Depressive Symptoms in Adults Separated from Their Parents as Children: A Natural Experiment during World War II

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Despite the significance of childhood trauma for later life, there is little evidence on the long-term consequences of parent-child separation. World War II created a unique natural experiment that allowed the authors to test whether 1) evacuation to temporary foster care unaccompanied by either parent and 2) separation from the father because of his military service predicted depressive symptoms later on. Members of the Helsinki 1934–1944 Birth Cohort (n = 1,658) filled out the Beck Depression Inventory (BDI) at the ages of 61.6 (standard deviation: 2.9) and 63.4 (standard deviation: 2.9) years. The mean of the two BDI scores was used as the dependent variable. The data on separation experiences were extracted from the Finnish National Archives and from a survey among the participants. Former evacuees (n = 410) reported 20% (95% confidence interval: 8.7, 33.1) more severe depressive symptoms, and the odds ratio was 1.7 (95% confidence interval: 1.1, 2.6) for having at least mild (BDI score: ≥10) symptoms over time compared with those who were not separated. Those separated from their father because of the father’s military assignment (n = 744) did not differ from those who were not separated.

Cohort studies; depression; life change events; object attachment; parent-child relations; psychology; war

Abbreviations: BDI, Beck Depression Inventory; CI, confidence interval; SD, standard deviation.

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The life circumstances in Finland were highly insecure because of Soviet-Finnish wars between 1939–1940 and 1941–1944. Air bombardments, food rationing, and deaths of close relatives, friends, and acquaintances threatened daily living. To protect the Finnish children from the worst, approximately 70,000 children from various socioeconomic backgrounds were evacuated unaccompanied by their parents abroad, primarily to Sweden and Denmark. In addition to the evacuations abroad arranged by the Finnish government, parents themselves took the initiative and sent a number of children to the homes of relatives or other family acquaintances abroad or within Finland, living outside the war zones. Many children were also separated from their fathers serving in the military forces. Today, over 60 years later, these historical circumstances have made it possible to explore the long-term mental health consequences of parental separation in childhood.

Despite the significance of childhood trauma, such as abuse or neglect, for later life (1, 2), information on the long-term outcomes of parent-child separation is limited.

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The majority of the evidence focuses on consequences of parental divorce (3) and death (4–6), which are often preceded and/or followed by various other life adversities, confounding the effects of the parent-child separation experience itself. Very few studies to date have focused on parent-child separation due to wartime adversities. This is surprising since even today, among the 9.2 million refugees throughout the world, there are thousands of unaccompanied children living in different conditions, such as in detention centers, refugee camps, and foster families (7). Studies on these children’s mental health are very few, however, and focus only on the short-term outcomes (8, 9). We are aware of only three studies, all based on the evacuation of children living in London (United Kingdom) during World War II, that have examined the long-term mental health outcomes of separation from both parents. Foster et al. (10) found that former evacuees (n = 169) were more likely to have insecure attachment styles and lower levels of current psychological well-being than controls (n = 43) at the age of 67 years. Tennant et al. (11), however, found no differences in adult depression and anxiety states between the former evacuees (n = 56) and the controls (n = 461). Neither did Birtchnell and Kennard (12) find any difference in mental health between former female evacuees (n = 38) and controls (n = 67). However, the evidence on the long-term consequences of parental separation is rather tenuous because of the small sample sizes, participant recruitment through advertisement and word of mouth, ambiguity related to the age when the outcomes were measured, paternal death in the control group, and data being restricted to women (10–12).

Consequently, our first aim was to explore the long-term outcomes related to separation from the only parent or both parents in childhood among members of the Helsinki Birth Cohort born in 1934–1944 (Finland). SD, standard deviation.

MATERIALS AND METHODS

Participants

Figure 1 displays the participants originating from the Helsinki Birth Cohort Study (15) born at the Helsinki University Central Hospital during 1934–1944. We identified 4,630 men and 4,130 women with birth and child-welfare records, who were living in Finland in 1971 when a unique personal identification number was allocated to each member of the Finnish population. In 2001–2004 (time 1), a randomly selected sample of 2,003 women and men underwent a clinical examination (15). In 2004 (time 2), after a mean period of 1.9 years (standard deviation (SD): 0.72; range: 0.4–3.3 years) from the original clinical examination, a psychological survey was mailed to those of the randomly selected sample who were still traceable. Of these, 1,658 yielded complete data on measures of depressive symptoms at both time 1 (2001–2004) and time 2 (2004), the mean age at time 1 and time 2 being 62.5 (SD: 2.9) years. Participants in the present analytical sample (n = 1,658) were more likely to be women (p < 0.001) compared with the remaining 345 subjects of the 2,003 randomly selected participants. The groups did not differ in social class during childhood or in adulthood (p’s > 0.17) or in depressive symptoms at time 1 (mean difference: 0.50, 95 percent confidence interval (CI): −1.13, 0.12; p = 0.15). The Ethics Committee of Epidemiology and Public Health of the Hospital District of Helsinki and Uusimaa approved this project, and all participants gave their informed consent.

Measures

Depressive symptoms. The Beck Depression Inventory (BDI) (16) consists of 21 items assessing symptoms of depression during the preceding 2 weeks. Respondents are instructed to circle the number that corresponds with the statement that best describes them, ranging from 0 to 3, indicating increasing severity. The ratings are summed to calculate a total BDI score ranging from 0 to 63. Cutoff
scores of 10, 19, and 30 or more are suggestive of mild to moderate, moderate to severe, and severe depressive symptoms, respectively. The reliability coefficients (Cronbach’s alpha) of the BDI were 0.84 at time 1 and 0.87 at time 2.

**Separation.** Information on the evacuations was gathered from a register in the Finnish National Archives that gives full documentation of the 48,628 children sent abroad through the Finnish government. We identified 185 participants (11.2 percent of the analytical sample) in this register. In addition, it is estimated that over 20,000 more children were evacuated abroad through the personal contacts of the families. Questions relating to wartime separations were therefore embedded in the psychological survey (time 2 in year 2004). In addition to subjects identified through the register, we identified 67 participants (4.0 percent of the analytical sample) reported to have been evacuated abroad and 148 (8.9 percent of the analytical sample) reported to have been evacuated in their homeland unaccompanied by either parent (information on placement was missing for 10 of the evacuees). In sum, our sample included 410 (24.7 percent) participants who had been evacuated unaccompanied by either parent (the “evacuated unaccompanied” group). The duration of the evacuation and the age at the time of separation were identified primarily from the register and, in the case that the evacuation was arranged by parents themselves, from the survey. Apart from eight participants, all evacuees identified from the register reported an evacuation in the survey. Self-reported duration of the evacuation and the age at the time correlated highly with government records \((r = 0.94, p < 0.001; r = 0.69, p < 0.001)\), respectively.

The “separated from their father” group included non-evacuated participants who reported that their fathers served in the Finnish armed forces but did not die in the war \((n = 744, 44.5\% of the analytical sample)\). A total of 28 subjects from the father-separated group (1.7 percent of the analytical sample) reported that their fathers had died in the war and were excluded from the analyses. The “nonseparated” group \((n = 476, 28.7\% of the analytical sample)\) included participants who did not experience separation from their parent(s) because of the war.

**Socioeconomic status.** Childhood socioeconomic status \((3 = \text{lower}, 2 = \text{lower middle}, 1 = \text{upper middle/upper})\) was based on the father’s occupation as indicated on the child’s health-care records. Adult socioeconomic status was defined according to the achieved level of education as reported at time 1 \((4 = \text{middle school}, 3 = \text{vocational school}, 2 = \text{senior high school}, 1 = \text{college/university degree})\).

**Statistical analyses**

We used multiple linear regression analyses to test how evacuation and father separation are related to depressive symptoms. Multiple regressions were also used to test the effect of the placement of the evacuated child (homeland vs. abroad), the duration of the evacuation, and the age at the time for depressive symptoms. Because depressive symptoms over time were highly stable (mean difference: \(-0.07, 95\% \text{CI:} -0.3, 0.1\) \((p = 0.52)\), between time 1 and time 2 BDI scores), we defined the outcome as the mean score of time 1 and time 2 BDI scores. In order to track intraindividual continuity in depressive symptoms over time, we used logistic regressions to test the associations of separation, the duration of evacuation, and the age at the time with symptoms of depression remaining at least mild in severity over the two measurement occasions (comparing outcomes “none,” i.e., a BDI score of \(<10\) at times 1 and 2, and “always at least mild,” i.e., a BDI score of \(\geq 10\) at times 1 and 2). We adjusted for gender, social class in childhood and adulthood, and age at assessment in the analyses.

We split the duration of the evacuation \((\leq 1 \text{ year}, \leq 2 \text{ years}, \leq 3 \text{ years}, > 3 \text{ years})\) and age at the time (infancy: \(< 2\text{ years}\); toddlerhood: \(< 4\text{ years}\); early childhood: \(< 7\text{ years}\); childhood: \(7–11\text{ years}\)) into four developmentally meaningful categories, dummy coded the variables, and used the nonseparated as the reference group. The mean of time 1 and time 2 BDI scores was log transformed \((\log + 1)\) to normalize the otherwise skewed distribution. In order to facilitate the interpretation, an exponential function was used to convert the effects on the original scale.

**RESULTS**

Table 1 gives the frequencies and the mean values of the study variables according to gender. Before addressing the major study objectives, we tested whether the groups that had been evacuated unaccompanied by either parent (homeland vs. abroad) or separated from their father because of his military service differed from the nonseparated in terms of socioeconomic status in childhood and adulthood and in terms of gender and age. There were no significant differences between the groups in gender or socioeconomic status \((p's > 0.07)\). The age at evacuation correlated significantly with the age at which depressive symptoms were measured in adulthood, indicating that the older people of the cohort had experienced evacuation at an older age in their childhood \((r's > 0.82, p's < 0.001)\). In addition, compared with the nonseparated participants, those who had been evacuated unaccompanied by either parent were on average 3.9 years older \((t = -23.3, p < 0.001)\), and those separated from their father because of military service were on average 2.0 years older \((t's > 6.8, p's < 0.001)\). Because of multicollinearity (condition indices: >30), we used in the first step of analyses the gender and socioeconomic status in childhood and adulthood as covariates, and in the second step we also included in the model the average age at assessment.

Table 2 shows that, after adjustment for gender and socioeconomic status in childhood and adulthood, those who had been evacuated unaccompanied by either parent reported 20 percent more severe depressive symptoms than did the nonseparated. This effect remained significant after further adjustment for age in adulthood. The proportion of participants with at least mild depressive symptoms over time was 17.7 percent among the evacuated and 10.8 among the nonseparated. The odds ratio for depressive symptoms remaining at least mild in severity over time was 1.7 times greater \((95\% \text{CI:} 1.1, 2.6\) \((p = 0.02)\), controlling for gender and socioeconomic status in childhood and adulthood) for the evacuated compared with the nonseparated.
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TABLE 1. Characteristics according to gender, Helsinki Birth Cohort born in 1934–1944 (Finland)

<table>
<thead>
<tr>
<th></th>
<th>Women</th>
<th>Men</th>
<th>t test ($t^2$)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Childhood separations (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonseparated</td>
<td>266 28.8</td>
<td>210 28.6</td>
<td>1.9</td>
<td>0.59</td>
</tr>
<tr>
<td>Separated because of father's military service</td>
<td>403 43.6</td>
<td>341 46.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Death of father in the war</td>
<td>17 1.8</td>
<td>11 1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evacuated unaccompanied (%)</td>
<td>238 25.8</td>
<td>172 23.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abroad†</td>
<td>135 58.7</td>
<td>117 68.8</td>
<td>4.3</td>
<td>0.05</td>
</tr>
<tr>
<td>Homeland†</td>
<td>95 41.3</td>
<td>53 31.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Continuous years of evacuation‡</strong></td>
<td>222 2.1 (1.9)</td>
<td>164 1.8 (1.3)</td>
<td>−1.9</td>
<td>0.05</td>
</tr>
<tr>
<td>≤1 year (%)</td>
<td>68 30.6</td>
<td>59 36.0</td>
<td>1.7</td>
<td>0.64</td>
</tr>
<tr>
<td>≤2 years (%)</td>
<td>86 38.7</td>
<td>61 37.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤3 years (%)</td>
<td>30 13.5</td>
<td>22 13.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;3 years (%)</td>
<td>38 17.1</td>
<td>22 13.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age at evacuation (years)$§$</strong></td>
<td>227 4.0 (2.6)</td>
<td>165 4.2 (2.7)</td>
<td>0.69</td>
<td>0.49</td>
</tr>
<tr>
<td>Infancy, &lt;2 years (%)</td>
<td>45 19.8</td>
<td>26 15.8</td>
<td>4.2</td>
<td>0.24</td>
</tr>
<tr>
<td>Toddlerhood, &lt;4 years (%)</td>
<td>74 32.6</td>
<td>64 38.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early childhood, &lt;7 years (%)</td>
<td>68 30.0</td>
<td>39 23.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School age, 7–11 years (%)</td>
<td>40 17.6</td>
<td>36 21.8</td>
<td></td>
<td></td>
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<tr>
<td><strong>Adulthood, time 1</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Age (years)</td>
<td>924 61.6 (3.1)</td>
<td>734 61.5 (2.8)</td>
<td>−0.08</td>
<td>0.94</td>
</tr>
<tr>
<td>Beck Depression Inventory (score)</td>
<td>924 6.5 (5.6)</td>
<td>734 4.8 (4.5)</td>
<td>−6.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Severity of depression (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None (score: &lt;10)</td>
<td>702 76.0</td>
<td>636 86.6</td>
<td>31.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mild (score: 10–18)</td>
<td>186 20.1</td>
<td>87 11.9</td>
<td></td>
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<tr>
<td>Moderate (score: 19–29)</td>
<td>31 3.4</td>
<td>8 1.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe (score: ≥30)</td>
<td>5 0.5</td>
<td>3 0.4</td>
<td></td>
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<tr>
<td><strong>Adulthood, time 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>924 63.5 (3.0)</td>
<td>734 63.3 (2.7)</td>
<td>−1.5</td>
<td>0.13</td>
</tr>
<tr>
<td>Beck Depression Inventory (score)</td>
<td>924 6.8 (6.5)</td>
<td>734 4.7 (5.3)</td>
<td>−6.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Severity of depression (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None (score: &lt;10)</td>
<td>690 74.7</td>
<td>627 85.4</td>
<td>29.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mild (score: 10–18)</td>
<td>178 19.3</td>
<td>81 11.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate (score: 19–29)</td>
<td>48 5.2</td>
<td>24 3.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe (score: ≥30)</td>
<td>8 0.9</td>
<td>2 0.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Consistency of Beck Depression Inventory score across time (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;10 at times 1 and 2</td>
<td>597 64.6</td>
<td>580 79.0</td>
<td>27.5</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>≥10 at times 1 and 2</td>
<td>129 14.0</td>
<td>51 7.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean of Beck Depression scores at times 1 and 2</td>
<td>924 6.6 (5.5)</td>
<td>734 4.8 (4.6)</td>
<td>−7.4</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

* SD, standard deviation.
† Both groups are included in the evacuated unaccompanied group.
‡ Available for 94% of the evacuees.
§ Available for 96% of the evacuees.

(odds ratio = 1.8, 95 percent CI: 1.0, 3.3 ($p = 0.06$), controlling for gender and socioeconomic status in childhood and adulthood and for age in adulthood). Furthermore, depressive symptoms were higher regardless of placement of evacuation (i.e., at home or abroad) (mean difference: −11.8 percent, 95 percent CI: −24.3, 2.74; $p = 0.11$). The gender ×
evacuation experience interaction was not significant ($p = 0.32$).

Depressive symptoms were significantly more severe for subjects who had experienced the longest or the shortest period of evacuation (figure 2) and for those who were evacuated in infancy, in toddlerhood, or at school age (figure 3), when compared with the nonseparated. The mean levels of depressive symptom scores by duration of evacuation ($F_3, 382 = 0.4, p = 0.56$) and age at the time ($F_3, 388 = 0.6, p = 0.63$) did not significantly differ from each other when the nonseparated group was excluded from the model. Compared with the nonseparated, the odds ratio for those who had experienced the longest period of evacuation was 4.4 (95 percent CI: 1.8, 10.8; $p < 0.001$) for falling into the group in which depressive symptoms remained at least mild in severity over time.

Those separated from their father because of his military service did not report significantly more severe depressive symptoms than did the nonseparated (table 2). Further comparison of the depressive symptom scores of those separated from their father and those of the evacuated group showed that the symptoms of the former were not as severe as were those of the latter (mean difference: $-11.3$ percent, 95 percent CI: 1.5, 22.0 ($p = 0.02$), controlling for gender and socioeconomic status in childhood and adulthood; mean difference: 9.0 percent, 95 percent CI: $-1.0$, $19.7$ ($p = 0.08$), controlling for age in adulthood and gender and socioeconomic status in childhood and adulthood). The gender $\times$ father separation interaction was not significant ($p = 0.79$).

### DISCUSSION

There is substantial evidence that development is influenced by early traumas, usually defined in terms of emotional or sexual abuse (1, 2). Only a few studies have targeted long-term outcomes of parent-child separation during

![FIGURE 2. Mean values of the depressive symptom score according to duration of the evacuation, adjusted for gender, and socioeconomic status in childhood and adulthood, Helsinki Birth Cohort born in 1934–1944 (Finland). The percent increase (95% confidence interval) in depressive symptom score compared with the nonseparated is given above the bar. To facilitate illustration, the residualized (gender, socioeconomic status in childhood and adulthood) and log-transformed depressive symptom scores were converted on the original scale; the Beck Depression Inventory (BDI) scores range from 0 to 63.](https://academic.oup.com/aje/article/166/10/1126/157752/1130)

![FIGURE 3. Mean values of the depressive symptom score according to age at evacuation, adjusted for gender, and socioeconomic status in childhood and adulthood, Helsinki Birth Cohort born in 1934–1944 (Finland). The percent increase (95% confidence interval) in depressive symptom score compared with the nonseparated is given above the bar. To facilitate illustration, the residualized (gender, socioeconomic status in childhood and adulthood) and log-transformed depressive symptom scores were converted on the original scale; the Beck Depression Inventory (BDI) scores range from 0 to 63.](https://academic.oup.com/aje/article/166/10/1126/157752/1130)
childhood, however. We explored the occurrence of depressive symptoms among members of the Helsinki Birth Cohort, born between 1934 and 1944, who had been evacuated to temporary foster families during World War II. We also tested whether temporary separation from the father because of military service was consequential in terms of depressive symptoms in late adulthood. Participants in both groups came from families with various socioeconomic backgrounds, thereby offering a unique opportunity in later life to study the significance of discontinuity in parental and paternal care during childhood.

We found that those who had been evacuated as children to temporary foster care unaccompanied by either parent reported, at the average age of approximately 60 years, 20 percent more severe depressive symptoms than did those who did not experience any parental separation in times of war. Furthermore, they were almost twice as likely to remain at least mild in severity in depressive symptoms over the two consecutive measurement occasions in late adulthood. Their evacuation had an influence regardless of the country of placement, that is, their homeland or abroad. Moreover, evacuation that lasted more than 3 years had the largest effect, being associated with over 33 percent more severe depressive symptoms, with an odds ratio of 4.4 for belonging to the group who reported depressive symptoms remaining at least mild in severity over time. Finally, those who had been evacuated either in infancy or at school age reported over 23 and 30 percent more severe depressive symptoms in late adulthood, whereas those evacuated in toddlerhood (aged from 2 to 4 years) or in early childhood (aged from 4 to 6 years) seemed to be the least affected. Importantly, the older cohort members who were born earlier during the war years were more likely to have experienced an evacuation than were those born at the end of the war years. In addition, the age at evacuation and its duration were associated with year of birth, the age thus being a problematic confounder in the analyses. Regardless of this overlap, we found that the effect of evacuation on later depressive symptoms remained significant even after controlling for age in adulthood.

Our findings on the long-term consequences of childhood evacuation are in line with those reported by Foster et al. (10), but they contradict the results obtained by Tennant et al. (11) and Birchnell and Kennard (12). Although we do not know how similar the British and Finnish evacuation conditions actually were for the children, we suggest that methodological differences may account for most of the discrepancies: Unlike any of the prior studies, the current study is an epidemiologic cohort study, based partly on register data. The larger sample in the present study also allowed detection of smaller effects. Finally, we used a well-validated screening tool for depressive symptoms, while the discrepant studies (11, 12) have used scales measuring broader concepts of mental well-being.

Why might early childhood evacuation and depressive symptoms in late adulthood be related? One possible explanation could lie in the evidence showing that early life stress leads to persistent neurobiologic adaptations, many of which intriguingly resemble neurobiologic findings in depression (17). Indeed, it has been suggested that the influence of early stress and emotional trauma on later well-being may be mediated by the substantial plasticity of the child’s central nervous system, in particular in regions that regulate stress and emotional processing. Most empirical evidence concentrates on the altered activity of the hypothalamic-pituitary-adrenal axis that is associated with early adversities such as recollections of childhood emotional, physical, and sexual abuse (18–22), which is among the most consistently demonstrated neurobiologic adversities in depressive states (23, 24). Experimental rodent (25) and nonhuman primate (26, 27) models have provided evidence showing that early life stress, defined as early maternal separation, may lead to altered hypothalamic-pituitary-adrenal axis activity associated with heightened responsiveness to stress that persists throughout the life span. It is of note that, although early life stress is usually defined in animal studies in terms of experimental disruption in the attachment system, such methods are inapplicable in human studies for ethical reasons. Yet, evacuation unaccompanied by parents could be considered a natural experiment on early separation that disturbed the attachment system of the child concerned, ultimately leading to altered hypothalamic-pituitary-adrenal axis activity to an extent similar to that found in animals.

A further possible explanation stresses the cognitive perspective on attachment (28). A lack of control over separation from the parent(s), which certainly characterizes evacuation, has the potential to distort the child’s relational schemas and to lead to generalized vulnerability when confronting subsequent life adversities. Insecure attachment representations, associated with heightened stress reactivity (29), are in turn suggested to be a common vulnerability factor for depressive outcomes (30), consistent with the ideas of the major theories of depression (31, 32). Importantly, the most affected group in the present study was the one that had been evacuated for more than 3 years. It is likely that they may have had time to develop a new attachment to their foster family, thus being exposed twice to traumatic separation during their childhood, which exceeded the potential protective function of this new attachment relationship.

With regard to our second major study objective, we found that those who had experienced separation from their fathers because of military service did not report significantly more severe depressive symptoms in late adulthood than did those who did not have such experiences in childhood. Lack of differences may not be due to insufficient statistical power, because we had enough power to detect differences of 0.2 standard deviation between the groups (91 percent power at alpha level = 0.05). These results differ from studies on short-term outcomes of parental separation (13, 14) and from long-term studies associating depressive symptoms in adulthood with temporary parent-child separation due to parental illness, for instance (33). Paternal separation, although obviously also outside the control of the child, may be considered a less severe exposure when a relationship with the mother is sustained.

This study has some limitations. First, although over 86 percent of the randomly selected cohort members participated in the psychological survey, there were more likely to be women. Second, we can only speculate about the potential mechanisms that underlie the associations we found, and we
cannot rule out the possibility that different mechanisms explain the effects of evacuation in infancy as opposed to evacuation later in childhood and at school age; these periods are developmentally very different in terms of attachment behaviors, for example. Information on whether adult depressive symptoms were the result of childhood depressive vulnerability that persisted or whether the effects became manifest only in adulthood would have provided additional information for the study. Furthermore, the effects of early separation may be modified by existing family structure, the effects of which the present study was not designed to assess. Neither can we rule out the possibility that the effects of separation are moderated by genetic vulnerability to depression (34). Finally, there is always the possibility that the decision to evacuate the child was dependent on family adversity other than that related to measurable socioeconomic status, such adversity acting as a potential confounder.

In conclusion, given the ethical limitations of exposing children to experimentally manipulated adverse experiences, the historical events due to World War II created a unique opportunity to study long-term, life-span outcomes related to parent-child separation in a natural setting, involving children from various socioeconomic backgrounds. We showed that childhood evacuation was associated with increased severity of depressive symptoms in late adulthood. Notably, the present study provided us with the opportunity to assess the effects of parental separation per se, emphasizing the consequences of attachment discontinuity. Although caution is necessary in drawing causal inferences, the present study contrasts with studies on parental divorce, for instance, that are very likely to be confounded by other, intrafamilial adversities surrounding the separation.

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