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ORIGINAL PAPER

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Childhood adversities, adult risk factors and depressiveness

A population study

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Abstract *Objective* Childhood adversities have been associated with adulthood depressiveness, but the contribution of adult risk factors is seldom described. We examined whether adult risk factors lie on the pathway from childhood adversity to adult depressiveness (pathway hypothesis) or whether the association depends on life events (vulnerability hypothesis). *Method* Among 21,101 randomly sampled working-aged respondents [the Health and Social Support in Finland (HeSSup) Study], the hypotheses were tested with logistic regression analysis models studying the associations between Beck Depression Inventory (BDI)-assessed depressiveness and self-reported childhood adversities alone and in combination with recent adverse events. *Results* Childhood adversities were consistently associated with depressiveness (women, age-adjusted odds ratio 3.1, 95% confidence intervals 2.6–3.7; men, 2.6, 2.1–3.3), although the risks were decreased by more than 30% after adjustments for adult risk factors such as living alone, education, alcohol consumption, social support and negative affectivity. Childhood adversities combined with recent life events were associated with depressiveness in an additive manner. Women with childhood adversities and recent person-independent events especially had increased vulnerability for depressiveness. *Conclusions* The childhood adversity–depressiveness associations were partly mediated by adult risk factors, supporting a pathway from childhood adversities to depressiveness through adult risk factors. Increased vulnerability for depressiveness was found among respondents with childhood adversities in combination with recent death/illness events. The findings emphasize the importance of early risk factors when identifying persons at risk of depression.

Key words adult risk factors – BDI – childhood adversities – depressiveness – population-based

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Introduction

Childhood adversities, such as family disruption or dysfunctional parenting, are correlated with increased somatic morbidity and mortality in childhood and adulthood [1–4]. Such adversities have also been found to be associated with depressive disorders and their prognosis in adulthood and in old age [5–7]. However, the contribution of adult risk factors to this association has seldom been described.

Adult risk factors may be hypothesized to lie on the pathway from early adversity to adult depressiveness (the pathway hypothesis) or to act as a vulnerability factor (the vulnerability hypothesis) or both [8]. The pathway hypothesis arises from the findings that early adversities predict certain (especially person-dependent) types of negative life events in adulthood (for instance, violence and financial difficulties) [9–11], as well as adult alcohol abuse, poor social support and negative affectivity [3, 10, 12–14]. All these adulthood factors are known risk factors for depression and other health problems [15–17].

The vulnerability hypothesis maintains that the consequences of an unfavourable childhood background may be worse if combined with adult negative life events [8]. A neurobiological explanation involves the hypothalamus–pituitary–adrenal (HPA) axis: childhood adversities may lead to HPA-axis-mediated sensitivity manifested in exaggerated stress-related sympathetic responses in adulthood, resulting in an enhanced risk of stress-related disorders such as depression [18, 19]. It is noteworthy that the pathway and the vulnerability hypotheses are not mutually exclusive.

In this study, we examined in a large population-based sample the associations between depressiveness, childhood adversities and adult risk factors (alcohol abuse, poor social support, negative affectivity and three categories of recent life events representing person-independent and person-dependent events), as explicated in the two hypotheses introduced above.

Methods

Material

The Health and Social Support in Finland (HeSSup) Study is a prospective study on the psychosocial health of the Finnish working-aged population. A random population sample of 52,739, in even-sized age groups of 20–24, 30–34, 40–44 and 50–54 years of age, was established at the Finnish Population Register Centre. The baseline survey in 1998 consisted of a comprehensive questionnaire on psychosocial, medical and behavioural variables. The postal survey resulted in a random cohort of 21,101 respondents (40.0% response rate). The study population is representative of the Finnish population, according to the non-response analysis [20]. After the subjects were given a complete description of the study, written consent, as required by Finnish legislation for later register linkages (but not for the use of questionnaire data per se), was received from 92% of the respondents.

Variables

Depressiveness We measured symptoms of depression (or, in this paper, depressiveness) with the Beck Depression Inventory (BDI) [21]. In the analyses, we included responses with no more than three missing items. Potential missing values were replaced with the mean score of the subject's other items. The sum score responses were dichotomized as follows: 0–18, no symptoms (no/mild); >18, symptoms of depression (moderate/severe) [22]. The mean BDI value in this sample was 6.3 (SD 0.1) for women and 5.4 (SD 0.1) for men.

Childhood adversities The occurrence of adversities in the childhood family was assessed with a 6-item scale [23]. The respondents were asked whether they had experienced the following adversities in their childhood: divorce/separation of the parents, long-term financial difficulties in the family, serious conflicts in the family, frequent fear for a family member, severe illness of a family member, alcohol problem of a family member (response options: no/yes/do not know or cannot say). The childhood psychosocial adversities variable/factor, including four of the reported items (parental divorce, serious conflicts, frequent fear and alcohol problem) (yes to one or more items), was included in the present analyses to represent childhood adversities. In separate analyses, the associations of depressiveness with the excluded childhood items, financial adversities and chronic illness in family resembled the associations with the psychosocial adversities factor (data not shown).

Recent life events The checklist of events consisted of 19 major negative life events (such as death or illness of close persons, interpersonal conflicts, financial or work-related difficulties, violence or accidents) [17, 24], with the point of time for each event (response options: the event occurred during the previous 6 months/5 years/earlier/never). The present study focuses on three types of events having occurred during the previous 6 months, later expressed as recent life events (no; yes): death or illness in the family (including one or more of the following: death of spouse, death of own child, severe illness of a family member), violence (single-item response: physical, emotional or sexual violence) and financial difficulties (single-item response: considerable worsening of own financial situation). The selection of these events was based on strong associations with BDI for the present sample, as well as previous analyses reported by two of the authors [17]. Events related to death or illness are likely to be independent of the respondent's own behaviour (person-independent events), while violence and financial difficulties may be related to behaviours increasing the individual's likelihood of being involved in situations that produce stressful life events (person-dependent events) [9].

Other adult risk factors of depressiveness included low social support, heavy alcohol consumption and negative affectivity. The 6-item Brief Social Support Questionnaire differentiates zero to six sources of social support in six different situations (such as, 'Whom can you count on to console you when you are very upset?') [25]. The SSQ sum scores (SS, range 0–36), classified into tertiles, were used as a measure of perceived social support. Low social support (yes; no) was indicated by the lower tertile (SS≤6 vs SS>6). The subjects reported their usual consumption frequency and amount of beer, wine and spirits, further transformed into grams of alcohol consumption per week [26]. One unit of pure alcohol (12 g) was equal to a 12-cl glass of wine, a single 4-cl measure of spirits or a 33-cl bottle of beer. Heavy alcohol consumption (yes; no) was indicated by a current weekly alcohol consumption of >175 g (women) and >263 g (men) of pure alcohol. The 4-item Reeder Stress Inventory [27] (SS range 4–20) was used as the measure of negative affectivity (yes; no), with the median (SS≥9) as the cut-off point. In the present sample, the measure correlates moderately with the BDI (r_s=0.46).

Other variables included age, gender, living alone and educational level. Age was classified according to the original stratification (20–24, 30–34, 40–44 and 50–54 years of age). The number of persons reported to live in the same household with the respondent was classified as 0/≥1 persons, indicating living alone (yes; no). Educational level was indicated by a self-report of the matriculation

examination (yes; no) as the basic education (≥12 years), representing socio-economic status.

Statistical methods

The outcome variable in the analyses was the BDI-assessed depressiveness, and all the analyses were made separately for women and men. The associations between explanatory variables and BDI categories were analysed by means of logistic regression analysis [28]. The results were summarized with odds ratios (ORs) and their 95% confidence intervals (95% CI). The ORs above 1.00 here represent a risk of greater depressiveness (BDI>18).

To study the pathway hypothesis, the associations between childhood psychosocial adversities and depressiveness were studied with logistic regression analysis models, where new covariates were added to the set of adjustments from the previous model (studied and interpreted according to the Baron–Kenny moderator–mediator model [29]). Model 1 included adjustment for age only. Model 2 added adjustments for other demographics (living alone, educational level), model 3 for other adult risk factors (social support, alcohol consumption, negative affectivity) and model 4 also for person-dependent recent life events.

To study the vulnerability hypothesis, joint measures of childhood adversity and each recent life event were formed, giving four different combinations for each studied life event: (1) no childhood adversity–no life event, (2) no childhood adversity–life event, (3) childhood adversity–no life event, (4) childhood adversity–life event. The associations between different combinations were calculated by means of logistic regression analysis, using the first category as the reference. Two logistic regression analysis models were used: Model 1 included adjustment for demographics and model 2 also for adult risk factors.

All statistical tests were two-tailed, and an alpha level of 0.05 was used for all of them. Statistical computing was performed with the SAS System for Windows, release 8.2/2000.

Results

Childhood adversities and adult risk factors

Childhood psychosocial adversities were reported by 45% of women and 39% of men (Table 1). All the studied recent negative life events were more common ($p<0.01$) among respondents with childhood psychosocial adversities (except recent death/illness event among men, $p=0.060$), as compared with those without childhood adversities. More respondents with childhood adversities reported low social support, heavy alcohol consumption, negative affectivity and lower educational level compared to their counterparts ($p<0.001$; low social support among men, $p=0.053$). Men with childhood psychosocial adversities more often reported living alone than men without such adversities ($p<0.001$). No such difference was found for women.

Childhood adversities and depressiveness

Among women and men, childhood adversities were associated with current depressiveness (Table 2). The age-adjusted ORs indicated an approximately threefold risk of depressiveness when the respondents had had childhood psychosocial adversities. Additional adjustments for living alone and education decreased

Table 1 Prevalence of childhood psychosocial adversities by gender, recent life events, adult risk factors and demographics

	Women					Men				
	No childhood adversities		Childhood adversities		*p* value	No childhood adversities		Childhood adversities		*p* value
	N	%	*N*	%		*N*	%	*N*	%	
	6,730	54.2	5,604	45.1		5,194	60.1	3,349	38.8	
Adult risk factors										
Recent death/illness event in family										
No	6,154	91.4	5,058	90.3		4,657	89.7	2,975	88.8	
Yes	242	3.6	264	4.7	0.002	143	2.8	116	3.5	0.060
Recent violent event										
No	6,109	90.8	5,026	89.7		4,654	89.6	2,931	87.5	
Yes	95	1.4	183	3.3	<0.001	25	0.5	45	1.3	<0.001
Recent financial difficulties										
No	5,835	86.7	4,675	83.4		4,480	86.3	2,774	82.8	
Yes	448	6.7	615	11.0	<0.001	317	6.1	329	9.8	<0.001
Low social support										
No	4,929	73.2	3,932	70.2		2,829	54.5	1,760	52.6	
Yes	1,624	24.1	1,531	27.3	<0.001	2,093	40.3	1,423	42.5	0.053
Heavy alcohol consumption										
No	6,490	96.4	5,304	94.6		4,826	92.9	3,005	89.7	
Yes	238	3.5	297	5.3	<0.001	367	7.1	341	10.2	<0.001
Negative affectivity										
No	3,403	50.6	2,385	42.6		2,379	45.8	1,272	38.0	
Yes	3,237	48.1	3,159	56.4	<0.001	2,751	53.0	2,035	60.8	<0.001
Demographics										
Higher educational level										
Yes	3,431	51.0	2,508	44.8		1,876	36.1	1,017	30.4	
No	3,290	48.9	3,086	55.1	<0.001	3,311	63.7	2,328	69.5	<0.001
Living alone										
No	5,499	81.7	4,567	81.5		4,321	83.2	2,625	78.4	
Yes	1,231	18.3	1,037	18.5	0.76	873	16.8	724	21.6	<0.001

Table 2 The associations between childhood psychosocial adversities and depressiveness (BDI >18 vs ≤18) by gender

	Childhood adversities	Model 1[a] OR (95% CI)	Model 2[b] OR (95% CI)	Model 3[c] OR (95% CI)	Model 4[d] OR (95% CI)
Women					
	No	1.00	1.00	1.00	1.00
	Yes	3.09 (2.58–3.70)	2.97 (2.48–3.56)	2.41 (1.99–2.93)	2.32 (1.88–2.86)
OR change after additional adjustments[e]			−6%	−28%	−6%
Men					
	No	1.00	1.00	1.00	1.00
	Yes	2.64 (2.13–3.28)	2.43 (1.95–3.02)	2.11 (1.65–2.69)	2.25 (1.72–2.95)
OR change after additional adjustments[e]			−13%	−22%	+13%

[a] Model 1, adjustment for age
[b] Model 2, adjustment for demographics (age, living alone, education)
[c] Model 3, model 2 + adult risk factors (alcohol consumption, social support, negative affectivity)
[d] Model 4, model 3 + recent person-dependent life events (violence, financial difficulties)
[e] The changes, calculated in percentages (with OR=1.00 as the baseline 'zero' value), represent the effects of the new covariates on the associations when added to the previous model (for example, the per cent change stated in column 'Model 3' refers to the effect of adult risk factors on the associations, as compared with the associations in 'Model 2')

the risks by 6% for women and 13% for men. The corresponding figures after adjustment for adult risk factors were 28 and 22%. Further adjustment for recent person-dependent life events decreased the risk of depressiveness by 6% for women, but increased the risk by 13% for men, suggesting an additional risk-enhancing effect for the events among women but not among men. Childhood adversities were even then associated with more than twofold risks for depressiveness.

Childhood adversities, recent life events and depressiveness

Childhood adversities were associated with depressiveness among women and men, irrespective of exposure to recent life events (Table 3). Recent life events further increased the childhood adversity-associated risks for depressiveness: in demographics-adjusted analyses, the risks associated with the childhood adversity–death/illness event combination were 3.5- or 5-fold (men and women, respectively), and with the adversity–violence event combination, as high as 11-fold (both genders), as compared with the no adversity–no life event combination. Additional adjustments for other adult risk factors decreased the odds for most of the adversity–life event combinations by approximately 20–30%, but did not result in a loss of statistical significance. Among men with the childhood adversity–recent death/illness event combination, the adjustment increased the odds by 17%. The patterns of associations suggest increased vulnerability for the childhood adversity–death/illness event combination, this being especially clear among women. The effects on depressiveness of person-dependent life events in

Table 3 The effect of recent life events on the association between childhood psychosocial adversities and depressiveness (BDI>18 vs ≤18) by gender

Childhood adversities	Recent life event	Women		Men	
		Model 1[a] OR (95% CI)	Model 2[b] OR (95% CI)	Model 1[a] OR (95% CI)	Model 2[b] OR (95% CI)
	Death or illness in family				
No	No	1.00	1.00	1.00	1.00
	Yes	0.97 (0.42–2.22)	1.02 (0.44–2.36)	1.36 (0.55–3.41)	1.80 (0.70–4.60)
Yes	No	2.88 (2.37–3.49)	2.39 (1.94–2.95)	2.50 (1.97–3.16)	2.21 (1.70–2.88)
	Yes	5.00 (3.32–7.55)	4.16 (2.66–6.51)	3.51 (1.82–6.78)	3.94 (1.93–8.05)
	Violence				
No	No	1.00	1.00	1.00	1.00
	Yes	7.23 (3.97–13.2)	6.45 (3.32–12.5)	3.85 (0.87–17.0)	NE
Yes	No	3.14 (2.56–3.85)	2.61 (2.10–3.25)	2.53 (1.98–3.22)	2.27 (1.73–2.97)
	Yes	11.4 (7.65–17.1)	6.66 (4.25–10.4)	11.5 (5.42–24.2)	7.78 (3.20–18.9)
	Financial difficulties				
No	No	1.00	1.00	1.00	1.00
	Yes	3.72 (2.48–5.58)	3.77 (2.43–5.83)	1.75 (0.97–3.17)	1.45 (0.74–2.82)
Yes	No	2.98 (2.41–3.69)	2.52 (2.00–3.17)	2.36 (1.85–3.02)	2.11 (1.60–2.77)
	Yes	8.92 (6.65–11.9)	7.11 (5.15–9.81)	5.18 (3.47–7.72)	4.03 (2.58–6.30)

NE Not estimable
[a] Model 1, adjusted for demographics (age, education, living alone)
[b] Model 2, adjusted for demographics and adult risk factors (social support, alcohol consumption, negative affectivity)

combination with childhood adversities seemed to be additive in nature.

Discussion

In this sample of 21,101 working-aged Finns, childhood psychosocial adversities were consistently associated with adulthood depressiveness. Childhood adversities combined with recent life events were associated with depressiveness in an additive manner: the odds were highest for those with exposures to both childhood adversities and recent life events, lowest for those with no such exposures. The associations were partly dependent on adult risk factors, supporting a pathway hypothesis from childhood adversities to depressiveness through adult risk factors. The findings on the combined effects of childhood adversities and recent person-independent death/illness events also suggest some increased vulnerability to depressiveness, thus lending partial support to the vulnerability hypothesis.

Childhood adversities have previously been shown to be associated with adult depression-prone personality characteristics [23] and to modify the effects of some genes, conditional on the exposure to environmental risks (gene–environment interaction) [10, 11]. Earlier research has suggested that genetically influenced personality traits may increase individuals' probability of selecting themselves into stressful-life-event-exposing environments that further increase their risk of depression [9]. Our results suggest that childhood adversities may act in this way as well. There were also some gender-related differences which may partly reflect a greater impact of events concerning social relations on women [8, 10]. Social support depends partly on childhood adversities, adulthood losses and other interpersonal events [10], which in turn increase the risk of harmful outcomes not only by themselves but also through decreasing social support [30]. Thus, childhood adversities, adult life events and risk factors interact in a complex interrelationship.

The prevalence of depression is generally higher among women than men [8], leading to the speculation that various stressors might affect the depressive onset in women more strongly than in men. In our study, women seemed to be at risk of depressiveness after person-dependent events, but not after person-independent events. In the latter case, childhood adversities were a precondition for depressiveness, although the risk was still greater for women than for men. Our findings are in agreement with a previous study where loss and humiliation-related events were both substantial predictors of major depression onset [31] and with previous findings on 1,898 female twins, among whom person-dependent life events were associated with major depression more strongly than person-independent ones when the level of threat was controlled [9]. Another study found a threefold 1-year incidence of major depression after any life event for women compared with men, with the risk after more distant losses or social-network-related events being greater for women, but equal for the genders after major events [32]. In one study, all events induced psychological problems among women, but only person-dependent ones did so among men, and all events were associated with sickness absence days among men but not among women [17].

Methodological aspects

Much of the previous research has focused on subjects with exposure to one or few single childhood or adult conditions without assessing them in combination or without describing the contribution of adult risk factors to the association. This study addressed these pitfalls by studying the effects of childhood adversities together with chronic stressors and risk factors, separately, for large groups of women and men.

The data, consisting only of self-reports, are liable to potential common method bias. If this were a major problem, the association between childhood adversities, recent life events and depressiveness would have disappeared after adjusting for adult risk factors (including negative affectivity, a potential moderator for response style) and would have been non-existent among those without childhood adversities.

The BDI scale has been assessed as a valid measurement of depressiveness in populations, where especially higher scores (19 or more) are obtained from people with at least some mental distress, while those suffering from a verified major depression will probably score more than 9 [24, 33]. The questionnaire offered no possibility of assessing recurrent episodes of depression. The threshold for concomitant episodes of depression may be lower due to a neurobiological sensitization to depression [8, 15], but resilience may also be increased, as stated above [15, 30].

Depressiveness may have affected the way of reporting childhood adversities [15] since respondents with depressiveness did report childhood adversities somewhat more often than those without (data not shown). More comprehensive questions on childhood adversities would have allowed us to investigate them more thoroughly. However, retrospective studies on childhood conditions can never be totally unbiased, and childhood adversities cannot be definitely verified in any setting or methodology.

Life event studies are also methodologically problematic because many life events may be dependent on depressive mood [8, 9]. We chose to address the report bias possibility by choosing death/illness as an event independent of the person's own actions or depressive-

ness, and violence and financial events, which may be person-dependent but are probably less dependent on the respondent's depressiveness [9].

Finally, the direction of associations cannot be conclusively established here. Prospective research could be the following step in confirming the causality of the observed associations.

Conclusion

Recent studies have provided evidence that depression is a lifetime disorder causing significant impairment [34]. Depression can be seen as the end-state of a process that takes a long time to develop. The onset is to a great extent determined by recent life events, the influence of which in turn depends largely on earlier adversities and the genetic makeup of the individual.

Our findings—that adult risk factors are connected to the same depressogenic pathway as childhood adversities—may provide possibilities to enhance the identification of persons at risk of depression. Whenever an individual who has had adversities in childhood is faced with recent negative events in life, poor social support, heavy alcohol consumption or negative affectivity, the increased risk of depression should be recognized and addressed in clinical settings. The depressed patients should be provided with adequate medical treatment (including support adequate in length) and a possibility to enhance personal coping or self-efficacy hampered by early adversities. Providing resources to face or avoid risk factors is of utmost importance in the prevention of depression, and therefore, our findings may also have implications for mental health policies and prevention projects aimed at promoting mental health at population level [35].

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