



## Original article

# Adverse childhood experiences leads to perceived negative attitude of others and the effect of adverse childhood experiences on depression in adulthood is mediated via negative attitude of others

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## ABSTRACT

**Background:** The attachment theory suggests that adverse childhood experiences (ACEs) can have an effect on how individuals perceive other people's attitude towards them. ACEs have also been associated with adult depression. We hypothesised that ACEs associate with perceived negative attitude of others (AoO) and depressive symptoms (DEPS), and that these associations differ between the genders.

**Methods:** Altogether, 692 participants drawn from the general population completed the Trauma and Distress Scale, as a measurement of ACE and its domains: emotional abuse (EmoAb), physical abuse (PhyAb), sexual abuse (SexAb), emotional neglect (EmoNeg) and physical neglect (PhyNeg); a visual analog scale with the question: "What kind of attitude do other people take towards you?", and the self-report scale DEPS on depressive symptoms.

**Results:** ACEs, AoO and DEPS correlated strongly with each other. In path analyses, ACE total and all its domains associated directly and indirectly, via DEPS, to negative AoO in the whole sample, and in females separately. ACE total, EmoAb, PhyAb, EmoNeg and PhyNeg associated directly and indirectly, via AoO, to DEPS in the whole sample and in both genders separately. EmoNeg, in all, and EmoAB, in males, had specific associations both with negative AoO and DEPS. Mediation effect via AoO was greater than via DEPS.

**Conclusions:** ACEs have a direct and indirect, via depression, negative effect on how adult individuals perceive other people's attitude towards themselves. Additionally, negative AoO mediates the effects of ACEs on depression. Childhood EmoNeg associates specifically with negative AoO and DEPS in adulthood.

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## 1. Introduction

As human beings, we live in social relations from our early childhood onwards. The way we perceive other people and their attitude towards us has a powerful impact on the ways we act at both interpersonal and societal level. According to Bowlby's attachment theory [9], the styles, in which we interpret other people's attitude towards us, have their roots in our childhood. Within interaction with attachment figures (most often with parents), children develop representational models that allow them to predict and interpret the behaviour of attachment figures and view themselves in relation to others. Negative representational models of attachment figures, built during childhood and

adolescence, tend to persist relatively unchanged into and throughout adult life, and can manifest in neurotic symptoms and personality disorders [8]; some people with neurotic or personality problems can produce their own severe life events in response to early negative experiences [15]. According to Rohner [27], parental emotional rejection as a part of the acceptance-rejection syndrome may specifically lead to psychological maladjustment including negative worldview.

Various adverse childhood experiences (ACEs) can distort development of the representational models resulting in insecure or vulnerable attachment styles, such as low self-esteem, poor support and childhood adversity, emotional disorders, depression in particular, and disruption in psychosocial functioning in adulthood [3,5,16,22,25,26]. Negative parenting practices, such as high level of criticism, verbal humiliation and lack of emotional warmth, may lead to dysfunctional attitudes and attribution styles with vulnerability for depression [1,4,10,15]; it is thus possible that insecure attachment styles with dysfunctional attitudes, such as

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perceived negative attitude of others (AoO), may act as mediators between ACE and depression in adulthood.

It has been also found that family environments, with ACEs, are associated with poor mental health, depression particularly [19,20,25,26,34], and that depression may change the way individuals perceive their environment, including other people and their attitude towards themselves [7,31,33]. Thus, it is possible that depression act as a mediator between individuals' ACE and the way they perceive attitude of others (AoO). Depression – more prevalent in females than in males – may moderate the association between ACE and AoO differently in females and males. Therefore, it has been suggested that, e.g. the association between depression and suicidal behaviour should be analysed separately by genders [23].

In a population sample, we aimed to explore the associations between ACEs and individuals' perceived AoO and depressive symptoms (DEPS). We hypothesised 1) that ACEs associate with AoO and DEPS, 2a) that AoO mediates the effect of ACEs to DEPS, 2b) that DEPS mediates the effect of ACEs to AoO, and 3) that these associations vary between females and males.

## 2. Methods

The study protocol was approved by the ethical committee of the University of Turku and the Turku University Central Hospital.

### 2.1. Sample

A random, age-stratified sample of 2080 citizens aged 18 years or more was drawn from the general population of South-West Finland. The general sampling rate was 1/100, and, because of their low proportion in the population, 2/100 for people over 70 years. An extensive questionnaire battery was mailed in spring 2008 and re-mailed to non-responders in summer 2008. The questionnaire included written consent and the individuals who had filled it in were accepted as study participants. The response rate for females (41.5%) was higher than that for males (25.3%; Fisher exact:  $p < 0.001$ ). Mean age of responders ( $42.0 \pm 16.95$  years) was slightly higher than that of non-responders ( $39.5 \pm 16.37$  years;  $p = 0.001$ ).

### 2.2. Assessments

The questionnaire included items on participants' socio-demographic background and previous care for mental problems, including treatment visits for mental problems to primary and

psychiatric care. The questionnaire also included a visual analog with the question: "What kind of attitude do other people take towards you?" The ends of the visual analog were: 0 = very negative and 10 = very positive. This question was used as an indicator of perceived attitude of others (AoO) and its distribution is shown in Fig. 1. The attitude question was taken from the PROD screen [18] developed for screening people with (cognitive) prodromal symptoms of psychosis. In a prospective study, perceived negative AoO predicted onset of psychosis in clinical high-risk to psychosis patients [29].

Depressive symptoms were assessed by the depression screening instrument DEPS [30]. It consists of 10 questions rated on a Likert scale as: 0='not at all', 1='to some extent', 2='rather much' and 3='very much'; their sum (range 1–30) indicates number of depressive symptoms during the past month. The DEPS, with Cronbach's  $\alpha 0.88$ , was originally developed for the use of general practitioners. In a sample of patients attending primary care at a cut-off of  $>8$ , the DEPS revealed a sensitivity of 74% and a specificity of 85% for clinical depression [30].

ACEs were assessed by the Trauma and Distress Scale (TADS) [24]. At the time of the present study, the TADS was the only available ACE instrument in Finnish. It includes 43 items on childhood trauma and adversity rated for their frequency in a Likert format: 0='never', 1='rarely', 2='sometimes', 3='often' and 4='almost always'. Five TADS domain scores can be calculated by summing their respective items: 1. emotional abuse (EmoAb; 5 items), 2. physical abuse (PhyAb; 5 items), 3. sexual abuse (SexAb; 5 items), 4. emotional neglect (EmoNeg; 5 items), and 5. physical neglect (PhyNeg; 4 items), as well as the TADS total score (sum of all five domain scores). The TADS, with Cronbach's  $\alpha 0.92$ , and its five core domains proved to be a valid, reliable and clinically useful instrument for assessing retrospectively reported childhood traumatisation [31].

### 2.3. Statistical analyses

First, means of AoO and DEPS scores were calculated by background characteristics, as well as ACE scores by gender, and differences were tested by t-test. ACE domain and DEPS scores were correlated (Spearman's rho) with AoO. Because the dependent variables, DEPS and AoO, were skewed, their logarithmic transformations were used in multivariate path analyses.

In multivariate analyses, a PROCESS macro in SPSS (model template 4) by A. F. Hayes [17] was used. In cross-sectional

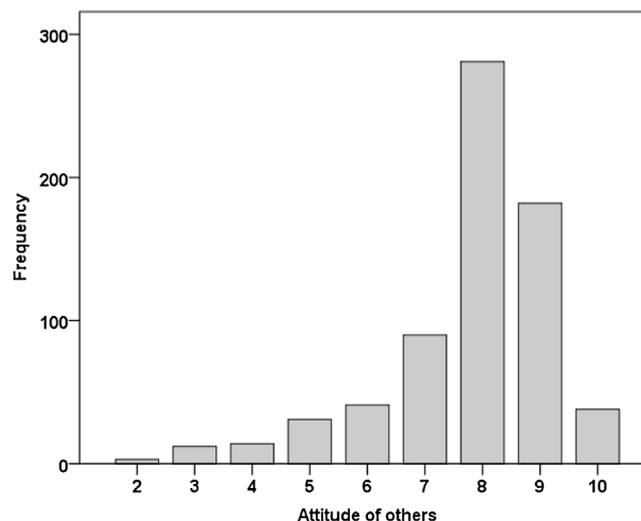


Fig. 1. Distribution of attitude of others scores (1=Extremely negative, 10= Extremely positive).

samples, this macro tests the direct and indirect effects of an independent variable (X) on a dependent variable (Y), while modelling a process in which X affects a mediator (M), which in turn affects Y. The models tested the effect of X (ACE) on a) Y (AoO) with the mediator (DEPS) and b) on Y (DEPS) with the mediator (AoO) in the total sample, and in females and males separately. In each model, the total effect of X on Y, the direct and the indirect effect via mediator DEPS/AoO, as well as the effect of ACE total on DEPS/AoO (a), the effect of DEPS/AoO on AoO/DEPS (b) and the direct effect of ACE total on AoO/DEPS (c) are reported in Fig. 2. In Table 4 and in Supplementary Table S1, the total effect X (ACE) on Y (AoO/DEPS), the direct effect and the specific effect, when the effects of other ACE domains are controlled, are reported. Five thousand bootstrap samples and 95% confidence intervals were used for all analyses. In these analyses, the effects of gender, age and previous mental care were controlled. The same analyses were also carried out in a subsample of participants without previous mental care. Because in preliminary path analyses age did not significantly mediate the effect of ACE to AoO or DEPS, it was not used as a mediator in final analyses. The data were analyzed using SPSS software (22.0 for Windows). P-values below 0.05 (two-tail) were considered statistically significant.

### 3. Results

#### 3.1. Univariate analyses

In the study sample, about two thirds were women, lived in an intimate relationship, and were in full-time work. The majority of

the subjects were younger than 45 years, about a third had completed education of university level, and a fourth had previously received care for mental problems (Table 1).

Women, the married or cohabitating, the highly educated, the full-time working subjects, and the subjects without previous mental care reported higher AoO scores. There were no gender or age differences in the DEPS scores. The single, those who had completed secondary school, the unemployed (or work situation unknown) and the participants who had received mental care reported higher DEPS scores (Table 1).

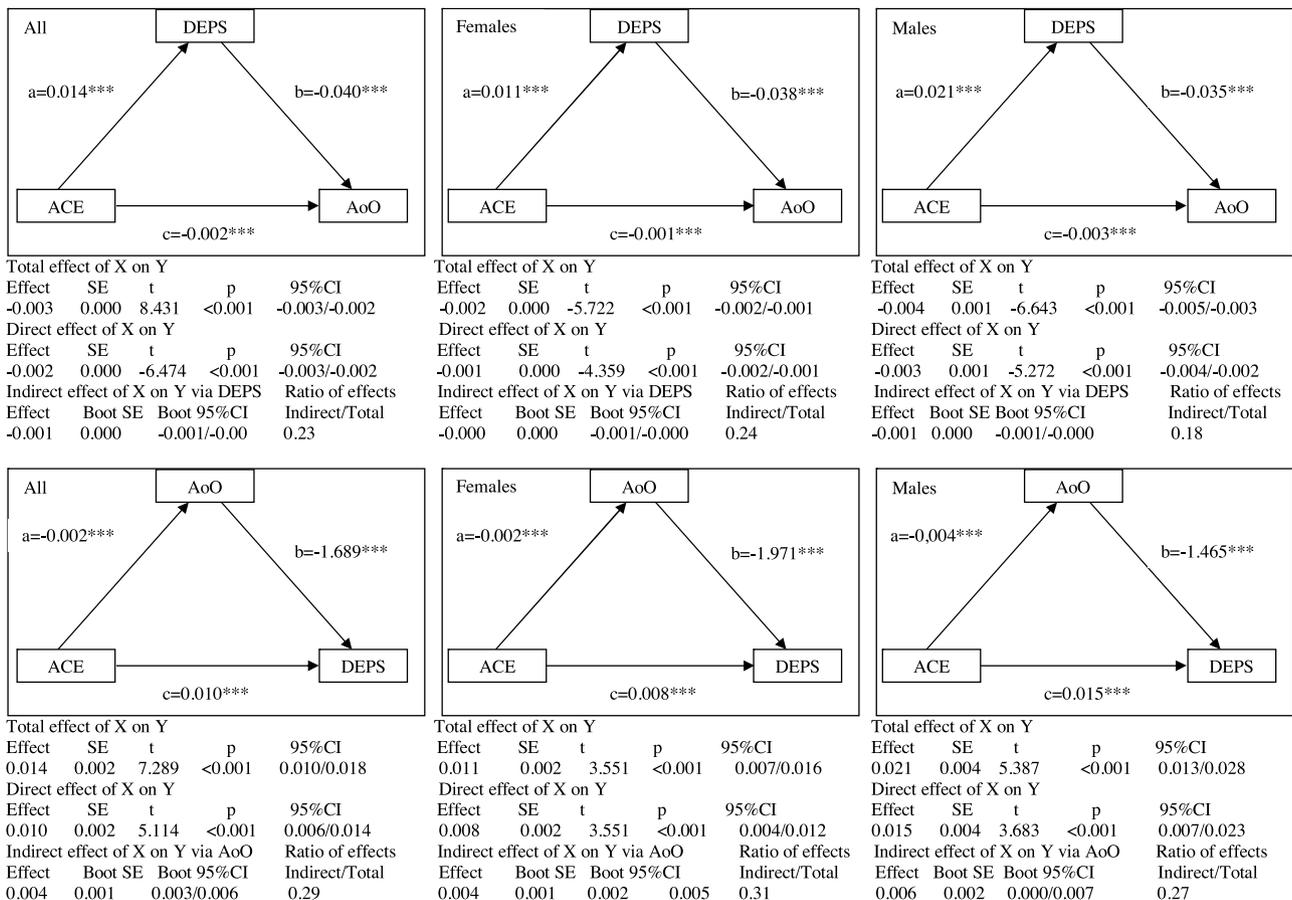
There were no gender differences in ACE total scores and both genders reported most EmoNeg. Females reported SexAb more than males and males reported EmoAb more than females (Table 2).

DEPS, ACE and its domains correlated strongly with AoO. There were also high inter-correlations between ACE domains, indicating a great overlap between individual domains (Table 3).

#### 3.2. Path analyses

In path analyses, DEPS and AoO were in turn treated as mediators and, correspondingly, AoO and DEPS as outcomes. Fig. 2 shows the components of direct and indirect effects, as well as ratios between indirect and total effect in the whole sample and females and males separately. Comparison between models revealed that the indirect/total effect ratio was higher when AoO was treated as a mediator than when DEPS was a mediator.

In the first analyses with DEPS as a mediator, when the effects of gender, age and previous mental care were controlled, ACE total



ACE = adverse childhood experiences; DEPS = depressive symptoms; AoO = attitude of others

Fig. 2. Path analyses for all and females and males separately; the effects gender (in all), age and previous mental care are controlled.

**Table 1**  
Background of the study sample and means (range 1–10) for attitude of others (AoO) and depression symptoms (DEPS).

	n	%	AoO			DEPS		
			mean	SD	p	mean	SD	p
All	692	100	7.8	1.5		5.0	5.2	
Gender					0.020			0.233
Men	260	37.6	7.6	1.6		4.7	5.3	
Women	432	62.4	7.9	1.3		5.2	5.1	
Age					0.612			0.125
18–24	81	11.7	7.7	1.5		5.9	5.3	
25–34	226	32.7	7.9	1.5		4.5	4.8	
35–44	110	15.9	7.9	1.5		4.7	5.3	
45–54	86	12.4	7.6	1.4		5.0	5.1	
55–64	87	12.6	7.7	1.4		6.1	6.2	
65–74	79	11.4	7.9	1.5		4.6	5.1	
75+	23	3.3	7.7	1.3		6.1	3.6	
Marital status					0.010			<0.001
Single	136	19.7	7.5	1.5		8.8	5.7	
Married/Cohabiting	460	66.5	7.9	1.4		4.1	4.3	
Separated/divorced	71	10.3	7.5	1.7		4.3	4.8	
Widowed	25	3.6	7.8	1.4		6.7	6.4	
Education					0.004			<0.001
Elementary school	66	9.5	7.6	1.7		5.2	4.7	
Secondary school	40	5.8	7.3	1.7		8.7	7.5	
Vocational school	123	17.8	7.6	1.5		5.8	5.9	
Upper secondary school	119	17.2	7.7	1.5		5.0	4.5	
College	130	18.8	7.8	1.4		4.9	5.1	
Vocational high school	110	15.9	8.2	1.1		4.6	4.5	
University	104	15.0	7.9	1.4		3.4	4.0	
Work situation					0.005			<0.001
Working	484	69.9	7.9	1.3		4.5	4.4	
Pensioned	146	21.1	7.6	1.6		4.3	4.8	
Unemployed	41	5.9	7.2	1.9		6.1	6.2	
Unknown	21	3.0	7.7	1.6		8.9	7.8	
Previous mental care					<0.001			<0.001
Yes	187	27.0	7.0	1.7		8.8	6.4	
No	505	73.0	8.1	1.2		3.6	3.8	

**Table 2**  
DEPS and ACE scores by gender.

	Female (n = 432)		Male (n = 260)		All (n = 690)		
	mean	SD	mean	SD	mean	SD	p
DEPS	5.21	5.10	4.72	5.30	5.03	5.18	0.233
EmoAb	3.42	4.11	2.52	3.76	3.08	4.00	<b>0.004</b>
PhyAb	2.30	3.28	2.19	3.06	2.26	3.20	0.666
SexAb	0.73	2.16	0.10	0.49	0.49	1.76	< <b>0.001</b>
EmoNeg	5.03	4.42	5.04	4.50	5.03	4.44	0.981
PhyNeg	2.34	2.68	2.58	2.70	2.43	2.68	0.271
ACE total	13.83	13.94	12.43	12.05	13.30	13.27	0.178

DEPS = depressive symptoms; EmoAb = emotional abuse; PhyAb = physical abuse; SexAb = sexual abuse; EmoNeg = emotional neglect; PhyNeg = physical neglect; ACE total = sum of adverse childhood experiences. Significant associations bolded.

**Table 3**  
Spearman's correlation between DEPS scores, ACE domains and AoO.

	AoO	DEPS	EmoAb	PhyAb	SexAb	EmoNeg	PhyNeg
DEPS	−0.466						
EmoAb	−0.393	0.438					
PhyAb	−0.290	0.327	0.648				
SexAb	−0.144	0.201	0.285	0.296			
EmoNeg	−0.426	0.427	0.662	0.565	0.249		
PhyNeg	−0.302	0.298	0.535	0.550	0.252	0.698	
ACE total	−0.427	0.453	0.816	0.761	0.347	0.911	0.807

All correlations:  $p < 0.001$ ; AoO = attitude of others; DEPS = depressive symptoms; EmoAb = emotional abuse; PhyAb = physical abuse; SexAb = sexual abuse; EmoNeg = emotional neglect; PhyNeg = physical neglect; ACE total = sum of adverse childhood experiences.

**Table 4**  
Path analyses for AoO (A) and DEPS (B); the effects of gender, age and previous mental care controlled.

		All					Females					Males						
		Effect	t	p	CI95%	d	Effect	t	p	CI95%	d	Effect	t	p	CI95%	d		
<b>A: X = ACE, Y = AoO, M = DEPS</b>																		
ACE total	a	-0.003	-8.431	<0.001	-0.003	-0.002	-0.002	-5.722	<0.001	-0.002	-0.001	-0.004	-6.643	<0.001	-0.005	-0.003		
	b	-0.002	-6.474	<0.001	-0.003	-0.002	0.23	-0.001	-4.359	<0.001	-0.002	-0.001	0.24	-0.003	-5.272	<0.001	-0.004	0.18
EmoAb	a	-0.007	-7.028	<0.001	-0.009	-0.005	-0.004	-3.789	<0.001	-0.006	-0.002	-0.012	-6.453	<0.001	-0.016	-0.008		
	b	-0.005	-5.274	<0.001	-0.007	-0.003	0.26	-0.003	-2.590	0.01	-0.005	-0.001	0.33	-0.010	-5.210	<0.001	-0.014	-0.006
	c	0.000	-0.268	0.789	-0.004	0.003		0.003	1.629	0.104	-0.001	0.006		-0.008	-2.472	0.014	-0.013	-0.002
PhyAb	a	-0.007	-5.910	<0.001	-0.009	-0.005	-0.005	-3.838	<0.001	-0.008	-0.002	-0.010	-4.390	<0.001	-0.015	-0.006		
	b	-0.005	-5.383	<0.001	-0.007	-0.003	0.28	-0.004	-2.767	0.006	-0.006	-0.001	0.30	-0.008	-3.369	<0.001	-0.012	-0.003
	c	-0.002	-0.880	0.379	-0.005	0.002		-0.001	-0.274	0.784	-0.004	0.003		0.000	-0.006	0.996	-0.007	0.007
SexAb	a	-0.005	-2.108	0.035	-0.009	0.000	-0.005	-2.745	0.006	-0.009	-0.002	-0.200	-1.421	0.157	-0.048	0.008		
	b	-0.003	1.410	0.159	-0.007	0.001	0.36	-0.004	-2.060	0.040	-0.007	-0.002	0.28	-0.013	-0.969	0.333	-0.039	0.013
	c	0.001	0.400	0.689	-0.003	0.005		-0.002	-0.741	0.459	-0.006	0.003		-0.009	-0.661	0.509	-0.034	0.017
EmoNeg	a	-0.008	-9.390	<0.001	-0.010	-0.006	-0.006	-6.789	<0.001	-0.008	-0.005	-0.010	-6.303	<0.001	-0.013	-0.007		
	b	-0.006	-7.426	<0.001	-0.008	-0.005	0.21	-0.005	-5.362	<0.001	-0.007	-0.003	0.21	-0.008	-5.059	<0.001	-0.011	-0.005
	c	-0.006	-4.876	<0.001	-0.009	-0.004	0.18	-0.006	-3.810	<0.001	-0.009	-0.003	0.19	-0.007	-3.090	0.002	-0.011	-0.003
PhyNeg	a	-0.008	-5.916	<0.001	-0.011	-0.006	-0.008	-5.011	<0.001	0.037	-0.011	-0.009	-3.498	<0.001	-0.014	-0.004		
	b	-0.006	-4.573	<0.001	-0.009	-0.004	0.25	-0.006	-4.106	0.001	-0.009	-0.003	0.21	-0.007	-2.553	0.011	-0.012	-0.002
	c	0.002	0.959	0.337	-0.002	0.006		-0.001	-0.446	0.656	-0.006	-0.004		0.006	1.598	0.111	-0.001	0.012
<b>B: X = ACE, Y = DEPS, M = AoO</b>																		
ACE total	a	0.014	7.289	<0.001	0.010	0.018	0.011	5.112	<0.001	0.007	0.016	0.021	5.387	<0.001	0.013	0.028		
	b	0.010	5.114	<0.001	0.006	0.014	0.29	0.008	3.551	<0.001	0.004	0.012	0.31	0.015	3.683	<0.001	0.007	0.023
EmoAb	a	0.042	6.514	<0.001	0.030	0.055	0.032	4.278	<0.001	0.018	0.047	0.060	4.858	<0.001	0.035	0.084		
	b	0.031	4.759	<0.001	0.018	0.044	0.27	0.024	3.252	0.001	0.010	0.038	0.26	0.041	3.169	0.002	0.015	0.066
	c	0.015	1.431	0.153	-0.006	0.036		0.007	0.573	0.567	-0.017	0.032		0.020	1.003	0.317	-0.020	0.060
PhyAb	a	0.044	5.453	<0.001	0.028	0.059	0.036	3.870	<0.001	0.018	0.054	0.058	3.830	<0.001	0.028	0.087		
	b	0.030	3.847	<0.001	0.015	0.046	0.31	0.025	2.810	0.005	0.008	0.043	0.29	0.039	2.263	0.009	0.010	0.069
	c	0.006	0.511	0.61	-0.018	0.030		0.007	0.473	0.637	-0.022	0.036		0.010	0.440	0.661	-0.034	0.054
SexAb	a	0.037	2.624	0.009	0.009	0.065	0.034	2.488	0.013	0.007	0.062	0.140	1.577	0.116	-0.035	0.316		
	b	0.031	2.286	0.023	0.004	0.058	0.023	1.708	0.089	-0.003	0.049	0.34	1.185	0.237	-0.067	0.268		
	c	0.012	0.825	0.41	-0.017	0.041		0.008	0.564	0.573	-0.021	0.038		0.071	0.827	0.409	-0.098	0.239
EmoNeg	a	0.042	7.316	<0.001	0.031	0.053	0.037	5.467	<0.001	0.024	0.051	0.049	4.851	<0.001	0.029	0.069		
	b	0.029	4.843	<0.001	0.017	0.040	0.32	0.025	3.631	<0.001	0.012	0.039	0.32	0.034	3.198	0.002	0.013	0.055
	c	0.022	2.467	0.014	0.005	0.040	0.37	0.024	2.100	0.036	0.002	0.046	0.37	0.023	1.534	0.126	-0.007	0.052
PhyNeg	a	0.045	4.767	<0.001	0.027	0.064	0.060	3.527	<0.001	0.018	0.062	0.058	3.452	<0.001	0.024	0.091		
	b	0.029	3.068	0.002	0.010	0.047	0.37	0.023	2.090	0.037	0.001	0.045	0.42	0.041	2.492	0.013	0.009	0.073
	c	-0.013	-0.970	0.332	-0.040	0.013		-0.018	-1.067	0.287	-0.051	0.015		-0.001	-0.047	0.962	-0.046	0.044

a = total effect of ACE on AoO/DEPS; b = direct effect of ACE on AoO/DEPS; c = specific direct effect of ACE on AoO/DEPS; d = ratio of indirect effect to total effect X to Y; AoO = attitude of others; DEPS = depression symptoms; Significant associations **bolded**

ACE total = sum of adverse childhood experiences; EmoAb = emotional abuse; PhyAb = physical abuse; SexAb = sexual abuse; EmoNeg = emotional neglect; PhyNeg = physical neglect.

and all its domains had significant direct and indirect effects on AoO, via DEPS, in the whole sample and in females and males separately, with one exception; in males SexAb had no significant effect on AoO (Table 4). Additionally, in the whole sample and in both genders EmoNeg had a significant direct and indirect specific effect on AoO when the effects of other ACE domains were taken into account. In males, also EmoAb had a direct and indirect specific effect on AoO (Table 4).

In the second analyses with AoO as mediator, ACE total and all its domains, except SexAb, had significant direct and indirect effects on DEPS in the whole sample and in females and males separately (Table 4). In the whole sample, SexAb had a direct, in females, only an indirect, and in males, no effect on DEPS. In the whole sample and in females, EmoNeg had a significant direct and indirect, in males only an indirect specific effect on DEPS. In males, also EmoAb had an indirect specific effect, via AoO, on DEPS (Table 4). The indirect/total effect ratios were for AoO as a mediator 1.5 or higher for ACE total and EmoAb in males, for EmoNeg in all and both genders and for PhyNeg in females, indicating that in these cases the indirect effect of AoO on DEPS was greater than vice versa.

About a fourth of the participants had received care for mental problems. It was probable that many of them had depressive symptoms before the inquiry. We therefore formed a subgroup of the participants who had not received mental care previously. We assumed that in this subgroup reported depressive symptoms would be brief, not chronic. The results of the first sensitivity analyses with DEPS as mediator were very similar to those in the first path analysis for all participants. However, SexAb had a significant direct effect on AoO in males, but no longer in females (Supplement Table 1).

Also the results of the second sensitivity analyses with AoO as mediator were similar to those in the second path analysis for all participants, with two exceptions; SexAb had no effect on DEPS in the whole subsample, and PhyNeg had no significant direct effect on DEPS in females and males (Supplement Table S1). In sensitivity analyses, the indirect/total effect ratios were for AoO as mediator 1.5 or higher for ACE total, EmoAb, EmoNeg and PhyNeg in all; for ACE total, PhyAb and PhyNeg in females; and for ACE total, EmoAb, PhyAb and EmoNeg in males, indicating that in participant without previous mental care, mediating effects of AoO on DEPS were greater than among all.

## 4. Discussion

The main hypotheses put forward were confirmed. The ACEs associated significantly with negative AoO and DEPS. The ACE and all its domains, except SexAb, had direct and indirect – via depressive symptoms – associations with negative AoO, and direct and indirect – via negative attitude of others – associations with DEPS. Generally, mediation of ACE via AoO to DEPS was stronger than vice versa. Of the five core ACE domains, EmoNeg had specific direct and indirect effects on negative AoO and on DEPS in the whole sample and in females. In males, EmoAb and EmoNeg had direct and indirect specific effects on AoO, but only an indirect specific effect on DEPS.

### 4.1. Gender

Females' perception of other people's attitude towards them was more positive than that of males although they reported slightly more ACEs than males. It seems that females take a more positive stand to other people and trust them more than males per se. It is possible that this gender difference has its origin in individuals' childhood: boys are inclined to extravert behavioural problems [e.g. [6] [36].], and may therefore receive negative

attention more often than girls from their parents and other attachment figures, and may consequently develop negative representational models more often than girls, the effect of which is seen as perceived negative AoO yet in adulthood.

In the present study, there were no significant gender difference in depressive symptoms measured by the DEPS, possibly because the DEPS instrument detects depressive symptoms more gender-neutrally than, e.g. the Beck Depression Inventory [32]. The fact that the total effects of ACE total on AoO and DEPS (Fig. 2) were in males stronger than in females indicates that adverse childhood experiences may in general have stronger effects on negative perceived AoO and depressive symptoms in males than in females.

### 4.2. Perceived attitude of others and depressive symptoms as mediators

In previous studies, mood disorders and symptoms have been associated with disturbed ability to attribute mental states of others [7,33,35], and with how individuals have perceived other people and their attitude towards them. Individuals with depressive disorders are inclined to interpret their interpersonal relations negatively and this bias towards negative emotions seems to persist even in the remission phase [35]. In line with clinical studies, in the present population study, DEPS associated with perceived negative AoO. And, because ACEs consistently associate with depression in adulthood, treating them as mediator between ACE and AoO was justified.

However, as Bowlby [8,9] and others [1,4,15] have suggested, childhood adversities, such as repeated critical comments, verbal humiliation and lack of emotional warmth, may lead to dysfunctional attitudes and attribution styles which in turn may act as vulnerability factors for depression; in other words, may mediate the effect of ACE on depression. Indeed, the present path analyses showed that a great deal of the effect of ACE and its domains on DEPS was mediated via AoO. The indirect/total effect rates for AoO as mediator were almost systematically higher than those for DEPS as mediator. In participants without previous mental care, these rates were even greater than in the whole sample, indicating that perceived negative AoO mediates the effects of ACE on current depression symptoms much more strongly than vice versa.

### 4.3. Adverse childhood experiences

All ACE domains, except SexAb, associated with negative AoO and DEPS, indicating that various adverse childhood experiences have long-term effects on how individuals perceive other people and their attitude towards themselves, as well as depressive symptoms. This is in line with the attachment theory [9] stating that the representational models of attachment modes, developed during childhood and adolescence, tend to persist into adult life [8], and with previous findings that various ACEs have detrimental effects on these representational models [5–8,13] leading to dysfunctional attitudes and attribution styles and depressive mood [1,4,15]. A new finding was that this association between ACE and perceived negative AoO was found in a general population sample. Our previous finding that 72% of the present sample of the general population reported that they had experienced some abuse or neglect at least sometimes [30] indicates that ACEs and their possibly negative effects on interpersonal relationships touch a great number of people, and also that the negative interpretation of other people's attitude towards themselves increases their vulnerability to depression.

Of the five core ACE domains [11], only emotional neglect had a specific indirect effect on negative AoO, as well as on DEPS, indicating that emotional neglect was the major specific factor influencing both AoO and DEPS. It is important to note that

emotional neglect was also the most frequently reported ACE domain, as has also been found in other cultures [2,12]. The domain of emotional neglect [24] comprises the following five items which for calculating domain scores are reversed: "When I was young, I felt valued or important", "My family was emotionally warm and loving", "When I was young, my family looked after each other", "I respect myself", "My family was supportive and encouraging when I was young". These items represent nicely the two key facets of secure (as opposed to insecure) attachment: 1) Self is perceived as worthy of love and attention, and 2) others are viewed as warm and responsive, as put forward by Bowlby [9]. In Rohner's concept of the parental acceptance-rejection syndrome, emotional rejection comes close to the emotional neglect of ACE [28]. According to Rohner [27], children and adults, who have experienced being rejected in their relationship with their parents, report specific forms of psychological maladjustment including impaired self-adequacy and negative worldview.

The greatest gender differences were found in EmoAb, SexAb and EmoNeg. In males, EmoAb and EmoNeg had specific effects on negative AoO directly and via DEPS, while their effects on DEPS were mediated via AoO, indicating that in males, adverse childhood emotional experiences greatly and specifically disturb their trust in other people and also make them vulnerable to depression. In females, SexAb had rather strong indirect effects on DEPS, via AoO, indicating that depression in females is considerably but not specifically mediated via perceived negative attitude of other.

In the present study, we were able to confirm the findings of Bowlby and Rohner that were based on individual psychology, on the population level, and show that, although ACEs as a whole may disturb the way in which we perceive our fellow human beings and their attitude towards us, the childhood experiences of being emotionally rejected or neglected have the most harmful specific effect on our ability to trust other people. In addition, these attitudinal disturbances may make us vulnerable to depressive mood and clinical depression.

#### 4.4. Implications

According to the literature, the ACEs are associated with various mental, physical, behavioural and functional problems [26]. The results of the present population study indicate that ACEs may have long-standing effects on individuals' social perception, beyond mental problems. Specifically, emotional neglect experienced in childhood seems to lead to the perception that other people take a negative attitude towards us. The emotional neglect, as it was defined in the present study, is common: more than half (51.2%) of the participants drawn from the general population reported that they had experienced emotional neglect at least sometimes in their childhood [31]. Taking into account that the self-reported negative effects of parental rejection, which comes close to the concept of emotional neglect, are universal, regardless of differences in culture, ethnicity, or language [27], the emotional neglect experienced during childhood may shadow a great number of people's adult social life and affect the whole society and its emotional atmosphere.

From a clinical point of view, there are two possibilities to benefit from the finding that ACEs and childhood emotional neglect specifically predicts negative AoO. In the patients with mental problems, depression particularly, it is useful to study how they perceive other people and their attitude towards themselves and use this finding in therapeutic intervention. On the other hand, if the patients report experiences of childhood emotional neglect, also dealing with current social relationships and their distortions may free emotional resources for recovery from mental illnesses.

#### 4.5. Strength and limitations

Some strengths and limitations of the present study should be acknowledged. The cross-sectional study design and retrospective assessment of ACEs do not allow strong causal conclusions. However, there is some evidence that adverse childhood experiences can be reliably assessed retrospectively [21] and that retrospective recall bias is likely to be conservative, leading to underreporting of childhood adversities [14].

ACEs were assessed by the TADS [23]. Our earlier study showed that the TADS is a reliable instrument and that there was a good concordance between self-reported and telephone-interviewed TADS domains [31]. It is possible that an interview would be a more reliable and objective method for assessing childhood adversities. However, as Rohner [27] has argued, individuals' subjective experience – in this case of emotional neglect and perceived attitude of others – is reality to them, as is their way to act also in relation to other people.

We were not able to define the onset of depressive symptoms. Therefore, we first controlled the effect of previous mental care, and secondly repeated path analyses in the group of participants without previous mental care. These sensitivity analyses reduced the bias due to lack of knowledge about onset of depressive symptoms, though not completely. The low response rate, in males in particular, limits the generability of the results.

#### Declaration of interest

None.

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#### Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.eurpsy.2018.06.011>.

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