021)). The FF studies investigated the effectiveness of a preventive parenting training and the development of different child and family characteristics. In 2001, $N = 280$ families were recruited from different kindergartens in Braunschweig, Germany (FF-I). All 33 child day care centers (kindergarten) in Braunschweig were informed about the FF research project. Of these, 23 expressed their interest to participate and 17 (74%) were randomly selected, using a stratified randomization to assign the intervention to the day care centers. The families were then recruited from the 17 day care institutions. Of the final eligible population of 915 families, $N = 280$ families agreed to participate in the study (recruitment rate: 31%). As families with lower socioeconomic status were underrepresented in the FF-I sample, in 2003, an additional $N = 197$ families were recruited from 15 randomly selected municipal child day care centers in socially disadvantaged areas of Braunschweig (FF-II; see (Heinrichs & Jensen-Doss, 2010)) for further information on study design and recruitment). The initial sample of the FF-project thus consisted of $N = 477$ families. The study participants were families with at least one child at kindergarten age which were reassessed six times over four years within the FF-I project (Pre, Post, 1- to 4-year follow-up) and four times over two years within the FF-II project (Pre, Post, 1- to 2-year follow-up). For the 18-year catamnesis (FF-IV), families that had previously participated in the FF project were contacted by post and informed about the new assessment. A total of $N = 316$ families from the FF-I and FF-II agreed to participate in the FF-IV, which equals a retention rate of 67%. The assessment took place from January 2020 to January 2022 and included a 1.5-hour interview on the current life situation, a structured clinical interview, and a set of questionnaires. EAs and their parents were assessed separately. Due to the COVID-19 pandemic, most interviews were conducted via telephone. Questionnaires were completed online or as paper-pencil questionnaires. The interview started with questions about the participants' current life situations, followed by the clinical interview. Participants gave their written informed consent, and each received a 50€ financial incen-

tive for completing both the interview and questionnaires. The ethics committee of the University of Braunschweig reviewed and approved all procedures (D-2020-09).

2.2. Participants

A total of $N = 294$ emerging adults and $N = 292$ parents ($n = 261$ mothers, $n = 18$ fathers, $n = 13$ mother-father dyads) participated in the 18-year catamnesis. For the following analyses, we excluded families in which only one member (parent or child) participated, fathers (because of the small sample size), and mothers who were not their child's biological mother. We also excluded dyads in which the child developed a mental disorder before the mother did, or in which the order of onset of the mental disorders could not be determined, leading to a total sample size of $N = 216$ mother-child dyads.

The EAs were aged 19 to 26 years ($M = 22.2$ years; $SD = 1.2$), 48% ($n = 103$) were female, and 32% ($n = 68$) still lived with their parents. Mothers had a mean age of 53.3 years ($SD = 4.6$). Most families had a high socioeconomic status (55%, $n = 119$), only 2% ($n = 4$) had a low socioeconomic status, and 18% ($n = 39$) of the sample had a migration background.

2.3. Measures

EA and their mothers completed a half-structured clinical interview (*Diagnostic Interview for Mental Disorders,* DIPS-OA (Margraf, Cwik, Suppiger, & Schneider, 2017)). The DIPS-OA includes the most common mental disorders (e.g., anxiety disorders, depressive disorders, trauma and stress disorders, substance use disorders) and enables differential diagnoses according to the DSM-V. The interview was conducted by five clinical psychologists who also were trained and licensed interviewers. Current and lifetime diagnoses were assessed and dichotomized (*none* vs. *one or more diagnoses*) for the areas of all mental health disorders, depressive disorders (including mild to severe depressive episodes, recurrent depressive disorders, and dysthymic disorder), and anxiety disorders (including agoraphobia, social phobia, specific phobias, panic disorder, and generalized anxiety disorder). Age of onset and, for lifetime diagnoses, age of remission were also assessed retrospectively for each diagnosis.

2.4. Data Analysis

For all EA with mental disorders, diagnoses were screened for the respective onset of disorder. The onset of the first mental disorder was coded as age in years. If time data were missing in cases of comorbid disorders, the earliest available time was coded as the age of first onset ($n = 22$; 19% of EA with a diagnosis). This procedure followed the assumption that such uncertain ages of onset occur unsystematically. There was no correlation between group membership (mentally ill mother: yes/no) and the number of these codes under uncertainty ($\chi^2(1) = 0.082$, $p = 0.775$). If data on the age of onset were missing for more than 50% of

diagnoses per case, cases were excluded from further analyses. This led to the exclusion of $n = 6$ (2%) cases regarding any child mental disorder, and $n = 7$ (2%) cases regarding child anxiety disorders (details of case exclusions can be found in **Figure S1** in the electronic supplement). Not all respondents named a concrete age or year of onset in the interview but made comments such as "since elementary school" or "always". These comments were coded into age of onset using a uniform scheme (see **Table S1** in the electronic supplement). If the diagnoses included a depressive or anxiety disorder, the first age of onset for this disorder was coded separately, even if it was not the first mental disorder.

All statistical analyses were performed using IBM SPSS Statistics (version 28). Survival analyses for discrete time were performed because they allow modeling the occurrence of an event measured coarsely in time as a function of predictors. For details on the procedure and a description of the approach please refer to Singer & Willett (2003) and Graham, Willett, & Singer (2012). Assumptions of noninformative censoring and linear additivity can be considered satisfied, the assumption of proportionality is explicitly accounted for in the specified models, and the assumption of no unobserved heterogeneity is negligible. Two relevant measures emerge from these analyses: *Hazard* describes the probability of an individual experiencing the event in each period of time. *Survival* describes the probability of an individual "surviving" a given period, i.e., the event has not yet occurred. In addition, the odds ratio of a predictor (in this study: mentally ill mother) can be determined by calculating the ratio of two hazards (with and without the predictor). Because of the relatively small number of cases (117 children with mental illness over a period of more than 20 years), the difficulty of reliably naming the onset of mental disorders (Simon & Von Korff, 1995; Wittchen et al., 1989), and the presence of non-specific information (e.g., "since elementary school"), age ranges rather than specific years were used for the analyses. These age ranges were primarily based on established child developmental periods (Berk, 2015). As those periods often cover five or more years, however, shorter age ranges were chosen that correspond to a child's typical path from kindergarten until high school, which were time markers given by many participants. The following age ranges were used: 2 - 5 years (kindergarten), 6 - 9 years (elementary school), 10 - 13 years (middle school), 14 - 16 years (high school), 17 - 18 years (high school), and 19 years and above (graduate). All discrete time data were assigned to these age ranges. Before a survival analysis for discrete time can be computed, a special transformation of the data is necessary. The syntax for this was adapted from Tekle & Vermunt (2012). As FF was originally an intervention study and part of the families of the current sample participated in a preventive parenting training (Triple P (Sanders, 1999)) 18 years ago, associations between program participation and the variables of interest were first tested using survival analyses (see **Table S2** in the electronic supplement). Because we found no statistically significant associations of program participation, it was not considered in the following analyses.

3. Results

Among the $N = 216$ mother-child dyads, $n = 117$ (54%) EA children fulfilled the criteria for at least one current or lifetime mental disorder, $n = 55$ (26%) met the criteria for a depressive disorder, and $n = 64$ (30%) were diagnosed with at least one anxiety disorder. Of the mothers, $n = 81$ (38%) fulfilled the criteria of at least one current or lifetime mental disorder that preceded any child mental disorder, $n = 39$ (18%) had a diagnosis of a depressive disorder, and $n = 47$ (22%) met the criteria for at least one anxiety disorder. A total of $n = 30$ (14%) children and $n = 18$ (8%) mothers were diagnosed with both depressive and anxiety disorders.

To answer the research questions, seven analyses following a uniform scheme were performed. In each analysis, parameters were estimated for three different models: Model A modeled the probability for all children to experience the event (first mental disorder/depressive disorder/anxiety disorder) in a given period of time. Model B additionally considered the predictor "mentally ill mother" by modelling a *constant* increase or decrease in the probability associated with this risk factor over time. Model C was specified so that the increase or decrease in the probability accounted for by the risk factor could be *time-varying.* Absolute values for goodness of fit for each model cannot be interpreted, however, models can be compared using deviance-based χ^2-hypothesis tests (Singer & Willett, 2003). The parameter estimates for each calculated model can be found in **Tables S3-S9** in the electronic supplement.

3.1. Maternal Transmission of Mental Disorders

3.1.1. Any Child Mental Disorder

More than 50% of time data were missing in $n = 6$ children, leading to a sample size of $n = 210$ mother-child dyads for the current analysis. In total, $n = 111$ (53%) children had at least one current or lifetime mental disorder, and $n = 78$ (37%) had a mother with at least one mental disorder. **Table 1** shows goodness of fit values, differences and deviance-based χ^2-hypothesis tests for models A, B, and C. Compared to Model A, model B shows an improved model fit that slightly misses statistical significance ($p = 0.054$). Due to the moderate sample size in the current study, however, this result should not be rejected prematurely. Model C does not offer a better model fit than model B ($p = 0.850$). Therefore, the model that conceptualizes the risk factor of a mentally ill mother as constant seems to be a better fit for the data at hand. Hazard and survival functions were created based on model parameter estimates. **Figure 1** shows that the probability to develop a first-time mental disorder varies over time (hazard model A), reaching a first peak at six to nine years (hazard: 13%), slightly decreasing until 14 - 16 years, and rising again until 19 years and older (hazard: 15%). Model A's survival function shows that almost 30% of children develop a mental disorder until the age of 10 - 13 years. Models B and C both show that children of mothers with mental disorders have an increased risk to develop a mental disorder across all age ranges. According to model B, the odds ratio of the risk factor mentally ill

Table 1. Goodness of fit and model test statistics for the predictor any maternal mental disorder and the events any child mental disorder, child depressive disorder, and child anxiety disorder.

	Model A	Model B	Model C
Any child mental disorder, $N = 210$			
Goodness of fit (−2LL)	685.402	681.686	679.689
Difference to previous model		3.716	1.997
Deviance-based χ^2-hypothesis test[a]		$p = 0.054$	$p = 0.850$
Child depressive disorder, $N = 216$			
Goodness of fit (−2LL)	384.518	383.463	382.119
Difference to previous model		1.055	1.344
Deviance-based χ^2-hypothesis test[b]		$p = 0.304$	$p = 0.719$
Child anxiety disorder, $N = 209$			
Goodness of fit (−2LL)	445.517	445.487	439.677
Difference to previous model		0.030	5.810
Deviance-based χ^2-hypothesis test[a]		$p = 0.863$	$p = 0.325$

Note. −2LL = −2 Log-Likelihood. [a]degrees of freedom: 1 (Model B), 5 (Model C). [b]degrees of freedom: 1 (Model B), 3 (Model C).

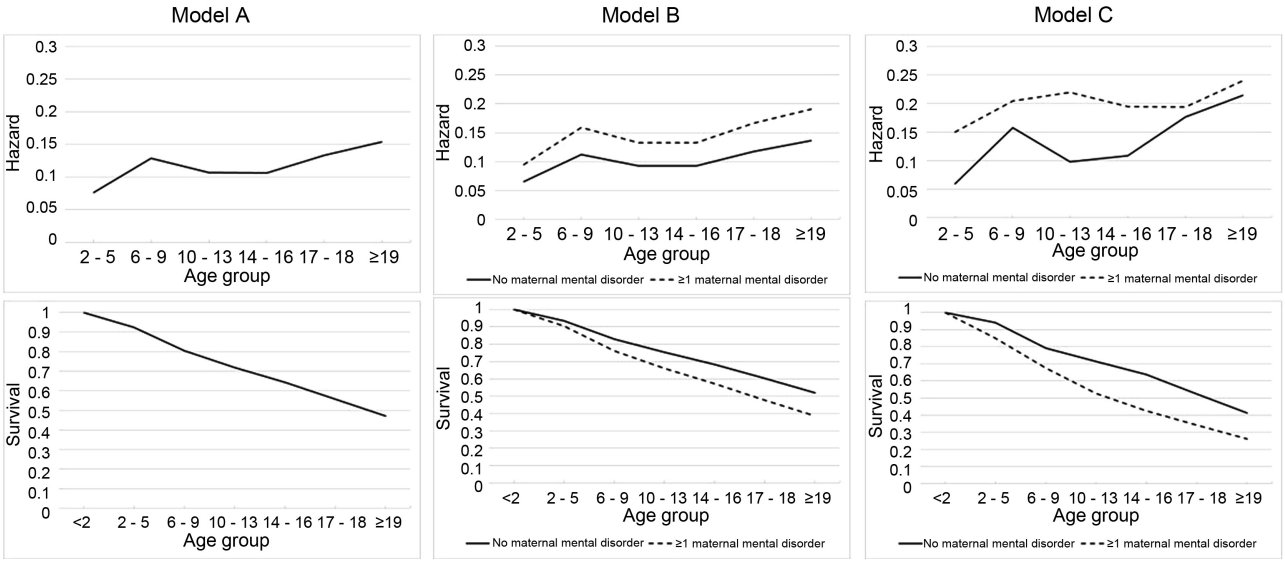

Figure 1. Hazard and survival functions for the predictor any maternal mental disorder and the event any child mental disorder.

mother is 1.49 for all age ranges. In model C, the odds ratio varies between 1.08 and 2.33.

3.1.2. Child Depressive Disorders

No data were missing for this analysis. $N = 55$ (26%) children had at least one current or lifetime depressive disorder, and $n = 81$ (38%) had a mother with at least one mental disorder. The age range of 2 - 5 years, however, did not occur at all and the age range 6 - 9 years occurred in only one case. As Maximum-

Likelihood Estimation is not reliable with (almost) empty categories (Singer & Willet, 2003), these two age ranges were excluded in this analysis. Neither model B nor model C shows significant improvements in model fit (see Table 1), which means that the risk factor of a maternal mental disorder does not significantly contribute to modeling the probability of developing a depressive disorder in children. The odds ratio of the risk factor "mentally ill mother" of model B is 1.35, and in model C, the odds ratio varies between 0.90 and 2.32. Hazard and survival functions can be found in Figure S2 in the electronic supplement.

3.1.3. Child Anxiety Disorders

More than 50% of time data were missing in $n = 7$ children, leading to a sample size of $n = 209$ mother-child dyads for the current analysis. In total, $n = 57$ (27%) children had at least one current or lifetime anxiety disorder, and $n = 79$ (38%) had a mother with at least one mental disorder. Again, models B and C show no significant improvements in model fit (see Table 1), which means that the risk factor of a maternal mental disorder does not significantly contribute to modeling the probability of developing an anxiety disorder in children. The odds ratio of the risk factor "mentally ill mother" of model B is 1.05, and in model C, the odds ratio varies between 0.32 and 2.33. Hazard and survival functions can be found in Figure S3 in the electronic supplement.

3.2. Maternal Depressive Disorders

3.2.1. Any Child Mental Disorder

More than 50% of time data were missing in $n = 6$ children and order of onset of disorder was unclear for $n = 4$ dyads, leading to a sample size of $n = 206$ mother-child dyads for the current analysis. Table 2 shows goodness of fit values, differences and deviance-based χ^2-hypothesis tests for models A, B, and C. Nei

Table 2. Goodness of fit and model test statistics for the predictor maternal depressive disorder and the events any child mental disorder and child depressive disorder.

	Model A	Model B	Model C
Any child mental disorder, $N = 210$			
Goodness of fit (−2LL)	668.936	668.936	665.522
Difference to previous model		0.000	3.414
Deviance-based χ^2-hypothesis test[a]		$p = 1.000$	$p = 0.636$
Child depressive disorder, $N = 216$			
Goodness of fit (−2LL)	368.650	368.275	361.102
Difference to previous model		0.375	7.173
Deviance-based χ^2-hypothesis test[b]		$p = 0.540$	$p = 0.067$

Note. −2LL = −2 Log-Likelihood. [a]degrees of freedom: 1 (Model B), 5 (Model C). [b]degrees of freedom: 1 (Model B), 3 (Model C).

ther model B nor model C shows significant improvements in model fit, which indicates that a maternal depressive disorder (n = 36) does not significantly increase the general risk of mental disorders (n = 108) in children. According to model B, the odds ratio of the risk factor of a mother with a depressive disorder is 1.00 for all age ranges. In model C, the odds ratio varies between 0.30 and 1.65. Hazard and survival functions can be found in Figure S4 in the electronic supplement.

3.2.2. Child Depressive Disorders

Order of onset of disorder was unclear for n = 4 dyads, leading to a sample size of n = 212 mother-child dyads for the current analysis. The first two age ranges were again excluded for this analysis (see above). Neither model B nor model C shows significant improvements in model fit (see Table 2), which indicates that a maternal depressive disorder (n = 37) does not significantly increase the risk of depressive disorders (n = 52) in children. The odds ratio of the risk factor "mother with depressive disorder" of model B is 1.26, and in model C, the odds ratio varies between 0.27 and 4.00. Hazard and survival functions can be found in Figure S5 in the electronic supplement.

3.3. Maternal Anxiety Disorders

3.3.1. Any Child Mental Disorder

More than 50% of time data were missing in n = 6 children and order of onset of disorder was unclear for n = 1 dyad, leading to a sample size of n = 209 mother-child dyads for the current analysis. N = 110 children had at least one current or lifetime mental disorder, and n = 43 had a mother with an anxiety disorder. Table 3 shows goodness of fit values, differences and deviance-based χ^2-hypothesis tests for models A, B, and C. Compared to model A, model B shows a significant improvement in model fit (p = 0.008). Model C, however,

Table 3. Goodness of fit and model test statistics for the predictor maternal anxiety disorder and the events any child mental disorder and child anxiety disorder.

	Model A	Model B	Model C
Any child mental disorder, N = 210			
Goodness of fit (−2LL)	680.194	673.075	666.145
Difference to previous model		7.119	6.930
Deviance-based χ^2-hypothesis test[a]		p = 0.008	p = 0.226
Child anxiety disorder, N = 209			
Goodness of fit (−2LL)	438.865	434.866	429.787
Difference to previous model		3.999	5.079
Deviance-based χ^2-hypothesis test[a]		p = 0.046	p = 0.406

Note. −2LL = −2 Log-Likelihood. [a]degrees of freedom: 1 (Model B), 5 (Model C).

does not further improve model fit (p = 0.226). Therefore, the model that conceptualizes the risk factor of "a mother with an anxiety disorder" as constant seems to be a better fit for the data at hand. According to model B, the odds ratio of the risk factor "mother with an anxiety disorder" is 1.93 for all age ranges. In model C, the odds ratio varies between 0.36 and 4.33. Figure 2 shows hazard and survival functions of models A, B, and C. Model B's survival function shows that by age 19, almost 50% of children of mothers without anxiety disorder have developed a mental disorder, compared to 70% of children of mothers with an anxiety disorder.

3.3.2. Child Anxiety Disorders

More than 50% of time data were missing in n = 7 children and order of onset of disorder was unclear for n = 1 dyad, leading to a sample size of n = 208 mother-child dyads for the current analysis. In total, n = 56 children had at least one current or lifetime anxiety disorder, and n = 44 had a mother with an anxiety disorder Again, model B shows a significantly better model fit than model A (p = 0.046; see Table 3), but model C does not significantly improve model fit compared to model B (p = 0.406). The odds ratio of the risk factor "mother with anxiety disorder" of model B is 1.88, in model C, the odds ratio varies between 0.50 and 4.65. Figure 3 shows hazard and survival functions of models A, B, and C. The hazard function of model A shows that the probability to develop a first-time anxiety disorder varies over time, reaching a peak at 10 - 13 years (hazard: 7%), decreasing until 17 - 18 years, and slightly rising again until 19 years and older (hazard: 4%). As the survival function of model B shows, by age 19 almost 40% of children whose mothers have anxiety disorders have developed an anxiety disorder themselves. Among children whose mothers don't have any anxiety disorders, this is just above 20%.

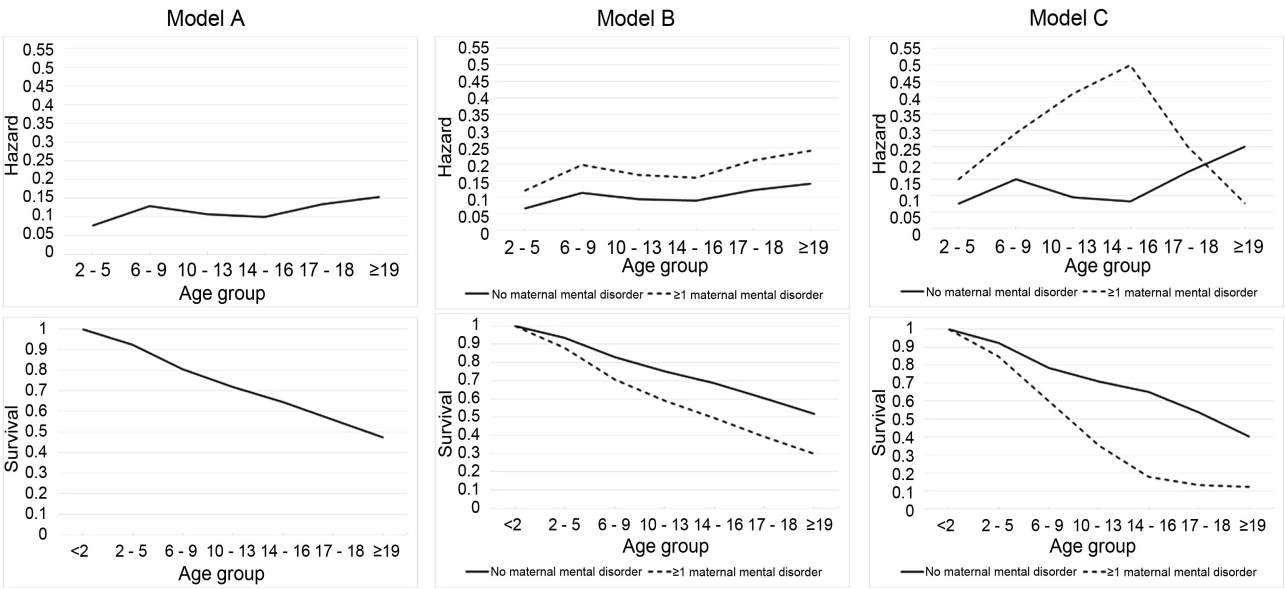

Figure 2. Hazard and survival functions for the predictor maternal anxiety disorder and the event any child mental disorder.

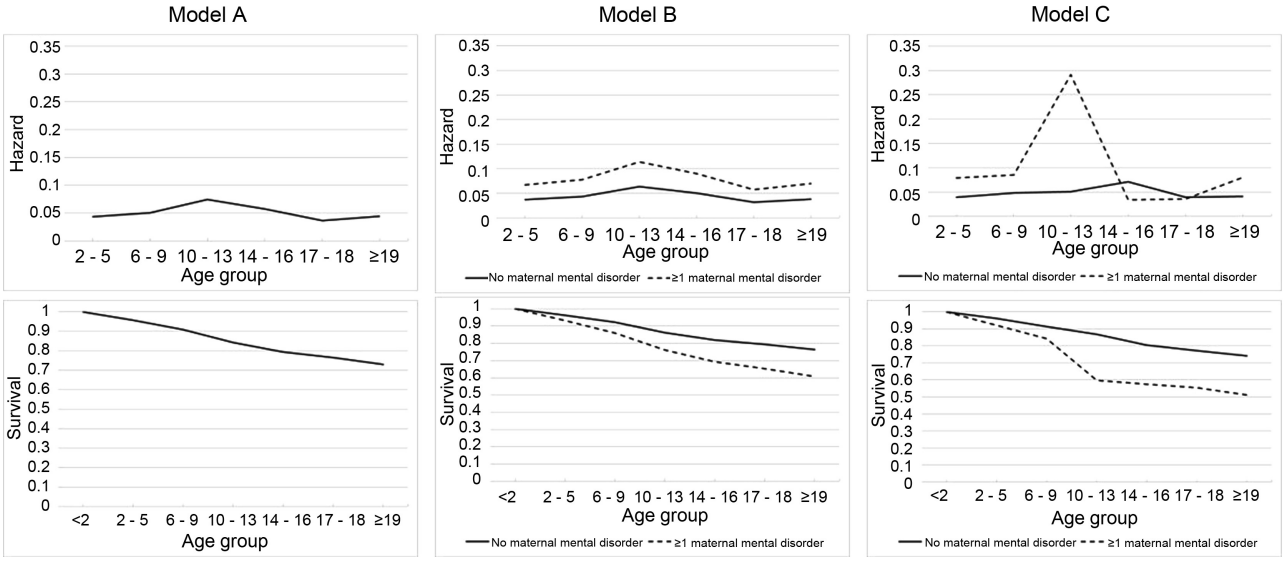

Figure 3. Hazard and survival functions for the predictor maternal anxiety disorder and the event child anxiety disorder.

4. Discussion

The aim of the current study was to investigate the temporal progression of the risk factor "mentally ill mother" for mental disorders in their offspring from childhood to emerging adulthood. We examined whether any maternal mental disorder, maternal depressive disorders, and maternal anxiety disorders represent a constant vs. time-varying risk factor for any mental disorder as well as depressive and anxiety disorders in their EA offspring.

For all EA children, the probability of a first-time mental disorder peaked at elementary school age (6 - 9 years), decreased between 10 - 13 years before increasing again until emerging adulthood (19 years and above), where it reached its maximum. The course of this hazard function of first-time mental disorders is similar to the findings of Ravens-Sieberer et al. (2015). They modeled the probability of developing mental health problems between 7 and 24 years. Although the first peak was only at age 12, the probability also decreased thereafter before increasing again and reaching its maximum at age 24. In terms of anxiety disorders, however, risk of onset peaked at middle school age (10 - 13 years). This result is in line with previous findings, e.g., by Kessler et al. (2005), who report a mean age of onset of 11 years for anxiety disorders. The present results further show that by the time of the interview, more than half of the participating EA children had developed a mental disorder. On the one hand, this is a comparatively high lifetime prevalence for emerging adults; for example, Eschmann, Weber Häner, & Steinhausen (2007) reported prevalences of 27 to 49%. On the other hand, disorder-specific epidemiological studies (Niermann et al., 2021; Reinherz, Paradis, Giaconia, Stashwick, & Fitzmaurice, 2003) report lifetime prevalences of affective and anxiety disorders of emerging adults similar to those observed in the study at hand. The overall increased lifetime prevalence could be due to the inclusion of many disorder domains (excluding tobacco

consumption). Likewise, an influence of increased mental health problems in emerging adults during the Covid-19 pandemic (Généreux et al., 2021; Kwong et al., 2021) cannot be excluded, as most interviews were conducted during this time. In 84% of EA with a lifetime diagnosis, however, onset of disorder was before the age of 19, indicating a definite onset before the beginning of the pandemic.

The role of the risk factor "mentally ill mother" was examined separately for all mental disorders, anxiety disorders, and depressive disorders in both mothers and children over time. In terms of all maternal mental disorders, the key finding was that for child first-time mental disorder, the time-variable risk factor model was not significantly better than the constant risk factor model. This suggests that children of mentally ill mothers are at a constantly higher risk of developing mental disorders compared to children of mentally healthy mothers at each age stage. The slight non-significance of the risk factor "mentally ill mother" in the time-constant model can be attributed to the comparatively small sample size of the current study. However, the results need replication in a larger sample. Surprisingly, in the analyses for child anxiety disorders and depressive disorders, none of the models including the risk factor of any maternal mental disorder were significant, suggesting no increased risk for child depressive or anxiety disorders associated with maternal mental disorders in general. The small number of EA children with depressive and anxiety disorders might have led to these results. It is also possible, however, that some maternal mental disorders are not associated with an increased risk for child depressive and anxiety disorders. As this is contrary to results from previous studies (Dean et al., 2010; McLaughlin et al., 2012), these results also need replication.

In terms of maternal depressive disorders, neither the constant nor time-varying risk factor models proved to be significant in predicting child mental disorder in general or depressive disorder specifically. As mentioned above, non-specific transmission has been postulated for affective disorders (Leijdesdorff et al., 2017), which could explain the non-significant result for child depressive disorders. Maternal depressive disorder, however, has previously been shown to be associated with an increased risk for mental disorders in their offspring (Goodman et al., 2011). Due to the low numbers of mothers and children with depressive disorders in our sample, again replications are needed to further investigate the constant and time-varying transmission risk associated with maternal depressive disorders.

A major finding of the current study concerns maternal anxiety disorders. EA children of mothers with anxiety disorders showed a constantly higher risk for both mental disorders in general as well as anxiety disorders in particular. Maternal anxiety disorders seem to be much more appropriate as a predictor of child anxiety disorders than maternal psychopathology without considering the specific diagnosis. This seems plausible since previous research has also found the transmission of anxiety disorders to most likely be specific (Leijdesdorff et

al., 2017; van Santvoort et al., 2015). As anxiety disorders are the disorder domain with the highest prevalence among EA in the current sample (n = 64; 55% of EA with a lifetime diagnosis), the effect regarding EA general mental disorders might be partly methodological. However, the 1.9-fold risk of a mental disorder among children of mothers with an anxiety disorder compared to children of mothers without anxiety disorders is highly relevant and should therefore be further investigated, especially considering the postulated specificity of the transmission of anxiety disorders. We furthermore advance previous findings by showing that a maternal anxiety disorder seems to be a constant risk factor rather than time-varying throughout childhood until emerging adulthood.

Although none of the statistical models of a time-varying risk factor were significant, odds ratios for the different age ranges in some of these models varied largely, particularly regarding maternal anxiety disorders (0.27 to 4.65). Our analyses should therefore be replicated in larger samples to further investigate possible time-varying effects.

As described above, the findings of previous research regarding the time dependence of the risk factor "mentally ill mother" are heterogeneous. A comparison with earlier studies is difficult due to very different methodological approaches and study objectives. However, Milne et al. (2009) address a particularly interesting aspect in the discussion of their results, in which a family history of mental illness was not associated with an earlier age of first child disorder in different disorder domains. They reviewed an argument originally made by Kendler, Gardner, & Prescott (1999) that the association between an earlier age of first disorder and family history may be a methodological artifact. Kendler et al. (1999) postulate that the effect may only occur in clinical samples because the combination of early child psychopathology and a psychopathological family history is potentially more likely to stimulate help-seeking behavior. Milne et al. (2009) reviewed literature on depression and found that of 26 studies in which an association between age of first illness and depression in the family was found, 21 (81%) examined clinical samples. Of the 12 studies that found no significant association, only 5 (42%) had been conducted with clinical samples. Overall, at least for depressive disorders, the association appears to be dependent on the type of sample, although other correlates of clinical samples may also be responsible (Milne et al., 2009). Our findings of a time-constant risk in a non-clinical sample might therefore be a further indicator of the methodological nature of previous findings of time-varying risk. Future research should investigate this sample bias systematically for different disorder domains.

In summary, children of mothers with a mental disorder showed a 1.5-fold risk to develop a mental disorder compared to children of mentally healthy mothers, and this risk did not vary significantly from childhood until emerging adulthood. Maternal depressive disorders were not associated with an increased risk for any child mental disorder, and the risk for children to develop depressive disorders in turn did not increase through any maternal mental disorder. Ma-

ternal anxiety disorders were associated with a 1.9-fold risk for children to develop any mental disorder or an anxiety disorder; both risks, again, were constant from childhood to emerging adulthood. The risk for child anxiety disorders was, however, not increased by maternal mental disorders in general.

4.1. Strengths and Limitations

To the best of our knowledge, this is the first study to investigate the time progression of the risk associated with a mentally ill mother in a sample of mother-child dyads until emerging adulthood. With 216 dyads recruited from a longitudinal prevention study, we provide an important sample for our analyses. We furthermore assessed all mothers and children with a half-structured clinical interview, which enabled us to use valid diagnoses of mental disorders made by trained and licensed clinical psychologists.

Our study, however, also has some limitations. We only used data from mothers. As paternal mental illness is also highly relevant in family transmission, a consideration of both parents (e.g., also regarding a possible buffer effect of a healthy parent (Chang, Halpern, & Kaufman, 2007; Kahn, Brandt, & Whitaker, 2004)) would have been desirable. In addition, partly due to content or methodological considerations and partly due to missing information, some dyads had to be excluded from the analyses. Most families in our sample had a high SES; as psychopathology is associated with SES (Dohrenwend, 1990; Reiss, 2013), this could have influenced the current results. With a mean EA age of 22 years, we furthermore did not include the whole developmental period of emerging adulthood in our sample. It is possible that examination of EAs until the mid/late twenties would show a different temporal progression of the risk factor "mentally ill mother". As approximately two third develop a disorder before the age of 25 years (Solmi et al., 2022), however, we consider this limitation to be negligible. As mentioned above, structured clinical interviews allow for a valid and reliable diagnosis and leave room for the clinical judgment of experienced diagnosticians (Margraf & Schneider, 2018), which represents a clear advantage compared to assessment based on questionnaires only. We did not, however, perform a comprehensive clinical assessment including a psychopathological assessment. The study design furthermore did not explicitly aim at recording the age of first onset of mental disorders, and thus did not include methods to improve the precision of such data (Knäuper, Cannell, Schwarz, Bruce, & Kessler, 1999). The data on disorder onset were very likely subject to memory bias. To counteract this, but also because of the relatively small number of children with mental disorders, age ranges were examined instead of individual life years. The results of this study are therefore dependent on the selected age ranges. Due to the comparatively low number of mothers and children with at least one mental disorder, particularly from the areas of anxiety and depressive disorders, the interpretability of the results might be limited. Lastly, we only investigated dyads in which the mother developed a mental disorder before their

child and did not consider bidirectional associations.

4.2. Implications for Clinical Practice and Research

The present study replicates the finding that children of mentally ill mothers have a significantly increased risk of developing mental disorders themselves, even beyond adolescence. Children, however, are currently not routinely considered in the psychiatric or psychotherapeutic treatment of adults (Geiger et al., 2021). Maybery & Reupert (2009) recommend implementing routinely screenings for child psychopathology in parental treatment. Our finding that a mentally ill mother is a risk factor even without taking any moderating or mediating variables into account suggests that such screenings should generally be applied to parents with mental health problems. Screened offspring who already show psychological distress could then be recommended appropriate support, for example, participation in preventive interventions, coaching, or even treatment for themselves. Our results strongly suggest that the increased risk for children of mentally ill parents is constant from childhood to emerging adulthood. Preventive interventions should therefore not stop once children reach adolescence but continue to also target at-risk youth. Moreover, the current study highlights the need for both universal and disorder-specific prevention, especially concerning maternal anxiety disorders. Several prevention programs already exist that aim to prevent anxiety disorders in children, however, the targeted use of these interventions requires identification of at-risk children (Lau & Rapee, 2011). Our findings suggest that one way of identifying these children might be through the diagnosis of a maternal anxiety disorder. Once identified, preventive interventions for children and adolescents of mentally ill parents might reduce the risk to develop the same disorder as the parent by 40% (Siegenthaler, Munder, & Egger, 2012). Nevertheless, the current results stress the need to not only target specific disorders, but to also offer preventive interventions aimed at reducing the risk for mental disorders in general.

Many intervention programs for children with mentally ill parents have been developed that focus on offspring affected in infancy, toddlerhood, childhood, and adolescence (Döhnert & Wiegand-Grefe, 2021). The current results, however, show that the risk for a first-time mental disorder is equally increased in emerging adulthood. Thus, the known (and unknown) transmission mechanisms not only operate during childhood and adolescence, but also affect emerging adults. It is questionable whether emerging adults benefit from current intervention programs and whether they can be identified in a timely manner. So far, research has paid little attention to emerging adults with parents with mental disorders. Our findings, however, strongly suggest that they also belong to the risk group of children with mentally ill parents and should therefore be taken into account in both research and clinical care.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Electronic Supplement

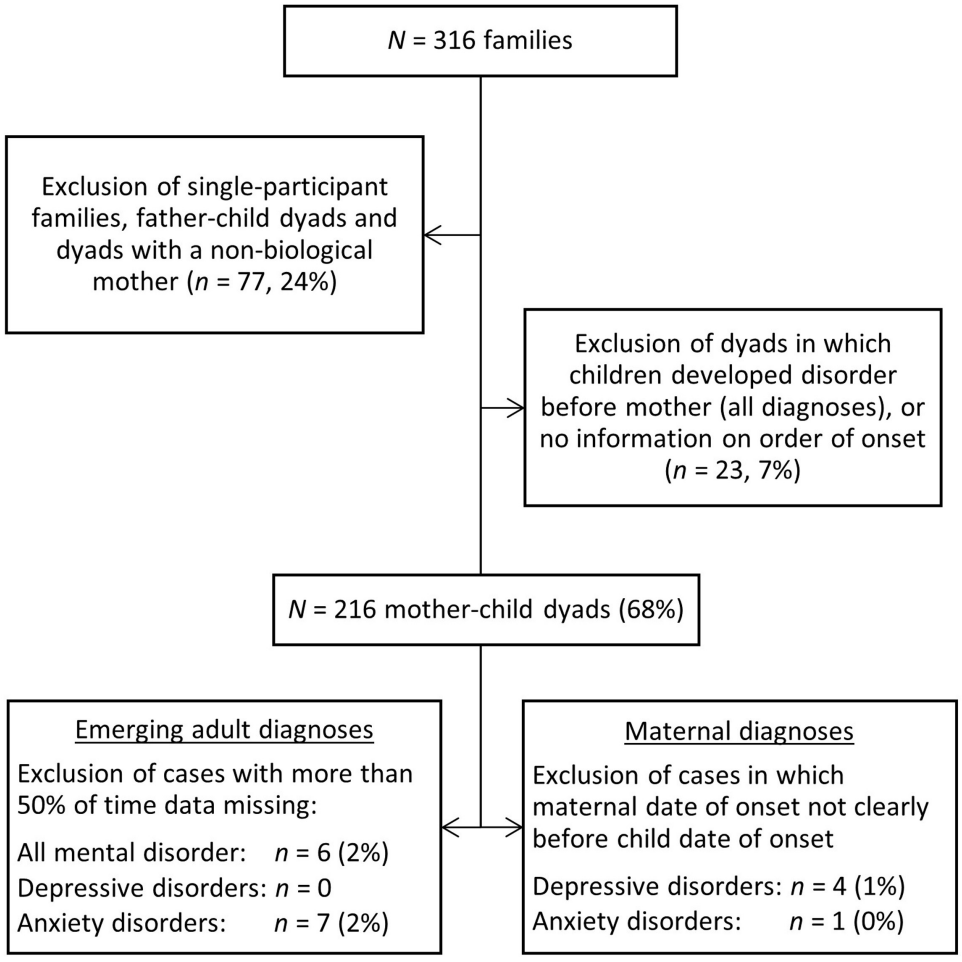

Figure S1. Flow chart of case exclusions.

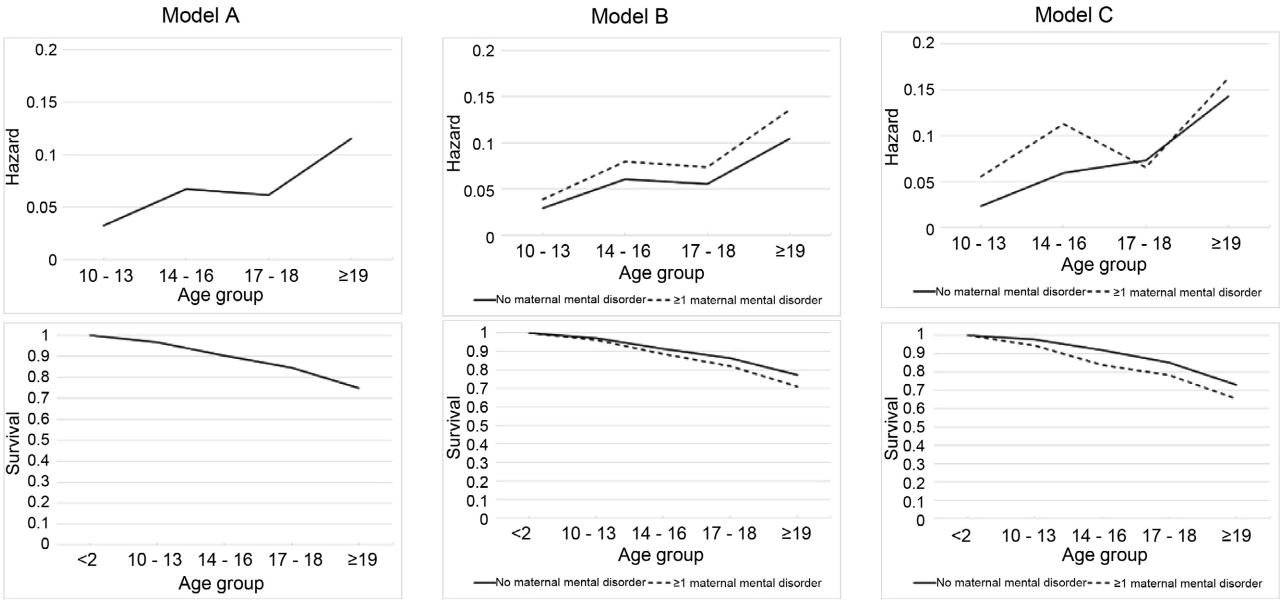

Figure S2. Hazard and survival functions for the preditor any maternal mental disorder and the event child depressive disorder.

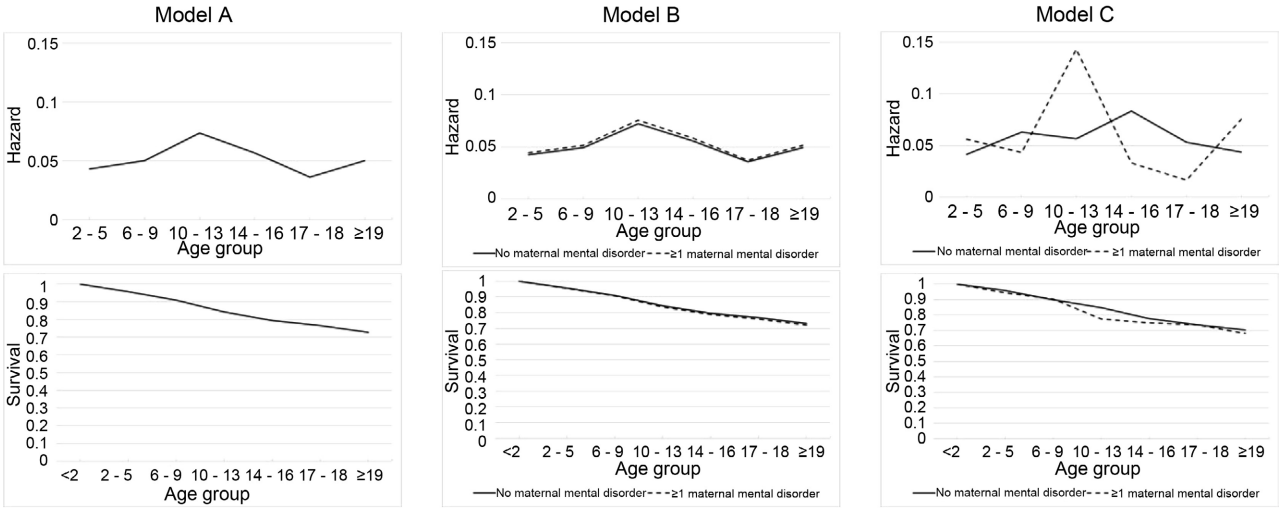

Figure S3. Hazard and survival functions for the preditor any maternal mental disorder and the event child anxiety disorder.

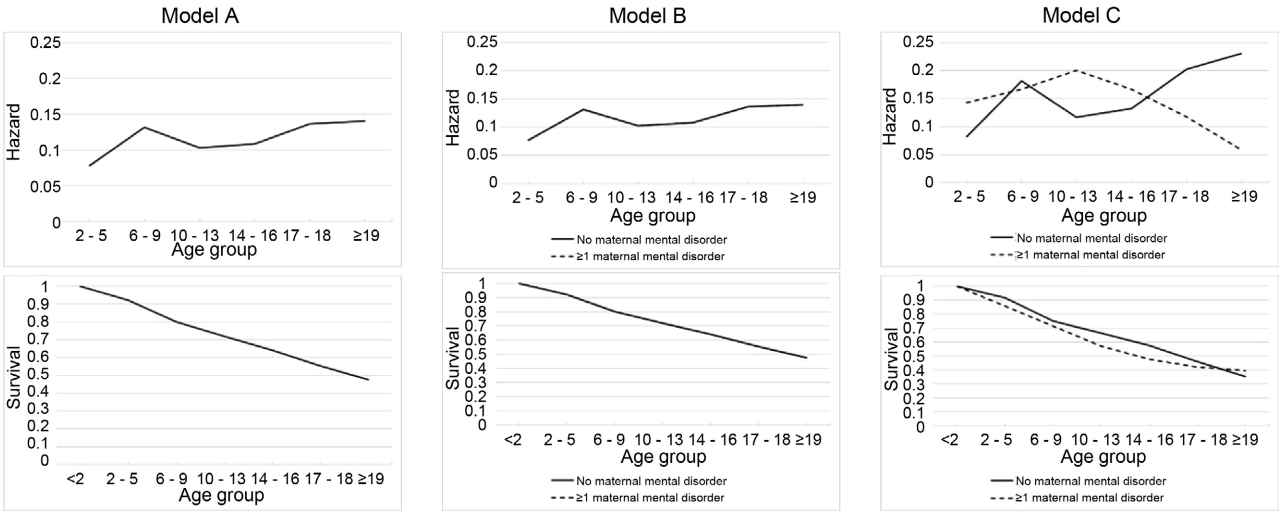

Figure S4. Hazard and survival functions for the preditor maternal depressive and the event any child mental disorder.

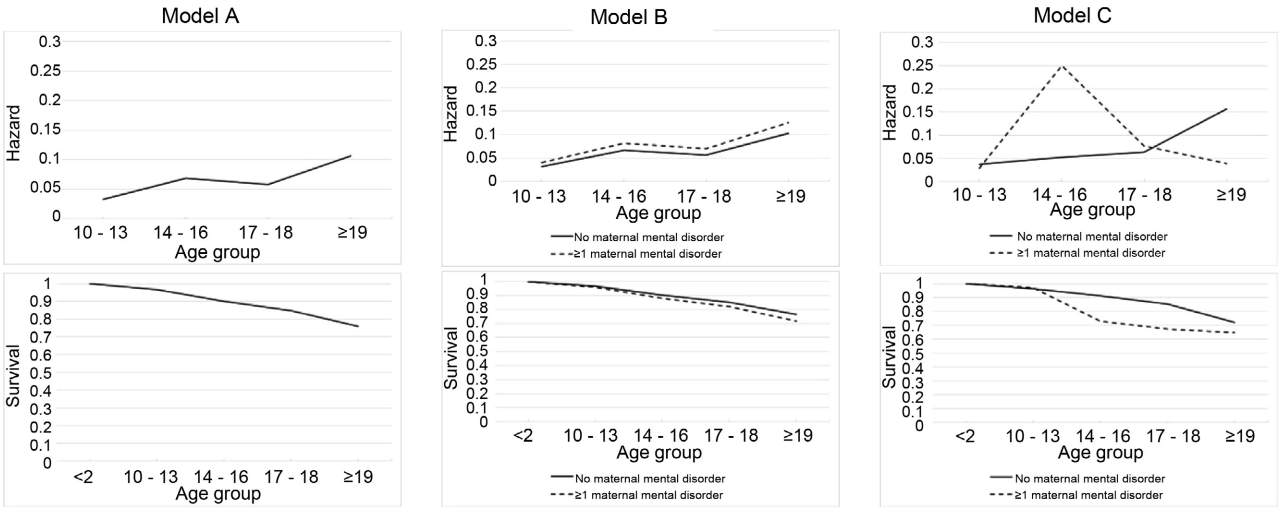

Figure S5. Hazard and survival functions for the preditor maternal depressive disorder and the event child depressive disorder.

Table S1. Codes of participants' comments on age of onset for all mental disorders, depressive, and anxiety disorders.

Comment	*n*[a]	Coded as age range	Explanation
Early 20s	1/0/0	≥19 years	-
Elementary school	3/0/1	6 - 9 years	-
Childhood	8/0/7	6 - 9 years	To distinguish from early childhood, the next category was chosen
Early Childhood	1/0/1	2 - 5 years	-
Always	9/0/6	2 - 5 years	Coded as earliest category
Since the Beginning	1/0/0	2 - 5 years	Coded as earliest category
Always, worse at 12 years	1/0/0	10 - 13 years	Coded as category that includes 12 years, as participant specifically referred to aggravation of symptoms at age 12
School age	1/0/0	6 - 9 years	Coded as elementary school age
Youth	0/1/1	14 - 16 years	Coded based on German law: "youth" starting at 14 years of age
Before 12 years	3/0/0	6 - 9 years	Only refers to ADHD-diagnoses, manifestation before 12 years of age is a diagnostic criterium for the diagnosis. Coded as category before the category that includes 12 years of age

Note. ADHD = Attention deficit-/Hyperactivity disorder. [a]numbers refer to the three categories of children's mental disorders: all mental disorders/depressive disorders/anxiety disorders.

Table S2. Goodness of fit and model test statistics for the predictor participation in Triple P and the events any child mental disorder, child depressive disorder and child anxiety disorder.

	Model 1	Model 2
Any maternal mental disorder		
Any child mental disorder, $N = 210$		
Goodness of fit (−2LL)	685.402	685.307
Difference to previous model		0.095
Deviance-based χ^2-hypothesis test[a]		$p = 0.758$
Child depressive disorder, $N = 216$		
Goodness of fit (−2LL)	384.518	384.062
Difference to previous model		0.456
Deviance-based χ^2-hypothesis test[a]		$p = 0.500$
Child anxiety disorder, $N = 209$		
Goodness of fit (−2LL)	445.517	445.494
Difference to previous model		0.023
Deviance-based χ^2-hypothesis test[a]		$p = 0.880$
Maternal depressive disorder		
Any child mental disorder, $N = 206$		
Goodness of fit (−2LL)	668.936	668.827

Continued

Difference to previous model		0.109
Deviance-based χ^2-hypothesis test[a]		$p = 0.741$
Child depressive disorder, $N = 212$		
Goodness of fit (−2LL)	368.650	368.197
Difference to previous model		0.453
Deviance-based χ^2-hypothesis test[a]		$p = 0.501$
Maternal anxiety disorder		
Any child mental disorder, $N = 209$		
Goodness of fit (−2LL)	680.194	680.042
Difference to previous model		0.152
Deviance-based χ^2-hypothesis test[a]		$p = 0.697$
Child anxiety disorder, $N = 208$		
Goodness of fit (−2LL)	438.865	438.781
Difference to previous model		0.084
Deviance-based χ^2-hypothesis test[a]		$p = 0.772$

Note. −2LL = −2 Log-Likelihood. Model 1 contained no predictors, model 2 contained the predictor participation in Tripe P. [a]Degrees of freedom: 1.

Table S3. Parameter estimates for the predictor any maternal mental disorder and the event any child mental disorder.

Predictor	Model A	Model B	Model C
D_1	−2.495	−2.661	−2.882
D_2	−1.911	−2.068	−1.992
D_3	−2.127	−2.282	−2.418
D_4	−2.133	−2.280	−2.325
D_5	−1.872	−2.013	−1.897
D_6	−1.705	−1.844	−1.735
Mentally ill mother		0.401	
D_1 x mentally ill mother			0.846
D_2 x mentally ill mother			0.217
D_3 x mentally ill mother			0.703
D_4 x mentally ill mother			0.509
D_5 x mentally ill mother			0.078
D_6 x mentally ill mother			0.092

Note. D_1 to D_6 refer to the six age periods included in the models (D_1 = 2 - 5 years; D_6 = ≥19 years). The interaction of D_1 to D_6 with the risk factor mentally ill mother models the variability of the risk factor over time. $N = 210$.

Table S4. Parameter estimates for the predictor any maternal mental disorder and the event child depressive disorder.

Predictor	Model A	Model B	Model C
D_3	−3.392	−3.512	−3.784
D_4	−2.629	−2.747	−2.882
D_5	−2.719	−2.834	−2.683
D_6	−2.037	−2.151	−2.079
Mentally ill mother		0.298	
D_3 x mentally ill mother			0.840
D_4 x mentally ill mother			0.594
D_5 x mentally ill mother			−0.105
D_6 x mentally ill mother			0.116

Note. D_3 to D_6 refer to the six age periods included in the models (D_3 = 10 - 13 years; D_6 = ≥19 years). The interaction of D_3 to D_6 with the risk factor mentally ill mother models the variability of the risk factor over time. N = 216.

Table S5. Parameter estimates for the predictor any maternal mental disorder and the event child anxiety disorder.

Predictor	Model A	Model B	Model C
D_1	−3.101	−3.120	−3.219
D_2	−2.944	−2.963	−2.825
D_3	−2.531	−2.550	−2.927
D_4	−2.809	−2.827	−2.565
D_5	−3.283	−3.302	−2.986
D_6	−2.944	−2.963	−3.168
Mentally ill mother		0.048	
D_1 x mentally ill mother			0.288
D_2 x mentally ill mother			−0.353
D_3 x mentally ill mother			0.847
D_4 x mentally ill mother			−0.869
D_5 x mentally ill mother			−1.125
D_6 x mentally ill mother			0.511

Note. D_1 to D_6 refer to the six age periods included in the models (D_1 = 2 - 5 years; D_6 = ≥19 years). The interaction of D_1 to D_6 with the risk factor mentally ill mother models the variability of the risk factor over time. N = 209.

Table S6. Parameter estimates for the predictor maternal depressive disorder and the event any child mental disorder.

Predictor	Model A	Model B	Model C
D_1	−2.474	−2.474	−2.578
D_2	−1.887	−1.887	−1.875
D_3	−2.164	−2.164	−2.255
D_4	−2.110	−2.110	−2.145
D_5	−1.846	−1.846	−1.781
D_6	−1.812	−1.812	−1.674

Continued

Mentally ill mother	−0.001	
D_1 x mentally ill mother		0.498
D_2 x mentally ill mother		−0.070
D_3 x mentally ill mother		0.464
D_4 x mentally ill mother		0.199
D_5 x mentally ill mother		−0.470
D_6 x mentally ill mother		−1.216

Note. D_1 to D_6 refer to the six age periods included in the models (D_1 = 2 - 5 years; D_6 = ≥19 years). The interaction of D_1 to D_6 with the risk factor mentally ill mother models the variability of the risk factor over time. N = 206.

Table S7. Parameter estimates for the predictor maternal depressive disorder and the event child depressive disorder.

Predictor	Model A	Model B	Model C
D_3	−3.372	−3.416	−3.332
D_4	−2.608	−2.652	−2.996
D_5	−2.789	−2.829	−2.820
D_6	−2.131	−2.170	−2.000
Mentally ill mother		0.230	
D_3 x mentally ill mother			−0.251
D_4 x mentally ill mother			1.386
D_5 x mentally ill mother			0.181
D_6 x mentally ill mother			−1.296

Note. D_3 to D_6 refer to the six age periods included in the models (D_3 = 10 - 13 years; D_6 = ≥19 years). The interaction of D_3 to D_6 with the risk factor mentally ill mother models the variability of the risk factor over time. N = 212.

Table S8. Parameter estimates for the predictor maternal anxiety disorder and the event any child mental disorder.

Predictor	Model A	Model B	Model C
D_1	−2.490	−2.658	−2.646
D_2	−1.905	−2.061	−2.030
D_3	−2.120	−2.269	−2.438
D_4	−2.197	−2.328	−2.565
D_5	−1.872	−1.979	−1.917
D_6	−1.705	−1.807	−1.609
Mentally ill mother		0.659	
D_1 x mentally ill mother			0.617
D_2 x mentally ill mother			0.542
D_3 x mentally ill mother			1.206
D_4 x mentally ill mother			1.466
D_5 x mentally ill mother			0.307
D_6 x mentally ill mother			−1.030

Note. D_1 to D_6 refer to the six age periods included in the models (D_1 = 2 - 5 years; D_6 = ≥19 years). The interaction of D_1 to D_6 with the risk factor mentally ill mother models the variability of the risk factor over time. N = 209.

Table S9. Parameter estimates for the predictor maternal anxiety disorder and the event child anxiety disorder.

Predictor	Model A	Model B	Model C
D_1	−3.096	−3.262	−3.271
D_2	−2.939	−3.100	−3.071
D_3	−2.526	−2.681	−3.024
D_4	−2.803	−2.943	−2.708
D_5	−3.277	−3.422	−3.258
D_6	−3.078	−3.222	−3.219
Mentally ill mother		0.629	
D_1 x mentally ill mother			
D_2 x mentally ill mother			0.656
D_3 x mentally ill mother			0.532
D_4 x mentally ill mother			1.536
D_5 x mentally ill mother			−0.693
D_6 x mentally ill mother			−0.109

Note. D_1 to D_6 refer to the six age periods included in the models (D_1 = 2 - 5 years; D_6 = ≥19 years). The interaction of D_1 to D_6 with the risk factor mentally ill mother models the variability of the risk factor over time. N = 208.