


## Regular Article

# Early-life adversities and adult attachment in depression and alexithymia

Jani Kajanoja<sup>1,2,3</sup> , Max Karukivi<sup>1,3</sup>, Noora M. Scheinin<sup>1,3</sup>, Hanna Ahrnberg<sup>1,3</sup>, Linnea Karlsson<sup>1,3,4</sup> and Hasse Karlsson<sup>1,3</sup>

<sup>1</sup>Department of Psychiatry, University of Turku and Turku University Hospital, Turku, Finland; <sup>2</sup>Satakunta Hospital District, Pori, Finland; <sup>3</sup>FinnBrain Birth Cohort Study, Population Health Research Centre, University of Turku and <sup>4</sup>Department of Child Psychiatry, University of Turku and Turku University Hospital, Turku, Finland

### Abstract

Alexithymia is a personality construct characterized by difficulties in identifying and verbalizing feelings, a restricted imagination, and an externally oriented thinking style. As alexithymia shows marked overlap with depression, its independent nature as a personality construct is still being debated. The etiology of alexithymia is unknown, although childhood emotional neglect and attachment formation are thought to play important roles. In the FinnBrain Birth Cohort Study, experiences of early-life adversities (EA) and childhood maltreatment (CM) were studied in a sample of 2,604 men and women. The overlap and differences between depression and alexithymia were investigated by comparing their associations with EA types and adult attachment style. Alexithymia was specifically associated with childhood emotional neglect (odds ratio (OR) 3.8,  $p < .001$ ), whereas depression was related to several types of EA. In depression co-occurring with alexithymia, there was a higher prevalence of emotional neglect (81.3% vs. 54.4%,  $p < .001$ ), attachment anxiety ( $t = 2.38$ ,  $p = .018$ ), and attachment avoidance ( $t = 4.03$ ,  $p < .001$ ). Early-life adversities were markedly different in the alexithymia group compared to those suffering from depression, or healthy controls. Depression with concurrent alexithymia may represent a distinct subtype, specifically associated with childhood experiences of emotional neglect, and increased attachment insecurity compared to non-alexithymic depression.

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### Introduction

Alexithymia is a personality construct first identified in hospitalized psychosomatic patients. It is characterized by an inability to identify and verbalize emotions in the self, a restricted imagination, and an externally oriented thinking style (Sifneos, 1973). Alexithymia is linked to an increased risk for several mental and physical health problems such as depression, anxiety disorders, and substance abuse (Berthoz, Consoli, Perez-Diaz, & Jouvent, 1999; Dorard et al., 2017; Honkalampi, Hintikka, Tanskanen, Lehtonen, & Viinamäki, 2000; Thorberg, Young, Sullivan, & Lyvers, 2009). Because alexithymic traits show overlap with depressive symptoms, controversy remains regarding their nature as a distinct personality feature: Some researchers claim that alexithymia is a state-dependent phenomenon in depressed or anxious individuals, while others argue that it represents a stable trait increasing vulnerability to mental health disorders (Hiirola et al., 2017; Marchesi, Brusamonti, & Maggini, 2000; Marchesi, Ossola, Tonna, & De Panfilis, 2014).

**Author for correspondence:** Department of Psychiatry, University of Turku and Turku University Hospital, Turku, Finland Teutori, FinnBrain/Lemminkäisenkatu 3, 20014, Turun Yliopisto; E-mail: [jani.kajanoja@utu.fi](mailto:jani.kajanoja@utu.fi)

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The etiology of alexithymia is not fully understood. Twin studies suggest a relatively low heritability rate of 30–35%, and therefore environmental effects are likely important (Jørgensen, Zachariae, Skytthe, & Kyvik, 2007). One pathway through which the family environment may affect the development of alexithymia, is parent–child attachment formation. Attachment theories hold that children are born with an innate tendency to seek proximity to caregivers in times of need. If parents fail to adequately respond to their child’s emotional needs, they may develop a sense of insecurity in human interaction and form negative representations of self and others (Mikulincer & Shaver, 2012; Pasco Fearon & Roisman 2017). Alexithymia has been proposed to arise from inadequate parental bonding and childhood emotional neglect, possibly leading to an insecure attachment style and emotion regulation deficits (Brown, Fite, Stone, & Bortolato, 2016; Lyvers, Mayer, Needham, & Thorberg, 2019; Taylor, Bagby, Kushner, Benoit, & Atkinson, 2014). Retrospective experiences of childhood emotional neglect and problematic parental bonding have been consistently linked to higher alexithymia levels (Aust, Alkan Härtwig, Heuser, & Bajbouj, 2013; Brown et al., 2016; Lyvers et al., 2019; Taylor et al., 2014; Thorberg, Young, Sullivan, & Lyvers, 2011). Indeed, many studies imply that the development of emotional awareness, creative imagination and healthy emotion regulation abilities likely require an emotionally safe rearing environment, and a secure attachment formation with caregivers (Cassidy, 1994; Moutsiana et al., 2014).

Early-life adversities (EA) such as parental separation, family economic hardship, or childhood maltreatment (CM) in the form of abuse or neglect, have long-lasting adverse effects for child neurocognitive development and later mental health (Cassidy, 1994; Nemeroff, 2016; Pechtel & Pizzagalli, 2011). CM is usually divided into emotional neglect, emotional abuse, physical neglect, physical abuse, and sexual abuse (Infurna et al. 2016; Mandelli, Petrelli, & Serretti, 2015). Traditionally, studies have measured only one type of CM, most often physical or sexual abuse, while failing to control for the effects of other types (Infurna et al. 2016). Types of CM tend to be highly co-occurring, which makes it often challenging to distinguish unique effects of individual CM types by statistical methods (Green et al., 2010; Vachon, Krueger, Rogosch, & Cicchetti, 2015). Therefore, it is still unclear how different forms of CM affect mental health outcomes (Cecil, Viding, Fearon, Glaser, & McCrory, 2017; Vachon et al., 2015). Nonmaltreatment types of EA such as parental separation or low socioeconomic status can also increase the risk for both alexithymia as well as depression in adulthood (Ford, Clark, & Stansfeld, 2011; Hackman & Farah, 2009; Karukivi & Saarijärvi, 2014), but it remains elusive whether these effects are independent from CM.

The purpose of this study was twofold: The first aim was to examine how different EAs and adult attachment associate with alexithymia. Although alexithymia is at least partly assumed to arise from emotional neglect in childhood, no studies have controlled for the effects of other EA types. In light of previous findings and attachment theory, we expected alexithymia to be specifically associated with a history of emotional maltreatment (Aust et al., 2013; Brown et al., 2016), and with adult attachment insecurity. In contrast, as depression is likely a heterogeneous syndrome (Goldberg, 2011; Rantala, Luoto, Krams, & Karlsson, 2018), we expected it to show broader associations with different types of EA. Secondly, we aimed to clarify the connection between depression and alexithymia by analyzing how different EA types impact their respective prevalences, and by comparing depressed individuals with concurrent alexithymia to those without it.

## Methods

### Study details and participants

This study is based on the FinnBrain Birth Cohort Study ([www.finnbrain.fi](http://www.finnbrain.fi)), a prospective cohort established to study the effects of prenatal and early-life stress exposure on child brain development and health (Karlsson et al., 2018). Participants were recruited between December 2011 and April 2015 from maternal welfare clinics in the South-Western Hospital District and the Åland Islands in Finland. After recruitment, the participants filled in a set of self-report questionnaires three times during pregnancy, at gestational weeks 14, 24, and 34. After birth, the families are followed up at 3- to 6-month intervals (the first 30 months) or 12- to 36-month intervals (from 36 months onwards) and the study is planned to continue for decades. The initial FinnBrain sample consisted of 3,808 mothers, 2,623 fathers and their babies. The participants for this study consisted of those parents (1,713 mothers and 882 fathers,  $N = 2595$ ) who filled in all relevant questionnaires. Attrition analyses have been reported elsewhere for those who dropped out of the study before the Toronto Alexithymia Scale (TAS-20) questionnaire was administered (Kajanoja, Scheinin, Karlsson, Karlsson, & Karukivi, 2017).

### Questionnaire data

Background information included age, and education divided into three classes: (a) high school or lower; (b) vocational/upper secondary school degree; (c) applied sciences/university degree. Questionnaires regarding background information were administered at gestational week 14.

EA: The Trauma and Distress Scale (TADS) (Salokangas et al., 2016) was used to assess CM. The TADS is a 43-item self-report questionnaire developed to assess CM retrospectively (exposure before 18 years of age). It includes five subdomains: emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect. The questionnaire measures frequency of maltreatment exposure using a 5-point scale (0 = *never*, 4 = *almost always*). When examining impacts of specific types of CM, dichotomized scores of each maltreatment type were used, a method previously validated in a Finnish population (Kajanoja et al., 2017). Additionally, raw TADS scores were used to examine intercorrelations between maltreatment types, and when used as control variables. Nonmaltreatment types of EA were assessed by items from the Health 2000 questionnaire (Heistaro, 2008). Parental common psychiatric disorders (major depression, anxiety disorders, eating disorders, psychotic disorders, bipolar disorder or attention-deficit/hyperactivity disorder (ADHD)), parental substance abuse, as well as parental separation during childhood, were asked as single yes/no questions. Financial problems in the childhood family were also assessed by a single item: "There were long-term financial difficulties in my childhood family," using a 5-point scale (0 = *never*, 4 = *almost always*). This measure was dichotomized in the same way as the TADS maltreatment domains. The TADS and Health 2000 questionnaires were administered at gestational week 14.

The TAS-20 (Bagby, Parker, & Taylor, 1994; Joukamaa et al. 2001; Taylor, Bagby, & Parker, 2003) is one of the most commonly used self-report scales to measure alexithymic features. It consists of 20 items divided into three subscales: Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DDF), and Externally Oriented Thinking (EOT). Items are rated with a 5-point Likert-scale (1 = *strongly disagree*, 5 = *strongly agree*). Thus, the total score ranges from 20 to 100. An individual is considered alexithymic if the TAS-20 total score exceeds 60 points. The TAS-20 was administered 6 months after the child's birth.

The Edinburgh Postnatal Depression Scale (EPDS) (Cox, Holden, & Sagovsky, 1987; Tamminen, 1990) is a widely used questionnaire for screening prenatal and postnatal depression and has also been validated in men (Matthey, Barnett, Kavanagh, & Howie, 2001). It is a 10-item self-report scale that asks respondents to rate their mood and other depressive symptoms in the previous 7 days. Questions are scored from 0 to 3 and thus the total score ranges from 0 to 30 points. Depressive symptoms were measured 3 and 6 months after the child's birth. The cut-off score of 9/10 was used, indicating the threshold for possible major or minor depressive disorder (Gibson, McKenzie-McHarg, Shakespeare, Price, & Gray, 2009). Scoring above the cut-off in either timepoint was interpreted as current depression.

The Experiences in Close Relationships questionnaire (ECR-R) (Fraley, Waller, & Brennan, 2000) was used to assess adult attachment style. The ECR-R is a 36-item questionnaire divided into two dimensions of attachment anxiety and avoidance, designed to assess attachment security in romantic relationships. Items

**Table 1.** Demographic information, study variables and prevalence of different types of early-life adversity

	Men (N = 882)	Women (N = 1713)	Whole sample (N = 2595)
Level of education	1. 4.1% 2. 39.2% 3. 56.7%	1. 2.0% 2. 30.6% 3. 67.4%	1. 2.7%* 2. 33.5% 3. 63.8%
	Mean (SD)		
Age	32.8 (5.3)	31.2 (4.3)	31.8 (4.8)*
TAS-20 score	43.0 (9.7)	39.7 (9.3)	40.9 (9.5)*
ECR-R anxiety	2.2 (0.8)	2.4 (0.9)	2.3 (0.9)*
ECR-R avoidance	2.5 (0.8)	2.3 (0.8)	2.4 (0.8)*
	Median [IQR]		
EPDS score	2.0 [4.0]	4.0 [6.0]	3.0 [5.0]*
	Prevalence (%)		
Current depression	7.8%	15.9%	13.2%*
High alexithymia	6.2%	2.7%	5.4%*
Emotional neglect	34.7%	34.9%	34.8%
Emotional abuse	22.7%	31.1%	28.2%*
Physical abuse	21.1%	22.2%	21.8%
Physical neglect	38.7%	36.9%	37.5%
Childhood history:			
Parental separation	22.6%	25.2%	24.3%
Parental financial problems	10.9%	16.1%	14.3%*
Parental psychiatric disorder	9.2%	15.2%	13.2%*
Parental substance abuse	13.4%	19.7%	17.5%*

Level of education: 1. High school or lower; 2. Vocational/upper secondary school degree; 3. Applied sciences/University degree. TAS-20 = Toronto Alexithymia Scale, EPDS = Edinburgh Postnatal Depression Scale, ECR-R = Experiences in Close Relationships.

\*Significant difference between men and women ( $p < .05$ ).

are scored on a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher scores indicate attachment insecurity. The dimension of attachment anxiety reflects preoccupation about the partner's emotional availability, whereas attachment avoidance is characterized by distrust in emotional closeness, and attempts to maintain independence, emotional distance' and self-reliance (Mikulincer & Shaver, 2012). The ECR-R was administered in mid-pregnancy.

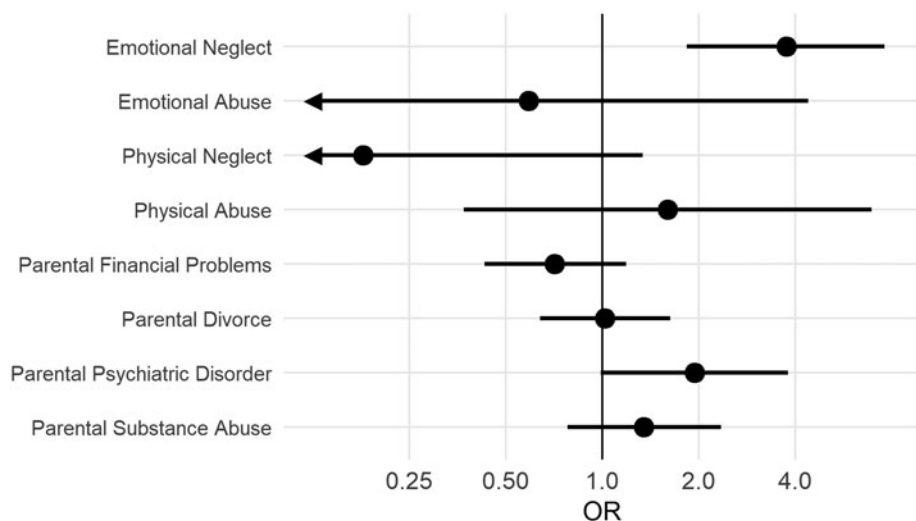
### Statistical methods

All statistical analyses were conducted using the IBM SPSS (version 24.0). Normality of distribution within variables was tested visually and using the cut-off values of larger than 7 for kurtosis and larger than 2 for skewness, indicating a non-normal distribution (Kim, 2013). All continuous predictor and outcome variables (TAS-20, EPDS, TADS dimensions, and ECR-R) were non-normally distributed. TAS-20 scores and ECR-R scores were log-transformed, after which they were normally distributed. EPDS and SCL-90 scores were highly skewed and could not be transformed into a normal distribution, therefore nonparametric tests were used. Chi-square test was used to assess differences between categorical variables, and Student's *t* test (for normally distributed data) or Mann-Whitney *U* test (for non-normally distributed) between continuous variables. In the intercorrelations between maltreatment types, Spearman's rho ( $\rho$ ) (non-parametric) or Pearson's *r*

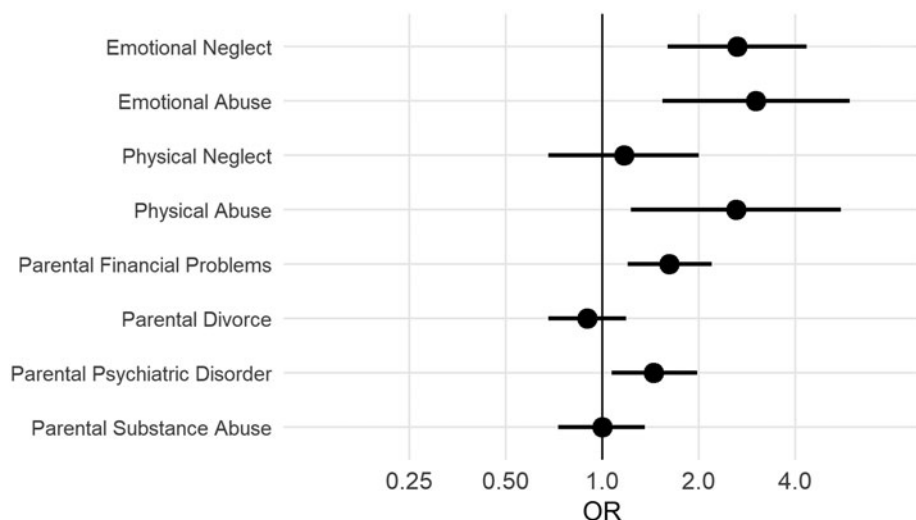
(parametric) were used to quantify the strength of the association. Analysis of variance (ANOVA) was used to examine the association between education level and attachment security. When analyzing attachment insecurity in depression and alexithymia, general linear model (GLM) was used to control for sex, age, and education level. GLM was additionally used when examining associations between non-maltreatment types of EA, and alexithymia levels and depressive symptoms, controlling for the effect of CM. Here, partial  $\eta^2$  was used as a measure of effect size. The significance level in all analyses was set at  $p < .05$  (two tailed).

To disentangle the effects of different types of CM, individuals who reported experiencing only one type of CM were compared to those who reported no maltreatment. This approach enabled us to identify groups that scored high in one specific domain of CM. As sexual abuse rarely occurred alone, controlling for other types of CM was not possible, and therefore sexual abuse was left out of the final analyses. Binary logistic regression analysis was used to assess the impacts of nonmaltreatment types of EA, while controlling for the effects of concurrent CM. Here, raw TADS total scores were used as a continuous control variable. As there were fewer individuals with high alexithymia than current depression, the associations between CM types and alexithymia had wider confidence intervals. We therefore also analyzed associations of EA types, TAS-20 overall scores, and individual TAS-20 dimensions separately, in order to avoid false negative

## Prevalence of Alexithymia by Type of Early Adversity



## Prevalence of Current Depression by Type of Early Adversity



**Figure 1.** Associations of specific types of early-life adversity (EA) with depression and alexithymia OR = odds ratio, LCL = lower limit for 95% confidence interval UCL = upper limit for 95% confidence interval. For each type of childhood maltreatment (CM), history of other types of CM has been excluded. For non-maltreatment types of EA, adjusted ORs are displayed, after controlling for the effects of concurrent CM. Graph created by Forest Plot Generator by Evidence Partners.

conclusions concerning the relationship between EA types and alexithymia.

## Results

### Characteristics of the study sample

Demographic information on the study sample, as well as prevalence of different EA types, are shown in Table 1. Data showed that 43.5% of the participants reported no history of maltreatment, while 36.2% reported experiencing more than one type of maltreatment. Lower education was associated with all types of maltreatment ( $p < .020$  for all comparisons), parental separation ( $p < .001$ ), and parental substance abuse ( $p = .021$ ). Raw scores of maltreatment types were highly correlated with each other ( $\rho = 0.489 - 0.641$ ,  $p < .001$  for all comparisons). History of parental separation, financial problems, psychiatric disorder, and substance abuse in the childhood family were all associated with every type of CM ( $p < .005$  for all comparisons).

### Impacts of EA types on depression and alexithymia

Of the total study sample, 5.7% ( $N = 148$ ) of participants reported a history of only emotional neglect, 9.1% ( $N = 236$ ) of only physical neglect, 2.8% ( $N = 72$ ) of only emotional abuse, 2.1% ( $N = 55$ ) of only physical abuse, and 0.6% ( $N = 16$ ) of only sexual abuse. Figure 1 shows the unique contribution of each EA type for current depression and alexithymia. Of individuals with high alexithymia, a total of 65.3% reported a history of emotional neglect, compared to 33.6% of those with low or moderate levels of alexithymia ( $p < .001$ ).

Analyzing the impacts of EA types on individual alexithymia dimensions and TAS-20 total scores as continuous variables yielded similar results as when using alexithymia as a categorical variable: Emotional neglect was strongly associated with all alexithymia dimensions and total scores ( $t = 3.237$  for DIF,  $t = 4.328$  for DDF,  $t = 4.915$  for EOT,  $t = 5.9$  for total scores,  $p < .001$  for all comparisons). Emotional abuse was additionally weakly associated with DIF ( $t = 2.307$ ,  $p = .021$ ) and physical neglect was

**Table 2.** Results of the general linear model predicting depressive symptoms and alexithymia levels

	EPDS			TAS-20		
	<i>F</i>	<i>p</i>	Partial $\eta^2$	<i>F</i>	<i>p</i>	Partial $\eta^2$
Sex	35.74	<.001	0.014	82.09	<.001	0.031
Age	2.44	.118	0.001	31.99	<.001	0.012
Education	4.05	.044	0.002	34.45	<.001	0.013
ECR-R anx	214.72	<.001	0.077	116.20	<.001	0.043
ECR-R av	4.28	.039	0.002	194.77	<.001	0.070
Full model	78.32	<.001	0.131	151.66	<.001	0.227

EPDS = Edinburgh Postnatal Depression Scale; TAS-20 = Toronto Alexithymia Scale; ECR-R anx = Attachment Anxiety; ECR-R av = Attachment Avoidance

weakly associated with EOT ( $t = 2.2, p = .029$ ). All other CM types were unrelated to alexithymia dimensions and total scores.

Parental history of psychiatric disorders, parental substance abuse, and parental separation was unrelated to TAS-20 overall scores ( $p > .4$  for all comparisons). Parental financial problems were positively associated with TAS-20 scores ( $t = 3.79, p < .001$ ), but this association was not significant after controlling for CM ( $p = .115$ ). Both parental psychiatric disorder as well as substance abuse were positively associated with DIF ( $z = 4.66, p < .001$  and  $z = 2.60, p = .009$  respectively) and negatively associated with EOT ( $z = 3.07, p = .002$  and  $z = 5.18, p < .001$  respectively). Associations between DIF and parental substance abuse ( $F = 7.45, p = .006$ , partial  $\eta^2 = 0.003$ ), EOT and parental psychiatric disorder ( $F = 23.70, p < .001$ , partial  $\eta^2 = 0.009$ ), as well as EOT and parental substance abuse ( $F = 4.69, p = .03$ , partial  $\eta^2 = 0.002$ ) remained significant after controlling for CM, but effect sizes were marginal.

Because alexithymia, depression, and some types of EA were unevenly distributed across men and women, possible gender-specific associations were also investigated. This approach produced very similar results regarding alexithymia: Emotional neglect was significantly associated with TAS-20 scores in both men ( $t = 3.1, p = .002$ ) and women ( $t = 4.5, p < .001$ ). Parental financial problems ( $F = 7.5$ , partial  $\eta^2 = 0.004, p = .006$ ) and substance abuse ( $F = 6.1$ , partial  $\eta^2 = 0.004, p = .014$ ) were weakly and independently associated with higher TAS-20 scores in women only. All other types of CM, as well as parental psychiatric disorders and separation, remained non-significant ( $p > .1$  for all comparisons). For women, parental psychiatric disorders ( $F = 10.4$ , partial  $\eta^2 = 0.006, p = .001$ ), financial problems ( $F = 6.1$ , partial  $\eta^2 = 0.004, p = .014$ ), emotional neglect ( $z = 4.5, p < .001$ ), and emotional abuse ( $z = 4.3, p < .001$ ) remained significant predictors of depressive symptoms. In men, only emotional neglect ( $z = 3.4, p = .001$ ) remained significantly associated with depressive symptoms.

### Adult attachment

Age was positively correlated with attachment avoidance (Pearson's  $r = .155, p < .001$ ), but not with attachment anxiety (Pearson's  $r = .010, p = .624$ ). Women scored higher in attachment anxiety (2.41 vs. 2.23,  $t = 4.81, p < .001$ ), while men scored higher in attachment avoidance (2.34 vs. 2.49,  $t = 4.33, p < .001$ ). Lower education was associated with both attachment anxiety ( $F = 16.46, p < .001$ ) and avoidance ( $F = 6.07, p = .002$ ). EPDS and TAS-20 scores were both positively correlated with both attachment anxiety ( $\rho =$

0.343,  $p < .001$  for EPDS;  $\rho = 0.329, p < .001$  for TAS-20) and avoidance ( $\rho = 0.179, p < .001$  for EPDS;  $\rho = 0.379, p < .001$  for TAS-20). After controlling for the effects of sex, age, and education level, attachment anxiety was the strongest predictor of depression, while attachment avoidance was the strongest predictor of alexithymia (Table 2).

### Overlap and differences between depression and alexithymia

EPDS and TAS-20 scores showed a moderate positive correlation ( $\rho = 0.367, p < .001$ ). Of individual dimensions of alexithymia, DIF ( $\rho = 0.528, p < .001$ ) and DDF ( $\rho = 0.355, p < .001$ ) showed positive correlations, while EOT was not associated with depressive symptoms ( $\rho = 0.002, p = .918$ ). Of depressed participants, 14% ( $N = 48$ ) had high levels of alexithymia, these were more likely to be men (30.4% of depressed men vs. 9.9% of depressed women had high alexithymia,  $p < .001$ ). Depressed men and women did not differ in reported levels of emotional neglect ( $p > .923$ ) or attachment anxiety ( $p = .910$ ), but depressed men scored higher in attachment avoidance ( $t = 3.21, p = .001$ ). Depressed individuals with and without alexithymia did not differ in education level ( $p = .509$ ). Of depressed individuals with high alexithymia, 81.3% reported childhood emotional neglect, compared to 54.4% of depressed individuals without alexithymia ( $p < .001$ ). Depression with alexithymia was also associated with higher levels of attachment anxiety (mean scores 3.20 vs. 2.84,  $t = 2.38, p = .018$ ) and attachment avoidance (mean scores 3.03 vs. 2.52,  $t = 4.03, p < .001$ ) compared to depression without alexithymia.

### Discussion

The main finding of our study was that alexithymia was specifically associated with experiences of childhood emotional neglect, whereas depression was more broadly related to several types of childhood maltreatment, financial problems in childhood family, as well as parental psychiatric disorders. These findings shed light on the nature of childhood experiences in alexithymia, and clarify the overlap and differences between depression and alexithymia.

Self-reported experiences of emotional neglect were associated with a nearly fourfold increase in the prevalence of high alexithymia, and two thirds of alexithymic individuals reported having experienced childhood emotional neglect. These findings are in line with previous research showing a consistent connection between emotional neglect and alexithymia (Aust et al., 2013; Pasco Fearon & Roisman 2017). We extended previous findings

showing that this relationship was specific, as no other type of CM was related to the prevalence of alexithymia. This implies an important role of childhood emotional neglect in the etiology of alexithymia, although it alone may not be a sufficient risk factor for its development. Although no definitive conclusions can be drawn regarding causality, as genetic makeup could explain both emotionally neglectful parenting and offspring alexithymia levels, we consider this unlikely, as twin studies have reported low heritability estimates for alexithymia (Jørgensen et al., 2007). Brown et al. (2016) recently reported similar findings to ours, showing that emotional neglect was the strongest predictor of alexithymia, and alexithymia mediated the relationship between emotional neglect and internalizing symptoms. However, as most individuals with self-reported childhood emotional neglect do not exhibit alexithymic features, future research should address possible protective factors conferring resilience.

Recent theories have hypothesized that alexithymia could result from inadequate parental bonding, leading to an insecure attachment formation in childhood, which in turn may affect the development of emotional awareness and regulation (Thorberg et al., 2011; Lyvers et al., 2019). In our sample, attachment anxiety was strongly associated with depression, but attachment avoidance more closely related to alexithymia levels. According to attachment theory, an avoidant attachment style may result from caregivers habitually ignoring the child's emotional needs (Mikulincer & Shaver, 2012; O'Loughlin, Cox, Kahn, & Wu, 2018). Avoidantly attached individuals do not seek social support in times of distress, and instead emphasize self-reliance and independence (Mikulincer & Shaver, 2012; O'Loughlin et al., 2018; Lyvers et al., 2019). Our results support the view that alexithymia could represent a result from childhood emotional neglect leading to attachment avoidance and impaired emotion regulation. However, as we only measured adult attachment style, reverse causality cannot be ruled out; that is, that the problems in emotional processing related to alexithymia could themselves cause problems in interpersonal relationships and attachment security.

Regarding the overlap between alexithymia and depression, Marchesi et al. (2014) have previously argued that the TAS-20 might more accurately measure negative affect than 'true' alexithymia. Specifically, they found that differences in alexithymia levels between different psychiatric disorders were explained by levels of depression and anxiety. Indeed, alexithymia has been found to strongly correlate with depression in several studies (e.g., Grabe, Spitzer, & Freyberger, 2004; Honkalampi et al., 2000; Kajanoja et al., 2017), although longitudinal studies have shown TAS-20 scores to be more stable over time compared to depressive symptoms (Luminet, Bagby, & Taylor, 2001; Saarijarvi, Salminen, & Toikka, 2006). Similarly, the TAS-20 and two of its subscales (DIF and DDF) were moderately correlated with depressive symptoms in our sample. However, only 14% of currently depressed individuals had high levels of alexithymia. Furthermore, the EOT dimension was not related to depressive symptoms at all. Together, these findings imply that the TAS-20 does not simply measure negative affect but is at least partly an independent phenomenon from depression and anxiety. Bagby, Parker, & Taylor (2020) have recently argued that the connection between alexithymia and negative affect is consistent with the view that alexithymia represents a cognitive deficit in emotional processing. That is, alexithymic individuals do indeed experience increased negative affect, but their emotions remain undifferentiated and unregulated. Moreover, there were clear

differences between depressive individuals with and without alexithymia. Depression with alexithymia was associated with remarkably high levels of reported childhood emotional neglect, attachment anxiety, and particularly attachment avoidance in the current relationship, compared to nonalexithymic depression. Recent evidence implies that depression associated with CM may represent a clinically distinct 'ecophenotype', predicting aberrant brain structure and function, as well as poorer outcomes to antidepressant treatment compared to depression without CM (Nemeroff et al., 2003; Opel et al., 2019; Teicher & Samson, 2013). Similarly, alexithymic individuals consistently report higher levels of childhood emotional maltreatment (Aust et al., 2013; Brown et al., 2016; Terock et al., 2018), and some evidence indicates they also respond poorly to antidepressant treatment (Ozsahin, Uzun, Cansever, & Gulcat, 2003).

Based on our findings, we hypothesize that alexithymic depression could be considered a specific subtype of depression that may require special attention to impaired emotion regulation and attachment problems. Attachment insecurity has been shown to negatively affect the formation of treatment alliance in psychotherapy (Daniel, 2006). The evidence is unclear about whether and how alexithymia affects psychotherapy treatment outcomes (Cameron, Ogrodniczuk, & Hadjipavlou, 2014). However, treatments directly targeting alexithymia, for example, by skills-training to increase emotional awareness, or exposure exercises, may be more efficient in treating alexithymia than treatments more heavily relying on verbal expression and self-reflection (Cameron et al., 2014). A recent systematic review and meta-analysis also found that mindfulness-based interventions may help reduce alexithymia levels, arguably by increasing interoceptive and emotional awareness (Norman, Marzano, Coulson, & Oskis, 2019).

Regarding gender differences in childhood adversity, women reported more emotional and sexual abuse compared to men. Other types of CM were equally common among genders. Emotional and physical neglect emerged as the most common maltreatment types in both men and women, and experience of childhood emotional neglect strongly predicted both depression and alexithymia. This is an important finding, as emotional and physical neglect are the least studied forms of childhood maltreatment (Stoltenborgh, Bakermans-Kranenburg, & van Ijzendoorn, 2013a). We found that childhood sexual abuse almost always co-occurred with other types of CM, making its specific contribution to mental health outcomes very difficult to decipher, a conclusion also made by another recent study (Vachon et al., 2015). We further observed some interesting gender differences in depressed individuals. Depressed men had higher levels of alexithymia and attachment avoidance compared to depressed women, and emotional neglect uniquely predicted both depression and alexithymia in men. This suggests that childhood emotional neglect and alexithymia may play a particularly important role in men's depression. This could be explained by an interaction between cultural factors and childhood family environment: Several researchers have argued that the higher alexithymia levels often observed in men may be a result of cultural norms that discourage emotional expression in males (Le, Berenbaum, & Raghavan, 2002; Levant, Hall, Williams, & Hasan, 2009; O'Loughlin et al., 2018). Therefore, men who experience emotional neglect in their childhood families may be especially vulnerable to disturbances in emotional development, as they often also lack cultural support for the expression of emotion.

**Limitations:** Our study sample consisted of a birth cohort of relatively highly educated parents (Karlsson et al., 2018). This selection bias, and the fact that pregnancy is likely to affect depressive symptoms and emotional processing especially in women, could imply that the results may not be directly comparable to the general population. However, our results regarding the relationships of EA, alexithymia, and depression resemble previous findings (Aust et al., 2013; Mandelli et al., 2015; Brown et al., 2016), and alexithymia has been shown to be a relatively stable trait also in the perinatal period (Le, Ramos, & Muñoz, 2007). Regarding attachment, we only examined adult attachment style, which does not directly measure childhood attachment formation. However, attachment styles, although malleable, show robust stability from childhood to adulthood (Waters, Merrick, Treboux, Crowell, & Albersheim, 2000; Fraley, 2002). Our prevalences of emotional and physical abuse were also convergent with cross-cultural estimates of prevalence (Stoltenborgh, Bakermans-Kranenburg, Alink, & van IJzendoorn, 2012; Stoltenborgh, Bakermans-Kranenburg, van IJzendoorn, & Alink, 2013b). In contrast, prevalences of emotional and physical neglect were higher in our study, as well as in the TADS validation study by Salokangas et al. (2016), compared to global estimates (Stoltenborgh et al., 2013a). Therefore, it seems likely that the TADS is overly sensitive to early neglect. Secondly, although the TADS is a validated questionnaire and has shown good psychometric quality, all retrospective measures of CM are subject to recall bias and seem to correlate poorly with prospective measures of CM (Baldwin, Reuben, Newbury, & Danese, 2019; Colman et al., 2016). There is evidence that depression and chronic stress may themselves affect responses concerning history of CM (Colman et al., 2016), and the possible effect of alexithymia on retrospective reports of CM is unknown. It is plausible that alexithymia itself could influence the accuracy of recalled childhood experiences, especially those with emotional content. Therefore, we must acknowledge the possibility of recall bias as a limitation of this study. We can only conclude that participants with alexithymia perceived their childhood environment differently compared to those with depression and healthy controls. Despite their limitations, retrospective accounts of CM are widely used in psychopathology research, and they associate with changes in brain limbic system structure and function even after controlling for psychiatric morbidity, giving strong support to their validity (Dannlowski et al., 2012; Opel et al., 2019; Teicher, Anderson, & Polcari, 2012). Regarding our use of the TADS, some information is inevitably lost when dichotomizing raw scores of CM, although this approach has been validated with TADS (Salokangas et al., 2016) and is widely used in CM research (Green et al., 2010; Infurna et al., 2016). We used dichotomized scores because they enabled a more reliable examination of the impact of individual maltreatment types. Statistical controlling continuous maltreatment scores can lead to false results because of high multicollinearity between maltreatment types (Vachon et al., 2015).

## Conclusions

Our study sheds light on the impacts of different forms of early-life adversity on adult depression and alexithymia. Together our results suggest at least partly different childhood experiences in alexithymia and depression. Our hypothesis of alexithymic depression as a specific depression subtype warrants further research. Finally, these findings may help in creating targeted

interventions to patients suffering from depression with concurrent alexithymia.

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