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Research paper

Parental divorce is associated with an increased risk to develop mental disorders in women

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ABSTRACT

Background: Parental divorce has been associated with reduced well-being in young adults. It is, however, unclear whether this finding is clinically relevant as studies using structured clinical interviews are missing. This study, therefore, investigated if young adults with divorced parents are at risk to develop mental disorders. Furthermore, differences in parental care, social connectedness, chronic stress and traumatic experiences between children of divorced and non-divorced parents were investigated.

Methods: 121 women (mean age: 23 years) were interviewed using the Structured Clinical Interview for DSM-IV Axis I (i.e., major mental disorders) and II (i.e., personality disorders) Disorders and asked to complete questionnaires assessing parental care, social connectedness (loneliness, attachment anxiety and avoidance), chronic stress, childhood trauma and depression.

Results: Young adults of divorced parents had a higher risk for Axis I but not Axis II disorders as compared to young adults of non-divorced parents. Participants from divorced families as compared to non-divorced families reported more depression, loneliness, childhood trauma, attachment avoidance, attachment anxiety, chronic stress and less paternal care.

Limitations: Due to the cross-sectional design of this study, conclusions about causality remain speculative.

Conclusion: The increased vulnerability of children of divorced parents to develop mental disorders, and to experience more chronic stress, loneliness, attachment avoidance, attachment anxiety, and traumatic experiences during childhood is alarming and highlights the importance of prevention programs and psycho-education during the process of parental divorce. Parental support with regard to adequate caregiving is needed to help parents to better support their children during and after their divorce.

Parental divorce is a major life event for the parents and children concerned and might result in traumatic stress. As a consequence, it has become a developmental challenge for many children to cope with the divorce of their parents. In Germany, for instance, approx. 125.000 children experienced the divorce of their parents in 2017 (Statistika, 2018). Although there is evidence that parental divorce seriously affects children during and immediately after the divorce process (Amato, 2000; Amato & Keith, 1991), there is not much research investigating the long-term health consequences of parental divorce using structured clinical interviews.

Parental divorce and health. Parental divorce, as a conglomerate of various pre- and post-divorce interfamilial conflicts and challenges, has been associated with an increased risk for mental ill-health of the child concerned (Shimkowski & Ledbetter, 2018). Examples concern depression (Harland et al., 2002; Liu et al., 2014; Sands et al., 2017), anxiety (Tweed et al., 1989), alcohol and drug use (Tebeka et al., 2016), social problems (Tebeka et al., 2016) or aggressive behavior (Harland et al., 2002; Tebeka et al., 2016). In addition, a longitudinal study observing long-term effects of parental divorce found an increased risk for frequent job-changing during early careers, premarital parenting and marital breakdown (Rodgers, 1994). A recent study investigating the effects of parental divorce during childhood on well-being during young adulthood found that adults, who experienced the divorce of their parents during childhood reported reduced well-being, resilience and increased levels of childhood trauma and rejection sensitivity compared to those with continuously married parents (Schaan & Vögele, 2016). The implications of these findings are, however, still unclear, as little is known about the nature of the traumatic experiences

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and the clinical significance of these findings (Schaan & Vögele, 2016). A recent meta-analysis on the impact of parental divorce on affective disorders highlights the need to assess clinical disorders, for instance by using structured clinical interviews, rather than relying on self-report assessments (Sands et al., 2017). In addition, previous studies have mostly relied on the sole assessment of depression rather than evaluating the broader spectrum of mental disorders (Sands et al., 2017). Brennan & Shaver (1998) observed that young adults of divorced parents reported more attachment insecurity and had a higher risk for personality disorders than young adults with continuously married parents. Nevertheless, they too only relied on self-report questionnaires to assess personality disorders. While self-report questionnaires support the validity of a clinical diagnosis, they are not designed for clinical classification and diagnosis. It is, therefore, important to investigate if the results reported by studies using self-report questionnaires are generalizable and can be replicated with structured clinical interviews, which have been specifically designed for diagnostic purposes and therefore offer additional information on whether mental symptoms require treatment.

Divorce and trauma. For prevention and treatment purposes, it is crucial to understand what kind of traumatic experiences are more frequently experienced by children of divorced parents. The divorcing process itself might elicit extreme stress for the parents, for instance due to financial worries, loss of one's social environment and support system as well as loss of one's romantic partner (Leopold, 2018). As a consequence, divorce has been shown to significantly increase the risk for mental health problems such as depression, substance abuse or anxiety in men and women (Leopold, 2018; Richards et al., 1997). When being faced with the burden of their divorce, parents might be so caught up in their own emotions that they do not have the resources to emotionally support their children (i.e., emotional neglect) and even actively put their children into difficult emotional situations ("If you love me, then you cannot like your fathers new girlfriend!"; i.e., emotional abuse). Children of divorced parents might also feel responsible for an amelioration of their parents conflicts and feel triangulated between them, as they might be used as messenger between both (Shimkowski & Ledbetter, 2018). Furthermore, during times of intense emotional stress that may develop into serious mental health problems, parents might not be attentive enough anymore to fulfill their children's physical needs such as preparing lunch, going to the doctor or buying new clothes (i.e., physical neglect; Chaffin et al., 1996). Intense emotional stress on the parent's side might even lead to physical punishment of the child due to depression, increased irritability and reduced emotion regulation capacity (i.e., physical abuse; Cadoret, 1995; Chaffin et al., 1996; Clément & Chamberland, 2008; Crouch & Behl, 2001). The finding of increased traumatic experiences reported by adults of divorced parents as compared to adults with continuously married parents (Schaan & Vögele, 2016) also highlights the importance to focus on family characteristics and processes that might increase the risk for the development of mental disorders and traumatic childhood experiences.

Divorce and mediating family characteristics. There is evidence that parental divorce and parental psychiatric history (e.g. alcohol abuse) interact and in combination double or even triple children's psychological problems in terms of suicide attempts (Thompson et al., 2017). In addition, some studies on genetic and environmental selection factors highlight the possibility that shared genetic liability in parents and their children, e.g. genetic risk for negative emotionality, may explain why some parents are more prone to divorce and why their children are more vulnerable to affective disorders (D'Onofrio et al., 2007). Other family characteristics that potentially mediate the relationship between parental divorce and children's well-being include quality of parent-child-relationship, parental communication style, and impaired parental coping skills, which have all been related to children's psychological problems (i.e., suicide attempts, high levels of hopelessness, internalized maladaptive coping skills; Rotunda et al., 1995; Thompson et al., 2017). One main influencing factor might therefore be how parents interact and care for their children. Do divorced parents provide less care to their children than parents who still live together?

Divorce and attachment. Children of divorced parents are at risk to develop insecure attachment styles and report increased rejection sensitivity in adulthood (Clark, 2017; Schaan & Vögele, 2016), which can hinder the development of a stable social network and increase loneliness (Watson and Nesdale, 2012). There is one report showing that adolescents with divorced parents feel more lonely than adolescents with non-divorced parents (Çivitci et al., 2009). However, to date, there are no results on increased loneliness perceived by adults of divorced parents as compared to non-divorced parents.

Divorce and chronic stress. Early life stress, elicited for instance by a traumatic parental break-up, can importantly impact the stress system on the long run and thereby change the experience of daily hassles (Elwenspoek et al., 2017; Hengesch et al., 2018; Schulz & Vögele, 2015; Wilson et al., 2011). In addition to the stress elicited by inter-parental conflicts, parental disclosure of divorce and the divorcing process, any strategy a child chooses to cope with their parental divorce has been claimed to elicit stress as they might feel caught between hostile parents (Amato & Afifi, 2006). Furthermore, increased divorce-related social insecurities might render everyday social interactions more stressful (Liu et al., 2014; Slavich et al., 2010). It is plausible to assume, therefore, that young adults of divorced parents experience more chronic stress in everyday life due to sensitization of their stress system and enhanced psychological stress because of increased social insecurities and complicated familial interactions compared with young adults of non-divorced parents.

Study relevance and aims. Given the important association between parental divorce and adult mental health it is crucial to understand its psychological impact on the family and social development of the child. It remains unclear, if children of divorced as compared to continuously married parents are at increased risk for mental disorders in adulthood as there are no studies using structured clinical interviews to assess mental disorders. This study, therefore, used a structured clinical interview for axis I and axis II mental disorders to ascertain whether children of divorced parents are at higher risk to develop a mental disorder or personality disorder in later life than those from non-divorced families. We furthermore intended to fill the gap of missing reports of adults of divorced parents with regard to perceived loneliness. A better understanding of the implications of parental divorce with regard to social connectedness of the child concerned as well as experienced traumas and family interactions can help to develop specific interventions designed to prevent children of divorcing families and their parents to suffer from long-term health consequences. We focused on female participants only to increase testing power by avoiding interactions by sex. This study aims a) to investigate if children of divorced parents have an increased risk to develop a mental disorder or personality disorder later in life (research question [RQ] 1), b) to analyze if divorced parents provide less care to their children than parents who still live together (RQ2) and c) to identify the traumatic experiences most frequently experienced by children of divorced parents as compared to adults with continuously-married parents (RQ3). We expected that increased emotional and physical abuse and neglect are more prevalent in the offspring of divorced families. Furthermore, it was expected that young adults of divorced parents a) report more depressive symptoms, more loneliness and more attachment insecurities than young adults of non-divorced families (hypothesis [H] 1), and b) experience more chronic stress in everyday life as compared to young adults of non-divorced families (H2).

1. Method

1.1. Participants

One hundred-twenty one women participated in the study. Sixty participants experienced the divorce of their parents during their

Table 1
Nationality, education background and age by group (no parental divorce vs. parental divorce). *M* = mean, SD = standard deviation.

	Parental divorce *N* = 60	No parental divorce *N* = 61
Austrian	0	1
Belgian	1	0
Brasilian	1	0
German	28	39
French	2	2
Italian	0	1
Luxemburgish	28	15
Portugiese	0	1
Romanin	0	1
Unkown	0	1
Student	52	54
Research assistant	3	3
Teacher	3	0
Gouvermental secretary	1	0
Nurse	1	2
Psychologist	0	1
European volunteer	0	1
Age	22.67 (SD = 3.76)	23.34 (SD = 5.21)

childhood (mean age of parental divorce: 10 years (*SD* = 4.71), and 61 reported that their parents were continuously married. Mean age was 23 years (*SD* = 4.55). Table 1 shows that both groups were comparable and similarly structured with regard to their nationality and professional background. Young adults of divorced parents reported a significant decrease in parental conflicts after the divorce (before: *M* = 6.04, *SD* = 2.49; after: *M* = 4.53, *SD* = 2.98; t(48) = 3.523, *p* = .001, *d* = 0.55) on a scale from 1 (= no conflicts) to 10 (= extreme conflicts), while the emotional strain they experienced because of the divorce of their parents was 5.84 (*SD* = 2.59) on a scale from 1 (= no emotional strain) to 10 (= extreme emotional strain).

1.2. Psychological data

Participants were interviewed with the two parts of the structured clinical interview for DSM-IV disorders (SCID 1: DSM-IV axis 1 disorders, i.e. major mental disorders, Wittchen et al., 1997; SCID 2: DSM-IV axis 2 disorders, i.e. PDs, Fydrich et al., 1997). A questionnaire preceded the SCID 2 interview to shorten the interview time, as negated items could be skipped. If previously agreed by the participant, interviews were audiotaped for validation purposes. The SCID 1 and 2 are currently used as the gold standard in determining clinical diagnoses. In the present study 20% of the interviews were rated by a second trained person, who was blind to the ratings of the first rater to assess inter-rater-reliability (kappa = 0.833, *SE* = 0.113, $p < .001$).

The Beck Depression Inventory (Kühner et al., 2007) was used to assess depressive symptoms. The inventory consists of 21 items that are answered on a 4-point Likert scale indicating the severity of a specific symptom (e.g., feeling sad or having suicidal ideations) and has been shown to have good psychometric properties ($\alpha > 0.84$, Kühner et al., 2007; current study: $\alpha = 0.72$).

Childhood trauma was measured using the Childhood Trauma Questionnaire (CTQ; Klinitzke et al., 2012). This 28-item questionnaire (5-point Likert scale ranging from 0 = =not at all to 4 = very often) assesses childhood trauma on five subscales: Emotional Abuse ($\alpha = 0.80$), Physical Abuse ($\alpha = 0.63$), Sexual Abuse ($\alpha = 0.92$), Emotional Neglect ($\alpha = 0.86$) and Physical Neglect ($\alpha = 0.30$). The psychometric properties of the sum scale were good in the current sample ($\alpha = 0.87$).

Chronic stress was assessed using the Trier Inventory for Chronic Stress (TICS; Schulz et al., 2003). This 57-item inventory assesses chronic stress on the following 9 dimensions: Work Overload, Social Overload, Pressure to Perform, Work Discontent, Excessive Demands from Work, Lack of Social Recognition, Social Tensions, Social Isolation, and Chronic Worrying. All items are rated on a five-point Likert scale ranging from 0 = never to 4 = very often and reflecting the frequency of specific experiences (e.g. “Although I try, I do not fulfill my duties as I should.”). The psychometric properties were excellent in this study ($\alpha = 0.96$).

Social connectedness was assessed using the German version of the revised experiences in close relationships scale (ECR; Ehrenthal et al., 2007). The scale consists of 18 items that are rated on a 7-point Likert Scale ranging from 1 (= I do not agree at all) to 7 (= I totally agree) measuring attachment-related anxiety ($\alpha = 0.91$) and attachment-related avoidance ($\alpha = 0.93$). For the assessment of social loneliness we used the German version of the UCLA Loneliness Scale (Döring & Bortz, 1993). The scale consist of 20 items ($\alpha = 0.88$), which are rated on a 5-point Likert-scale ranging from 1 (= I do not agree at all) to 5 (= I totally agree).

Furthermore, participants were asked to complete the Parental Bonding Instrument (PBI; Parker et al., 1979) for both fathers and mothers, with each version consisting of 21 items that are answered on a 4-point Likert scale ranging from 0 = very likely to 3 = very unlikely. The instrument consists of two subscales: parental overprotection (maternal: $\alpha = 0.85$; paternal: $\alpha = 0.81$) and care (maternal: $\alpha = 0.91$; paternal: $\alpha = 0.89$).

1.3. Procedure

German-speaking participants were recruited online via social networks, through university postings and university circular emails. Volunteers were invited to a two-hour interview session, during which they were interviewed and also asked to fill out the questionnaires. All interviews were conducted by the first author, a psychologist and clinical psychology trainee, and supervised by the last author, a chartered clinical psychologist. The interviewer was blind with regard to the parental situation (divorce vs. no divorce). All participants provided written informed consent. Feedback to the participant and contact information on clinical services was provided, if requested by the participant. After participation, all volunteers were thanked and they received a financial compensation of 20 Euros. All procedures were in accordance with the 1964 Helsinki declaration and its later amendments. The study design was approved by the Ethics Review Panel of the University of Luxembourg.

1.4. Statistical analysis

All data were scored and analyzed using *SPSS 21*. Kolmogorow-Smirnow and Mauchly's tests were performed to test for the normal distribution and sphericity assumptions, respectively. Outlier identification was carried out by visual inspection for all variables, and extreme values (>2.5 *SD*s above the mean) were set to missing. Effect sizes are reported for any significant interaction or main effect using *Cohen's d* statistic (for *t*-tests) or partial eta-squared statistics (η_p^2; for ANOVA results). By convention, an effect size of $d = 0.20/\ \eta_p^2 = 0.01$, $d = 0.50/\ \eta_p^2 = 0.06$, and $d = 0.80/\ \eta_p^2 = 0.14$ reflect small, medium, and large effects sizes, respectively (Cohen, 1992, 1988). Significance level was set at $p < .05$. In the case of significant Levene-test results, *t*- and *F*-values for unequal variances are reported. Significance levels were Bonferroni corrected for multiple comparisons of questionnaire scores.

RQ1 was analyzed by calculating two Chi2-tests comparing young adults of divorced and non-divorced families with regard to mental and personality disorders.

RQ2 was examined using multivariate analysis of variance (MANOVA) with maternal and paternal care and overprotection as dependent variables, and group (parental divorce vs. no parental divorce) as between subject variable.

RQ3 was analyzed using a MANOVA entering the five subscales of childhood trauma as dependent variables and group (parental divorce

vs. no parental divorce) as between subject variable.

H1 was analyzed using student t-tests entering attachment anxiety and avoidance as well as loneliness and depression as dependent variables and group (parental divorce vs. no parental divorce) as between subject variable.

H2 was analyzed using a MANOVA entering the chronic stress subscales as dependent variables and group (parental divorce vs. no parental divorce) as between subject variable.

2. Results

2.1. Psychological vulnerability (RQ1, RQ3, H1)

Twenty-six out of 60 young adults of divorced parents fulfilled the criteria for a mental disorder, whereas this was the case for only 14 out of 61 young adults of continuously married parents ($Chi^2 = 5.68$, $p = .017$). There was, however, no difference with regard to personality disorders (parental divorce: SCID 2: 6 out of 60; no parental divorce: SCID 2: 3 out of 61, $Chi^2 = 1.135$, $p = .287$). The SCID 1 diagnoses were then categorized following the DSM-IV into anxiety disorders, mood disorders, substance (abuse) disorders, eating disorders, psychotic disorders and PTSD (Table 2).

Participants with divorced parents ($M = 5.08$, $SD = 4.39$) reported more depressive symptoms than control participants ($M = 3.05$, $SD = 3.34$, $t(115) = 2.815$, $p = .006$, $d = 0.521$, CI[−0.345; −0.60]). They also scored higher on attachment anxiety ($M = 2.43$, $SD = 1.13$) and avoidance ($M = 2.69$, $SD = 0.88$) than control participants (anxiety: $M = 1.89$, $SD = 0.86$, $t(119) = -2.932$. $p = .004$, $d = 0.538$, CI [−0.899; −0.174]; avoidance: $M = 2.31$, $SD = 0.63$, $t(119) = -2.777$, $p = .006$, $d = 0.497$, CI[−0.659; −0.110]). Participants with divorced parents ($M = 34.59$, $SD = 9.92$) reported higher loneliness scores than did participants with non-divorced parents ($M = 29.17$, $SD = 7.43$, $t(116) = -3.360$, $p = .001$, $d = 0.618$, CI[−8.62; −2.227]).

Young adults with divorced parents reported higher childhood trauma scores as compared to adults with continuously married parents (divorced parents: $M = 7.32$, $SD = 2.13$; control: $M = 6.11$, $SD = 1.06$, $t(117) = 3.799$, $p < .001$, $d = 0.72$, CI[−1.766; −0.556]). MANOVA on the different subscales of the CTQ was significant ($F(5,110) = 3.661$, $p = .004$, $\eta_p^2 = 0.143$; see Fig. 1). Bonferroni corrected univariate comparisons showed that participants with divorced parents reported higher levels of physical abuse ($F(1,117) = 9.147$, $p = .015$, $\eta_p^2 = 0.074$, CI[−0.213; −0.043]), emotional abuse ($F(1,117) = 12.368$, $p = .005$, $\eta_p^2 = 0.098$, CI[−0.637; −0.170]) and emotional neglect ($F(1,117) = 9.686$, $p = .010$, $\eta_p^2 = 0.078$, CI[−0.689; −0.172]) than control participants from non-divorced families. No differences between groups could be observed with regard to sexual abuse ($F(1,117) = 1.441$, $p > .99$, $\eta_p^2 = 0.012$, CI[−0.265;0.065]) or physical neglect ($F(1,117) = 2.546$, $p = .565$, $\eta_p^2 = 0.022$, CI[−0.233; 0.030]).

2.2. Chronic stress (H2)

There were significant group differences (parental divorce vs. no parental divorce) with regard to chronic stress ($F(10,117) = 2.188$, $p = .024$, $\eta_p^2 = 0.170$, see Table 3). Groups differed at Bonferroni adjusted significance levels on the subscales: Screening scale for chronic stress ($F(1,117) = 12.362$, $p = .01$, $\eta_p^2 = 0.096$, CI[−0.722; −0.106]), social isolation ($F(1,117) = 9.116$, $p = .03$, $\eta_p^2 = 0.073$, CI [−0.777; −0.059]), chronic worrying ($F(1,117) = 11.178$, $p = 01$, $\eta_p^2 = 0.088$, CI[−0.919; −0.086]) and work discontent ($F(1,117) = 8.249$, $p = .05$, $\eta_p^2 = 0.066$, CI[−0.627; −0.011]).

2.3. Family dynamics (RQ2)

The MANOVA ($F(4.107) = 4.564$, $p = .002$, $\eta_p^2 = 0.146$, see Fig. 2) indicated significant differences between both groups with regard to parental care. Participants with divorced parents reported marginally less maternal care ($F(1,112) = 6.253$, $p = .056$, $\eta_p^2 = 0.054$, CI [0.541;1.749]) and significantly less paternal care ($F(1,112) = 15.732$, $p < .001$, $\eta_p^2 = 0.125$, CI[2.409;7.062]) than children of non-divorced families. There was no difference with regard to overprotection of mother ($F(1,112) = 1.993$, $p = .644$, $\eta_p^2 = 0.018$, CI[−3.949;0.688]) or fathers ($F(1,112) = 2.307$, $p = .528$, $\eta_p^2 = 0.021$, CI[−3.651;476]) between both groups.

2.4. Further analysis

Mental health and parental care: Pearson's correlations were calculated to examine the mechanisms underlying the impact of parental care for mental well-being (i.e., loneliness, attachment anxiety and avoidance, as well as childhood trauma). Parental care was significantly associated with perceived loneliness (mothers: $r = -0.529$, $p < .001$, fathers: $r = -0.498$, $p < .001$), attachment anxiety (mothers: $r = -0.225$, $p = .015$, fathers: $r = -0.372$, $p < .001$), and avoidance (mothers: $r = -0.198$, $p = .033$, fathers: $r = -0.375$, $p < .001$), depression (mothers: $r = -0.334$, $p < .001$, fathers: $r = -0.165$, $p = .079$), as well as emotional abuse (mothers: $r = -0.626$, $p < .001$, fathers: $r = -0.354$, $p < .001$), emotional neglect (mothers: $r = -0.649$, $p < .001$, fathers: $r = -0.465$, $p < .001$) and physical neglect (mothers: $r = -0.358$, $p < .001$, fathers: $r = -0.229$, $p = .014$).

Mental health and custody: For exploratory analysis purposes we included an additional variable (frequency of contact with both parents), after having tested 24 participants with divorced parents. The results from the remaining sub-sample of participants with divorced parents ($n = 38$) show that 32.5% reported to have lived in shared residential custody, defined as staying at least 33% of their time with one parent, the remaining percentage with the other parent (Kelly, 2007). Overall, women with divorced parents reported to have spent approximatively 79.52% ($SD = 22.39$) of contact time with their mothers and the remaining time with their fathers (20.48%; $SD = 22.62$). To further understand the impact of shared vs. sole custody on mental health, we calculated a regression analysis on SCID 1 diagnosis as dependent variable.

Two dummy variables were introduced as follows: The first dummy indicated the comparison between families with shared custody vs. no parental divorce and the second variable indicated the comparison

Table 2
Number of SCID 1 diagnoses shown separately for participants who experienced parental divorce and no parental divorce (percentages in parentheses).

SCID 1	Parental divorce $N = 60$	No parental divorce $N = 61$	Chi^2
Anxiety Disorder	15 (25%)	9 (14.8%)	1.997, $p = .158$
Mood Disorder	15 (25%)	5 (8.2%)	6.190, $p = .013$
Substance	3 (5%)	2 (3.3%)	0.226, $p = .634$
Abuse	0 (0%)	1 (1.6%)	0.992, $p = .319$
Dependency	3 (5%)	1 (1.6%)	1.069, $p = .301$
Eating Disorders	2 (3.3%)	3 (4.9%)	0.192, $p = .661$
Psychotic Disorders	1 (1.7%)	0 (0%)	1.025, $p = .311$
PTSD	0 (0%)	1 (1.6%)	0.992, $p = .319$

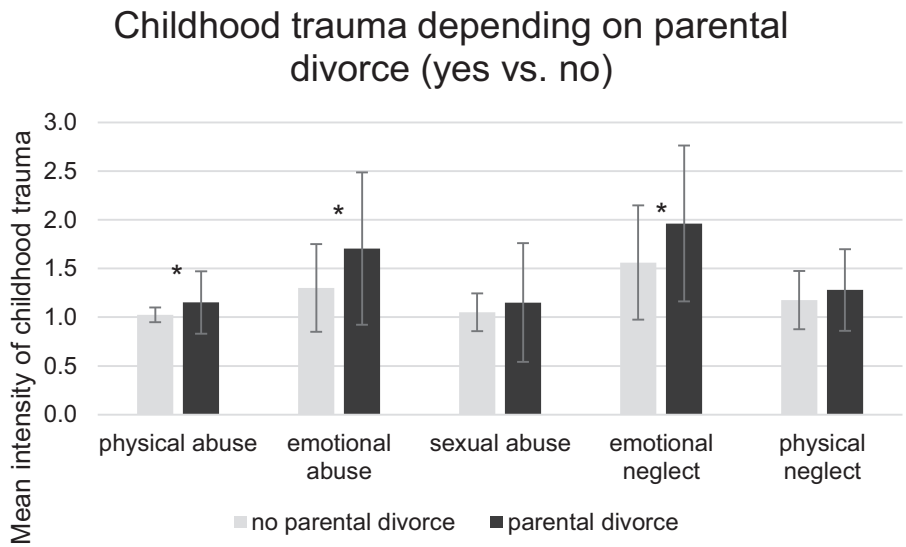

Fig. 1. Illustration of the childhood trauma subscales per group (no parental divorce vs. parental divorce). Error bars indicate one standard deviation.

Table 3
Illustration of the chronic stress subscale scores per group (no parental divorce vs. parental divorce). *M* = mean, *SD* = standard deviation.

	No parental divorce $N = 60$ M (SD)	Parental divorce $N = 61$ M (SD)	Statistics
Screening scale for chronic stress	0,946 (0.591)	1,360 (0.689)	$F(1,117) = 12.362$, $p = .010$, $\eta_p^2 = 0.096$, CI[−0.722; −0.106]
Social tensions	0,700 (0.496)	0,971 (0.867)	$F(1,117) = 4.395$, $p = .380$, $\eta_p^2 = 0.037$, CI[−0.067;0.609]
Social isolation	0,775 (0.590)	1193 (0.887)	$F(1,117) = 9.116$, $p = .03$, $\eta_p^2 = 0.073$, CI[−0.777; −0.059]
Chonic worrying	1,033 (0.721)	1,5345 (0.90)	$F(1,117) = 11.178$, $p = .01$, $\eta_p^2 = 0.088$, CI[−0.919; −0.086]
Work discontent	0,883 (0.547)	1,202 (0.653)	$F(1,117) = 8.249$, $p = .05$, $\eta_p^2 = 0.066$, CI[−0.0.627; −0.011]
Excessive demands at work	0,828 (0.580)	1,069 (0.712)	$F(1,117) = 4.075$, $p = .460$, $\eta_p^2 = 0.034$, CI[−0.574;0.092]
Lack of social recognition	0,696 (0.662)	0,987 (0.779)	$F(1,117) = 4.791$, $p = .310$, $\eta_p^2 = 0.040$, CI[−0.662;0.08]
Work overload	1,265 (0.729)	1,575 (0.838)	$F(1,117) = 4.633$, $p = .330$, $\eta_p^2 = 0.038$, CI[−0.714;0.094]
Social overload	0,792 (0.572)	1,129 (0.801)	$F(1,117) = 6.974$, $p = .09$, $\eta_p^2 = 0.057$, CI[−0.693;0.019]
Pressure to perform	1,185 (0.673)	1,404 (0.658)	$F(1,117) = 3.197$, $p = .76$, $\eta_p^2 = 0.027$, CI[−0.561;0.123]

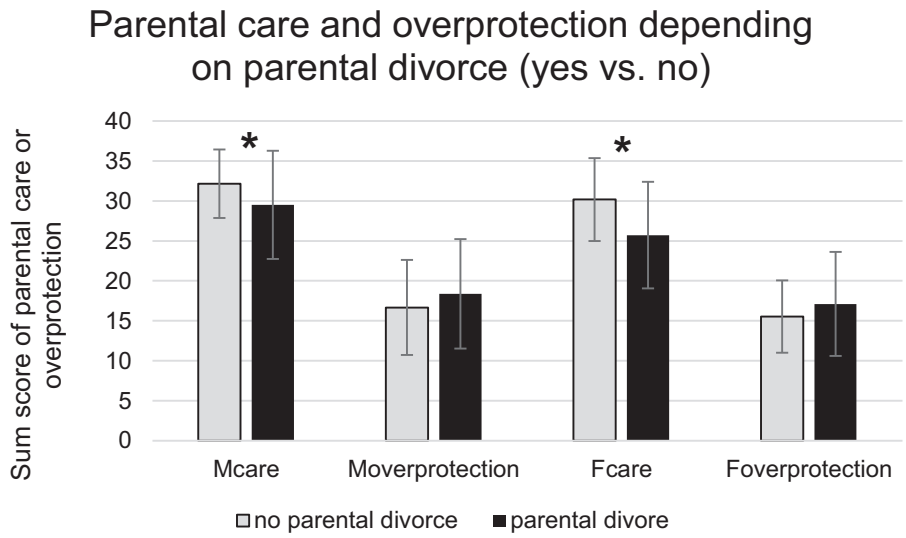

Fig. 2. Illustration of the care and overprotection of mothers (M) and fathers (F) per group (no parental divorce vs. parental divorce). Error bars indicate one standard deviation. Mcare = maternal care, Moverprotection = maternal overprotection, Fcare = paternal care, Foverprotection = paternal overprotection.

between families with sole custody vs. no parental divorce. Results of the logistic regression analysis showed that only the latter comparison was significant (Wald's $\chi 2 = 4.858$, $p = .028$, Exp(B) = 3.033; $CI = [1.131; 8.135]$). This suggests that the risk to develop a mental disorder was higher for women raised in sole custody arrangements but not for women raised in shared custody (Wald's $\chi 2 = 0.817$, $p = .366$, Exp(B) = 1.878; $CI = [.479; 7.362]$). Nevertheless, due to the small co-parenting sample of the parental divorce group ($n = 11$), statistical power may have been to low to detect differences between shared custody vs. no parental divorce groups. The overall regression did not reach significance with $\chi 2 = 5.018$, $df = 2$, $p = .081$.

3. Discussion

Parental divorce has become a developmental challenge to many children. However, due to the enormous implications of parental divorce for children's' lives (e.g., pre-divorce parental conflicts, possible relocation and change of school, unavailability of one or both parent(s) or increased traumatic experiences) many children feel overstrained and suffer from immense social and health-related consequences (Amato, 2000; Amato & Keith, 1991; Sands et al., 2017; Schaan & Vögele, 2016). Given the important implications of parental divorce on adult mental health, it is crucial to understand its psychological impact on the family and social development of the child. This is the first study to examine the vulnerability of young adults with divorced as compared to non-divorced parents for mental disorders by using a structured clinical interview. In addition, divorce-related long-term implications on loneliness, traumatic experiences and parental care were examined for the first time. A better understanding of the consequences of parental divorce for children's risk to develop mental disorders and for specific traumatic experiences can help to develop specific prevention programs supporting children to stay healthy during and after their parental divorce.

This study offers new insight into the association between parental divorce and mental health of the children concerned by using a structured clinical interview that allows to diagnose mental disorders as compared to previously-used self-report questionnaires. Young adults of divorced parents fulfilled the criteria of a mental disorder (SCID 1) more often than young adults of non-divorced families. This finding suggests that children of divorced parents have almost twice the risk (26 diagnoses in the parental divorce group vs. 14 diagnoses in the control group) to develop a mental disorder as compared to adults with continuously married parents. With regard to specific diagnostic categories, there was an increased risk for depression in adults of divorced parents compared to non-divorced parents. This is in line with the systematic review and meta-analysis by Sands and colleagues (Sands et al., 2017). Our results, therefore, support previous results on depression as the most frequently experienced emotional disturbance in women with divorced parents. No differences with regard to personality disorders were observed. This finding was unexpected as attachment insecurity, that is more frequently observed in children of divorced parents, has been shown to be associated with personality disorders (Brennan & Shaver, 1998; Crawford et al., 2007). Nevertheless, there is evidence that personality still changes during young adulthood (Caspi & Roberts, 2001), and as the sample in this study was quite young, personality development may not have reached maturity (Caspi et al., 2005; Johnson et al., 2000). An assessment at later time points (e.g.10 or 30 years later), would allow for more meaningful conclusions on the long-term impact of parental divorce, as meta-analytic findings suggest that personality continuity/stability peaks after age 50 (Caspi et al., 2005).

This study also aimed to identify the source of the traumatic experiences that are more frequently reported by children of divorced parents as compared to adults with continuously married parents (Schaan & Vögele, 2016). The results of this study indicate less paternal care, more emotional abuse and neglect and more physical abuse in divorced families as compared to non-divorced families. This result supports previous studies showing that divorce influences fathering more than mothering, which has been suggested to be especially difficult for boys (Coiro & Emery, 1998; Størksen et al., 2005). Due to the association between parental care and children's well-being (i.e., loneliness, depression, attachment anxiety and avoidance) and the relationship between traumatic experiences and mental health (Schaan & Vögele, 2016), it is indispensable to better implement well-validated therapeutic support systems for divorcing families. At this point, we can only speculate about the reasons for the inadequate interactions of divorced-parents with their children. The most apparent reason might be, that parents do not find enough emotional and temporal resources to sufficiently care about their children due to financial or emotional distress (Chaffin et al., 1996; Leopold, 2018; Richards et al., 1997; Shimkowski & Ledbetter, 2018). To replace speculations with knowledge, we need studies assessing parents and children together to understand their interaction, and to better understand the reasons for maltreatment. Future studies may include both a diagnostic session followed by therapeutic sessions for the parents, the child and the whole family together, to adequately target everyone's needs and efficiently train specific interactions and strategies. By implementing a waiting-list control group, an evaluation of the long term effectiveness of the therapeutic support could be included as well, which might help to suggest specific treatment packages for families of divorced parents.

Young adults of divorced parents reported more overall chronic stress (especially more social isolation, chronic worrying and work discontent), more loneliness and attachment anxiety and avoidance during their every-day life than young adults whose parents still lived together. Thus, parental divorce, as a reflection of unloving interactions between parents and possible loss of one main caregiver, seems to upset children's social worldview who, therefore, respond with increased uncertainty in social relationships and thus transfer their parents' unstable relationship experience onto their own intimate, peer and work relationships. This interpretation is supported by previous findings of children of divorced parents, who reported being anxious to repeat their parents' problems (Laumann-Billings & Emery, 2000). The present study, therefore, further highlights the need for family interventions and psychological support for children of divorced parents.

Although parental divorce was associated with negative health-related outcomes, the parental decision to divorce might have been the better solution for the family at this point in time. Parental divorce is not only a challenge to manage by two (probably arguing) parents and their child, but primarily a reflection of previous parental problems. Staying in a war-zone among two fighting parents might result in even worse health-related outcomes for the child due to never-ending traumatic experiences at home. The question is, therefore, not if but how to divorce. The way how children are taken care of after the divorce matters. Today there is broad agreement that children in shared residential custody are better adjusted and report equal or better emotional, behavioral, physical and academic well-being compared with those in sole custody (Nielsen, 2014). This is especially true for parents who are able to implement cooperative co-parenting, characterized by joint planning, coordination and flexibility in organizing custody. Cooperative co-parenting has been argued to buffer against negative divorce-related consequences, and even to increase children's resilience (McIntosh & Chisholm, 2008; Nielsen, 2014). Not every divorce, however, results in two conflict-free, mutually supportive parents. When parents reported high levels of conflict even years after the divorce, shared parenting was associated with poorer outcomes for the child (Kelly, 2007; Mahrer et al., 2018; McIntosh & Chisholm, 2008). Parents with shared residence reported less personal problems, little parental conflict and more resources, highlighting again the importance for future studies to investigate family dynamics at home by interviewing not only children but also their parents (Poortman & Gaalen, 2017). In the present study the number of women raised in shared custody was relatively low. Only 32.5% of those who were interviewed and experienced a divorce of their parents ($n = 11$) reported to be raised in shared custody. Despite this small and unbalanced sample, we conducted exploratory analyses investigating the effects of the way the divorce was dealt with. These analyses lend support to the hypothesis that shared custody might ameliorate the potential negative effects of divorce on mental health, as only the group of women raised in sole custody significantly differed from the no-parental divorce control group and had a three times increased risk to develop a SCID 1 diagnosis. Nevertheless, testing power was low in the current study, so these results should be interpreted with caution.

It might be helpful to offer parents professional advice before they even let their child know of their divorce. Outsourcing discussions

about the divorce at an early stage might protect the child from unfiltered emotions and verbal critique towards the partner. At this early stage, parents might be also offered support and guidance in how to interact with the child. In addition, parents should be offered information on childhood trauma and parental care and the well-established consequences of parental divorce on children's health (e.g. attachment insecurity, loneliness, mental health problems; Amato, 2000; Amato & Afifi, 2006; Amato & Keith, 1991; Brennan & Shaver, 1998; Sands et al., 2017; Schaan & Vögele, 2016; Shimkowski & Ledbetter, 2018). In doing so, increased awareness towards one's responsibility towards the child may be increased. Regular therapeutic individual or group sessions for the child or the parents could be offered, designed to help with coping with divorce-related emotional challenges. Specialized school psychologists might be included in the help system for the child, as they are accessible to the child and located in a place that is familiar to both parents and children. School psychologists may contribute further information on the social integration and academic performance of the child, which in turn may serve as additional indicators for the child's social functioning.

There is evidence that women tend to have poorer mental health outcomes as a reaction to parental divorce than men (Cooney & Kurz, 1996; Størksen et al., 2005). For example, women report more depression, anxiety and other mental illnesses in response to parental divorce, whereas men tend to show specific behaviors with regard to school problems (Størksen et al., 2005) and drug and alcohol intake (Almuneef et al., 2017) after the experience of early life adversity. Fuller-Thomson and Dalton (2015) even observed an increased risk of stroke in males as compared to females in children of divorced parents that was explained by heightened cortisol reaction to stress in males as compared to females. Nevertheless, in a recent meta-analysis including 29 studies on the long-term effects of parental divorce on mental health in the offspring (Sands et al., 2017), no sex differences regarding the association between parental divorce and depression could be observed. Størksen and colleagues (Størksen et al., 2005) argue that sex differences might depend on age. Pre-adolescent boys reacted more intensively to divorce than did girls, while this difference diminished during early adolescence (Hetherington, 1993). Similarly, in another study, no sex differences could be observed in early adolescence, while girls (but not boys) responded to parental distress and discord with internalizing problems in mid-adolescence (Crawford et al., 2001). Among older adolescents (mean age 16 years), this sex difference seemed to stay stable, with girls reporting more divorce-related symptoms of anxiety and depression than boys (Størksen et al., 2006). In the present study we focused on women; it remains unclear, therefore, whether the present results extend to male populations. Future studies are needed to assess if boys and men experiencing parental divorce are equally affected by mental disorders girls and women.

4. Limitations

Due to the cross-sectional design of this study, conclusions about causality remain speculative. There is evidence from a cross sectional mediation model that childhood trauma, resilience and rejection sensitivity are important mediators of the parental divorce – well-being relationship (Schaan & Vögele, 2016). The current sample size and the cross-sectional design of this study does not offer adequate power to test the question if and to what extent the increased risk for children of divorced parents compared to children of non-divorced parents was affected by less paternal care, more emotional and physical abuse, more emotional neglect, more loneliness, chronic stress and attachment avoidance and anxiety. Therefore, it remains unclear if the observed harmful family interactions result from the divorce or if they were already present before. Longitudinal research designs are, therefore, needed. It may also be important to assess parental perceptions of family dynamics and their well-being to better understand if the present increased levels of childhood trauma and reduced parental care scores are the result of divorce-related parental burdens (e.g., emotional, time, social, health or financial). Cross-sectional studies targeting the consequences of parental divorce, however, clearly suggest an increased risk for reduced well-being in the children concerned. As we did not assess parent's medical and psychological history, any effects on the observed differences between groups due to family psychiatric history cannot be ruled out (Rotunda et al., 1995; Thompson et al., 2017). The fact that causality might be unclear does, however, not diminish the fact that those families have an enhanced need for professional help. It cannot be ruled out that null findings in the current study were due to lack of statistical power. Based on post-hoc simulation analyses using G-Power, only effects larger than $f = 0.25$ could be detected with sufficient power ($1\text{-}\beta = 0.80$). Small effects, therefore, may have gone undetected. As the sample consisted only of females with a preponderance of university students, the generalization of the findings is limited. Given this sample of young, successful females, the findings are, however, alarming, as worse outcomes might be expected from less-socially successful adults. Even as the TICS was primarily designed to assess work-related stress in employees, previous studies have demonstrated its validity also for student samples (Li-Tempel et al., 2016; Schulz et al., 2013).

5. Conclusions

In this study, an increased risk for children of divorced parents compared to children of non-divorced parents to develop a mental disorder during young adulthood could be observed. However, no increased incidence with regard to personality disorders was found. Furthermore, parental divorce was associated with less parental care, more emotional and physical abuse, more emotional neglect, more loneliness, chronic stress and attachment avoidance and anxiety. The results highlight the need for adequate prevention programs to support both children and parents during this emotionally difficult period.

Conflicts of interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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CRediT authorship contribution statement

Violetta K. Schaan: Conceptualization, Funding acquisition, Investigation, Project administration, Writing - original draft, Methodology. **André Schulz:** Conceptualization, Funding acquisition, Project administration, Validation, Writing - original draft, Supervision, Methodology. **Hartmut Schächinger:** Project administration, Validation, Methodology. **Claus Vögele:** Conceptualization, Funding acquisition, Project administration, Validation, Writing - original draft, Supervision, Methodology, Resources.

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