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ALEXITHYMIA AND PARENTAL BONDING AMONG FIRST-VISIT ADOLESCENT PATIENTS IN SPECIALIZED MENTAL OR MEDICAL HEALTHCARE

ABSTRACT

Background: *Alexithymia is a personality trait characterized by difficulties in identifying and describing emotions. In adults, it has been associated with several psychiatric conditions and medical illnesses. Although similar associations appear to exist in adolescents, alexithymia has been studied only rarely in adolescent patient populations. Furthermore, experienced parental bonding has not previously been studied in relation to alexithymia in clinical adolescent samples. Therefore, our aim was to investigate the prevalence of alexithymia and its association with parental bonding among adolescents entering specialized mental or medical healthcare.* ***Methods:*** *The study samples comprised first-visit patients attending an adolescent psychiatry clinic (n=176, aged 13-22 years) or a paediatric clinic (n=117, aged 12-15 years). Alexithymia was assessed using the Toronto Alexithymia scale (TAS-20) and perceived parental bonding with the Parental Bonding Instrument (PBI). The psychometric properties of the TAS-20 were assessed using confirmatory factor analysis and the main analyses were carried out using general linear models.* ***Results:*** *High levels of alexithymic features were prevalent in both samples, with rates of 48.3% in the adolescent psychiatry sample and 19.7% in the paediatric sample. Median TAS-20 scores were significantly higher in the former (60.0 vs. 51.0, p<0.001). Low parental care was significantly related to alexithymic features in both samples. High maternal overprotection had a significant association with alexithymic features only in the adolescent psychiatry sample.* ***Conclusions:*** *Alexithymic features are common among adolescents entering specialized healthcare, particularly among those referred to adolescent psychiatry. Perceived parental bonding is significantly related to alexithymia also among patients referred to paediatric care. Further research is needed to clarify the role of alexithymia in somatic complaints and medical illnesses during adolescence.*

KEYWORDS: ADOLESCENT PSYCHIATRY, ALEXITHYMIA, PARENTAL BONDING, PARENTAL ATTITUDES, PAEDIATRIC PATIENT

INTRODUCTION

Alexithymia is a personality construct, which is characterized by difficulty in identifying and describing feelings and an externally oriented or concrete way of thinking (1). The 20-item Toronto Alexithymia scale (TAS-20) is a widely used self-report questionnaire for assessing alexithymia (2,3). It measures three dimensions of alexithymia: Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DDF) and Externally Oriented Thinking (EOT) (2). In Western countries, alexithymia has been reported to be quite common, as the prevalence in general population adults is approximately 10% (4). In samples representing general adolescent populations, the prevalence of alexithymia has been reported to be between 7.3% and 23.5% (5–7).

Interestingly, when comparing younger and older age groups of adolescents, it has been noticed that alexithymia appears to be more prevalent among younger adolescents (5,7). For example, Säkkinen et al. (2007) found that the prevalence of alexithymia among secondary school pupils (median age 14.6 years) was 15.9%, but among 12 to 13-year-olds the prevalence was 21.1% (7). Furthermore, the TAS-20 scores have been observed to decline, at least to some extent, from adolescence to young adulthood (8). Thus, from a developmental perspective, these findings suggest that alexithymia does not represent a personality characteristic that develops during adolescence

per se, but rather a manifestation of underdeveloped emotion processing skills.

However, the psychometric properties of the TAS-20 in younger adolescents have been questioned (9,10). These challenges may reflect difficulties in understanding the questionnaire items as well as the ongoing development of affect regulation. The stability of alexithymia has been shown to be influenced by factors such as concurrent depressive symptoms and psychotherapeutic treatment (11). Taken together, current evidence suggests that during adolescence, alexithymia gradually evolves into the personality trait constellation observed in adulthood, and comprises both stable trait-like and more state-dependent features.

In multiple previous studies, alexithymia has been related to mental disorders and medical conditions, such as depression, eating disorders and diabetes mellitus (12−15). Fewer studies have been conducted among adolescents. Still, an increasing number of studies show an association between alexithymic features and psychiatric illnesses, such as anxiety (16) and depression (17), also in adolescents. Some somatic conditions, such as chronic pain (18) and fibromyalgia (19), have been linked to alexithymia in adolescents, as well as medically unexplained symptoms (20). Regarding the prevalence of alexithymia in mental disorders, for example, over 40% of adult patients with depression have been reported to exhibit high alexithymic features (21) and the prevalence appears to be in the same range for anxiety disorders (22). For medical illnesses, the prevalence of alexithymia also appears to be higher in patient samples compared with general population, for example, in adults with psoriasis 24.8% and atopic dermatitis 27.7% (23,24). In previous studies, the prevalence of alexithymia has ranged from 10% to 53% in patients with multiple sclerosis and from 15% to 52% in patients with fibromyalgia (25,26). However, to our knowledge, the prevalence of alexithymia has not been investigated in adolescent patients in specialized health care.

The relationship between alexithymia and medical illness is likely multifactorial. One potential explanation involves shared risk factors and mental disorders may act as moderating factors in these associations (27). Alexithymia has also been linked to chronic stress (28), which may contribute to the onset and progression of medical illnesses. In addition, lifestyle factors commonly associated with alexithymia, including physical inactivity (29) and unhealthy dietary habits (30) may represent further pathways.

As with many other complex psychological traits, alexithymia is thought to emerge through an interplay between biological and environmental influences. The latter, including dysfunctional parenting and adverse childhood events, have consistently been linked to the development of alexithymic features (31,32). Furthermore, socio-environmental factors, such as maternal low educational level or psychopathology and being an unwanted child, have also been related to alexithymia (6,33,34). Parental bonding refers to the quality of the emotional relationship between a child and their parents or primary caregivers. As a broad indicator of parent-child relationship quality, it has attracted interest in developmental research on alexithymia. Studies in adult populations have shown that less favourable parental bonding is associated with greater difficulties in identifying and expressing emotions (35). Moreover, maternal alexithymic features have been associated with weaker post-partum bonding (36).

Most studies assessing the relationship between parental bonding and alexithymia have used the Parental Bonding Instrument (PBI) (37,38), which measures two dimensions of parenting: care and overprotection. The PBI is a self-report questionnaire in which respondents retrospectively evaluate their parents' behaviour during the first 16 years of life. In a study by Thorberg et al. (2011), a lack of maternal care was found to be particularly related to alexithymia as well as the separate TAS-20 dimensions of DIF and DDF (35). Furthermore, paternal overprotection had a significant but small association with alexithymia. Other studies have also linked maternal overprotection to alexithymia in both adults (39) and late adolescents (40). Most studies investigating the association between alexithymia and parental bonding have been conducted in general population samples or among psychiatric patients. Mannarini et al. (2018) reported a significant association between alexithymia and parental bonding in 12 to 18-year-old adolescent psychiatry patients; however, no further analyses regarding the dimensions of alexithymia were conducted (41). One study investigated the relationship between alexithymia and parental bonding in adult patients with fibromyalgia (42). Interestingly, studies of adults with medical illnesses have tended to highlight paternal bonding dimensions more strongly than maternal dimensions (43,44). In contrast, studies of adult psychiatric populations have more consistently identified maternal dimensions, in particular maternal overprotection, as significant correlates of alexithymia (45,46).

The first aim of the present study was to evaluate the prevalence of alexithymic features in adolescents who enter specialized mental healthcare or paediatric care. The second aim was to assess the relationship between parental bonding and alexithymia, as well as potential differences in this between the two patient groups. To our knowledge, no previous studies have examined these questions in adolescents with medical illnesses. Our hypothesis was that parental bonding, especially

experienced lack of maternal care, would be associated with alexithymia in both patient groups. We also hypothesized, that paternal bonding dimensions would be more strongly associated with alexithymic features in the paediatric sample, whereas maternal dimensions, especially maternal overprotection, would show stronger associations in the adolescent psychiatry sample.

MATERIAL AND METHODS

PARTICIPANTS

The study is part of the research project ´Emotions and wellbeing in adolescents´. The study setting and earlier results have been reported elsewhere (47). The participants for the study were recruited from the Satakunta Hospital District, Finland, which provides specialized healthcare for the inhabitants in the province. The adolescent psychiatry outpatient clinics serve 13 to 22-year-olds and the paediatric clinic offers specialized medical care for 12 to 16-year-old adolescents. The present study comprises two samples, one that was recruited from the adolescent psychiatry outpatient clinics, and another recruited from the paediatric clinic. Both samples were recruited from adolescents, who after a referral were visiting the clinic for the first time. The aim was that the samples would represent actual patient material. Thus, we did not have any particular inclusion or exclusion criteria and all first-visit patients were provided an opportunity to attend the study. A written informed consent was received from all participants, and for adolescents under 15 years of age their guardians also gave their written consent. The guardians of the adolescents at the age of 15 to 17 received a notification of the adolescent's participation. The Ethics Committee of the Hospital District of Southwest Finland gave a favourable opinion of the study (ETMK 89/1801/2017).

Adolescent psychiatry sample

The first sample was from the Satakunta Hospital District adolescent psychiatry clinic and the recruitment phase lasted from November 2017 to December 2018. Participation was offered to all 13 to 22-year-old first-visit patients by the professionals meeting them at the visit. During the recruitment phase, there were altogether 749 eligible first-visit patients. We were not able to collect data on adolescents who refused. In all, 190 participants completed the study questionnaire. However, due to missing data, 14 (7.4%) of them were excluded and the sample in the present study comprises 176 participants.

Paediatric sample

The second sample was recruited from the Satakunta Hospital District paediatric clinic and the recruitment phase lasted from January 2018 to January 2019. Participation was offered by a research nurse to all 12 to 15-year-old first-visit patients at the paediatric clinic. Emergency patients were not recruited. During the recruitment phase, altogether 419 eligible patients visited the clinic for the first time. Research nurse was able to approach 188 of them. Of the potential participants, 34 (18.1%) declined directly. In all, 154 adolescents gave an informed written consent. After receiving the study questionnaire, it was filled in immediately at the clinic or later at home and mailed to the research nurse. Altogether, 12 (6.4%) later refused and 25 (13.3%) did not return the questionnaire. Thus, 117 (62.2%) adolescents who returned the completed questionnaire formed the final sample. Compared with those who refused or dropped out, the participants were more often female (p=0.004), but no significant age difference was found.

MEASUREMENTS

Primary clinical diagnoses

Information on the primary clinical diagnoses was recorded for both study groups to characterize the patient samples. The clinical diagnoses were based on the International Classification of Diseases, Tenth Revision (48). In the adolescent psychiatry sample, information on the primary diagnosis was obtained from patient records following completion of the assessment period. In Finnish clinical practice, this assessment period is conducted by a multidisciplinary team and typically consists of 4–6 visits. In addition to diagnostic assessment, a treatment plan is formulated during this period. The primary diagnoses were categorized into broad diagnostic groups, such as, depression (F32-33), anxiety disorders (F40-42), psychotic disorders (F2X) and eating disorders (F50). In the paediatric sample, the primary diagnoses recorded at the first visit were used, as paediatric services do not employ a comparable assessment period practice. The diagnoses were categorized according to their respective ICD-10 chapters, for example, diseases of the respiratory system (J00-J99), and diseases of the musculoskeletal system and connective tissue (M00-M99).

Background information and traumatic experiences

Since both alexithymia and parental bonding are related to sociodemographic factors, the following variables were included in the analyses: living arrangements (with biological parents/with family of one biological parent/alone or other), occupation/

education (comprehensive school/upper secondary school or higher education/employed/conscription or other), smoking or using snuff (never tried/using irregularly or regularly). Furthermore, traumatic experiences have been associated both with alexithymia and adverse parenting styles and thus, the questionnaire included also questions about possible traumatic experiences (personal experience of a serious accident/victim of violence or sexual assault/death of a loved one/witnessing an accident or a crime/other traumatic experience).

Questionnaire data

Toronto Alexithymia Scale (TAS-20) includes 20 items that are rated using a 5-point Likert scale. The psychometric properties for the TAS-20 scale as a whole and for the DIF (Difficulty Identifying Feelings) and the DDF (Difficulty Describing Feelings) subscales have been shown to be good, whereas the validity of the EOT (Externally Oriented Thinking) subscale is only moderate (2,49,50). TAS-20 has also been shown to be a feasible measure in previous studies with Finnish adolescents (7,51). The TAS-20 total and dimension scores were treated as continuous variables in the main analyses, but also a cut-off score of 61 points or more for categorizing a subject as having high alexithymic features was used.

Parental Bonding Instrument (PBI) questionnaire consists of 25 items and each of them is rated on a 4-point Likert scale (37). Of the items, 12 are related to the Care subscale and 13 to the Overprotection subscale. A low Care subscale score indicates perceived parental neglect, whereas a high score perceived parental affection. A high Overprotection subscale score indicates perceived intrusive parenting and exaggerated control and a low score perceived parental acceptance of a child's autonomy. The instrument has shown strong psychometric properties (52,53). In the present study, the participants assessed separately their mothers and fathers, and the Care and Overprotection subscale scores were used as continuous variables.

Overall Anxiety Severity and Impairment Scale (OASIS) is a short 5-question overall measure of anxiety severity (54,55). OASIS evaluates the intensity of anxiety symptoms, behavioural avoidance and impairment related to anxiety. The OASIS questionnaire is considered to have potential as a general measure of anxiety and has demonstrated excellent reliability and convergent and divergent validity (54). OASIS score was used to measure present distress and anxiety in order to control for them in the analyses.

STATISTICAL METHODS

The normality of the distributions of the continuous variables was evaluated both graphically and with the Shapiro-Wilk test. Because the distributions were non-parametric, medians and interquartiles (IQR) are used to characterize the continuous variables. Group differences between two groups were analysed with the Mann-Whitney U test and between three groups with the Kruskall-Wallis test. Categorized variables were compared using the Chi-Square test. Due to the significant differences between the two samples, the analyses were conducted separately for them. The correlation between the PBI and TAS-20 total and subscale scores was assessed with the Spearman's correlation coefficient.

In order to assess to what extent the PBI scores predicted the TAS-20 total and subscale scores, general linear models (GLM) were utilized. The separate PBI scores that were significantly ($p<0.05$) correlated with the TAS-20 total and dimension scores were included in the GLM analyses. Additionally, the sociodemographic variables that were significantly ($p<0.05$) associated with the outcome variables were included as confounding factors. To evaluate the fit of the models, both the normality and variance of the residuals was assessed. Log-transformed values for the PBI and OASIS scores were used.

A confirmatory factor analysis was conducted to confirm the psychometric properties of the TAS-20 scale in the present study. The comparative fit index (CFI) was 0.89, a score ≥ 0.90 being acceptable. Chi-square/df was 1.91, a score <3 being good. Additionally, standardized root mean square residual (SRMR) was acceptable at 0.072 (<0.09 being acceptable), along with the root mean square error of approximation (RMSEA) at 0.059 (<0.08 being acceptable). Thus, despite the borderline CFI, these were evaluated as satisfactory.

The internal consistency for the measures was analysed using Cronbach's alpha. While the questionable score for EOT (0.550) was an exception, the scores for the TAS-20 scale and its subscales showed good internal consistency: TAS-20 0.815, DIF 0.843 and DDF 0.736. For the other scales, the scores varied from good to excellent: PBI Mother Care 0.925, PBI Mother Overprotection 0.864, PBI Father Care 0.932, PBI Father Overprotection 0.877 and OASIS 0.917. In all analyses in the study, p-values <0.05 were considered statistically significant. The analyses were conducted using the IBM SPSS software, versions 25.0 and 29.0.

RESULTS

DESCRIPTIVES AND COMPARISONS OF THE ADOLESCENT PSYCHIATRY AND PAEDIATRIC GROUPS

In the adolescent psychiatry sample, there were 121 (68.8%) girls and 55 (31.3%) boys. In the paediatric sample, there were 72 (61.5%) girls and 45 (38.5%) boys. The difference in the gender distribution between the samples was not statistically significant. In the adolescent psychiatry sample, the most common primary diagnostic groups were depression (n=81, 46.0%) and anxiety disorders (n=30, 17.0%). In the paediatric sample, the primary diagnostic groups were musculoskeletal diseases and disorders (n=50, 42.7%) and R00-R99 diagnoses, that is, symptoms and abnormal findings, without a definitive diagnosis of an illness (n=24, 20.5%).

In the adolescent psychiatry sample, the prevalence of high alexithymic features was 48.3% (n=85), while in the paediatric sample the prevalence was 19.7% (n=23) (p<0.001). Altogether 50.4% (n=61) of girls and 43.6% (n=24) of boys were categorized as highly alexithymic in the adolescent psychiatry sample, and 22.2 % (n=16) of girls and 15.6 % (n=7) of boys in the paediatric sample. In both samples, the prevalence difference between girls and boys was not statistically significant.

Regarding age, there was a significant difference between the groups, the paediatric sample being younger. *Table 1* presents the median scores for the continuous variables for all participants, as well as for the two separate samples. The adolescent psychiatry sample had a higher TAS-20 total score (Med=60.00, IQR=15.07) compared to the paediatric sample (Med=51.00, IQR=18.00) with a statistically significant difference (p<0.001). Regarding PBI, the Care subscale scores differed significantly between the groups, both maternal and paternal care being lower in the adolescent psychiatry sample. However, for the Overprotection scores no significant group-wise differences were observed.

Table 1. Comparisons of the continuous variables in the adolescent psychiatry sample and the paediatric sample

	All (n=293)		**Adolescent psychiatry sample (n=176)**		**Paediatric sample (n=117)**		
	Median	IQR	Median	IQR	Median	IQR	P[a]
Age	15.00	4.00	18.00	5.00	14.00	2.00	<0.001
TAS-20 Total Score	57.00	17.50	60.00	15.07	51.00	18.00	<0.001
DIF	19.00	10.45	21.00	8.00	15.00	9.50	<0.001
DDF	15.00	7.00	16.00	6.00	12.97	6.00	<0.001
EOT	23.00	6.00	23.00	6.00	23.00	6.00	0.711
PBI Mother Care	31.00	12.00	28.5	12.00	33.00	10.00	0.005
PBI Mother Overprotection	10.00	11.00	11.00	10.25	10.00	13.00	0.984
PBI Father Care	26.00	15.00	24.00	14.00	30.00	14.00	<0.001
PBI Father Overprotection	8.00	10.00	8.00	10.00	8.50	10.00	0.653
OASIS	8.00	8.00	11.00	6.75	4.00	7.75	<0.001

IQR=Interquartile, TAS-20=20-Item Toronto Alexithymia Scale, DIF=Difficulty Identifying Feelings, DDF=Difficulty Describing Feelings, EOT=Externally Oriented Thinking, PBI=Parental Bonding Instrument, OASIS=Overall Anxiety Severity and Impairment Scale
[a]Mann-Whitney U Test

The younger age of the paediatric sample was also reflected on the differences in the sociodemographic variables (*Table 2*). The majority of the adolescents in the paediatric sample lived with at least one biological parent and were still attending comprehensive school. Adolescents in the adolescent psychiatry sample more frequently reported experiences of being a victim of violence or sexual assault, as well as experiencing other traumatic experiences.

Regarding potential confounding factors, in the adolescent psychiatry sample, none of the sociodemographic variables were significantly associated with the TAS-20 total or DDF scores. Gender was significantly associated with DIF scores (p=0.002), and living arrangements with the EOT scores (p=0.02). In the paediatric sample, gender (p=0.002) was significantly associated with both TAS-20 total (p=0.002) and DIF (p<0.001) scores. Additionally, other traumatic experiences were associated with EOT scores (p=0.001). No significant associations were observed for DDF scores.

Table 2. Comparisons of the categorical variables in the adolescent psychiatry sample and the paediatric sample

		All	**Adolescent psychiatry sample**	**Paediatric sample**	
Variable	Categories	n	n (%)	n (%)	P[a]
Living arrangements (n=290)	With biological parents	142	61 (34.9)	81 (70.4)	<0.001
	With the family of one biological parent	86	56 (32.0)	30 (26.1)	
	Alone or other	62	58 (33.1)	4 (3.5)	
Occupation (n=290)	Comprehensive school pupil	159	56 (32.0)	103 (89.6)	<0.001
	Upper secondary school or higher education student	68	56 (32.0)	12 (10.4)	
	Employed	17	17 (9.7)	0 (0)	
	Other (including conscription)	46	46 (26.3)	0 (0)	
Smoking or using snuff (n=291)	Never tried	158	66 (37.9)	92 (78.6)	<0.001
	Using irregularly or regularly	133	108 (62.1)	25 (21.4)	
Personal experience of a serious accident (n=293)	Yes	13	7 (4.0)	6 (5.1)	0.639
	No	280	169 (96.0)	111 (94.9)	
Victim of violence or sexual assault (n=293)	Yes	26	24 (13.6)	2 (1.7)	<0.001
	No	267	152 (86.4)	115 (98.3)	
Death of a loved one (n=293)	Yes	9	6 (3.4)	3 (2.6)	0.681
	No	284	170 (96.6)	114 (97.4)	
Witnessing an accident or a crime (n=293)	Yes	41	28 (15.9)	13 (11.1)	0.246
	No	252	148 (86.1)	104 (88.9)	
Other traumatic experience (n=293)	Yes	27	25 (14.2)	2 (1.7)	<0.001
	No	266	151 (85.8)	115 (98.3)	

[a]Chi-Square Test

CORRELATIONS BETWEEN ALEXITHYMIA AND PARENTAL BONDING

Due to statistically significant differences between the two samples, the statistical analyses were carried out separately for them. The results of correlation analyses examining the associations between TAS-20 total and subscale scores and PBI scores are presented in *Table 3* for the adolescent psychiatry sample and in *Table 4* for the paediatric sample. In both groups, the TAS-20 total score, as well as the DIF and DDF subscale scores were negatively correlated with the maternal and paternal PBI Care subscale scores. In the adolescent psychiatry sample, the associations with the PBI Overprotection subscale scores were more variable, and none of the associations between TAS-20 scores and paternal Overprotection scores were statistically significant. In contrast, in the paediatric sample, the TAS-20 total score and the DIF and DDF subscale scores were all significantly correlated with both maternal and paternal PBI Overprotection subscale scores.

MULTIVARIATE ANALYSES OF ALEXITHYMIA AND PARENTAL BONDING

Since EOT scores were not significantly correlated with PBI Care and Overprotection scores in either group, separate GLM analyses were not conducted for this outcome. The results of the GLM analyses are showed in *Table 5* for the adolescent psychiatry sample and in *Table 6* for the paediatric sample. In the adolescent psychiatry sample, low maternal Care was significantly associated with DDF subscale scores (adjusted R2=0.301), whereas high maternal Overprotection was significantly associated with TAS-20 total (adjusted R2=0.280) and DIF (adjusted R2=0.358) scores. In the paediatric sample, low maternal Care was significantly associated with higher TAS-20 total (adjusted R2=0.345), DIF (adjusted R2=0.272) and DDF (adjusted R2=0.318) scores. Additionally, low paternal Care was significantly associated with higher DDF scores. Neither maternal nor paternal Overprotection were associated with any TAS-20 scores in the paediatric sample.

Table 3. Spearman´s correlations for continuous variables in the adolescent psychiatry sample (n=176)

	Age	TAS-20	DIF	DDF	EOT	MC	MO	PC	PO	OASIS
Age	–	-0.120	-0.037	-0.061	-0.176*	0.003	-0.113	-0.134	-0.077	0.100
TAS-20	-0.120	–	0.804***	0.827***	0.453***	-0.258***	0.165*	-0.111	0.085	0.503***
DIF	-0.037	0.804***	–	0.656***	-0.21	-0.291***	0.206**	-0.150	0.110	0.565***
DDF	-0.061	0.827***	0.656***	–	0.136	-0.310***	0.124	-0.144	0.103	0.535***
EOT	-0.176*	0.453***	-0.21	0.136	–	0.012	0.036	0.006	0.015	-0.084
MC	0.003	-0.258***	-0.291***	-0.310***	0.012	–	-0.542***	0.352***	-0.242**	-0.252***
MO	-0.113	0.165*	0.206**	0.124	0.036	-0.542***	–	-0.242**	0.382***	0.011
PC	-0.134	-0.111	-0.150	-0.144	0.006	0.352***	-0.242**	–	-0.526***	-0.135
PO	-0.077	0.085	0.110	0.103	0.015	-0.242**	0.382***	-0.526***	–	0.115
OASIS	0.100	0.503***	0.565***	0.535***	-0.084	-0.252***	0.011	-0.135	0.115	–

TAS-20=20-Item Toronto Alexithymia Scale; DIF=20-Item Toronto Alexithymia Scale, Difficulty Identifying Feelings; DDF=20-Item Toronto Alexithymia Scale, Difficulty Describing Feelings; EOT=20-Item Toronto Alexithymia Scale, Externally Oriented Thinking; MC=Parental Bonding Instrument, Maternal Care score; MO=Parental Bonding Instrument, Maternal Overprotection score; PC=Parental Bonding Instrument, Paternal Care score; PO=Parental Bonding Instrument, Paternal Overprotection score; OASIS=Overall Anxiety Severity and Impairment Scale

*p<0.05
**p<0.01
***p<0.001

Table 4. Spearman´s correlations for continuous variables in the paediatric sample (n=117)

	Age	TAS-20	DIF	DDF	EOT	MC	MO	PC	PO	OASIS
Age	–	-0.05	-0.118	0.032	0.022	-0.009	0.105	-0.217	0.055	-0.17
TAS-20	-0.05	–	0.865***	0.882***	0.418***	-0.570***	0.462***	-0.428***	0.434***	0.533***
DIF	-0.118	0.865***	–	0.775***	0.018	-0.525***	-0.437***	-0.361***	0.380***	0.521***
DDF	0.032	0.882***	0.775***	–	0.150	-0.529***	0.457***	-0.387***	0.408***	0.507***
EOT	0.022	0.418***	0.018	0.150	–	-0.149	0.031	-0.188	0.155	0.079
MC	-0.009	-0.570***	-0.525***	-0.529***	-0.149	–	-0.544***	0.714***	-0.458***	-0.489***
MO	0.105	0.462***	-0.437***	0.457***	0.031	-0.544***	–	-0.531***	0.734***	0.387***
PC	-0.217*	-0.428***	-0.361***	-0.387***	-0.188	0.714***	-0.531***	–	-0.555***	-0.513***
PO	0.055	0.434***	0.380***	0.408***	0.155	-0.458***	0.734***	-0.555***	–	0.398***
OASIS	-0.17	0.533***	0.521***	0.507***	0.079	-0.489***	0.387***	-0.513***	0.398***	–

TAS-20=20-Item Toronto Alexithymia Scale; DIF=20-Item Toronto Alexithymia Scale, Difficulty Identifying Feelings; DDF=20-Item Toronto Alexithymia Scale, Difficulty Describing Feelings; EOT=20-Item Toronto Alexithymia Scale, Externally Oriented Thinking; MC=Parental Bonding Instrument, Maternal Care score; MO=Parental Bonding Instrument, Maternal Overprotection score; PC=Parental Bonding Instrument, Paternal Care score; PO=Parental Bonding Instrument, Paternal Overprotection score; OASIS=Overall Anxiety Severity and Impairment Scale
*p<0.05
**p<0.01
***p<0.001

Table 5. Multivariate analysis of the association of the Parental Bonding Instrument (PBI) Care and Overprotection scores with the 20-Item Toronto Alexithymia Scale (TAS-20) total and subscale scores in the adolescent psychiatry sample

Model 1 (TAS-20)				Model 2 (DIF)				Model 3 (DDF)			
	F	df	P[a]		F	df	P[a]		F	df	P[a]
PBI Mother Care	0.064	1	0.801	PBI Mother Care	0.001	1	0.972	PBI Mother Care	4.143	1	0.043
PBI Mother Overprotection	5.844	1	0.017	PBI Mother Overprotection	8.212	1	0.005				
OASIS	56.219	1	<0.001	OASIS	69.497	1	<0.001	OASIS	57.318	1	<0.001
				Gender	1.531	1	0.218				
Intercept	10.658	1	0.001	Intercept	0.941	1	0.333	Intercept	21.626	1	<0.001
Adjusted R^2	0.280			Adjusted R^2	0.358			Adjusted R^2	0.301		

DIF=Difficulty Identifying Feelings, DDF=Difficulty Describing Feelings, PBI=Parental Bonding Instrument, OASIS=Overall Anxiety Severity and Impairment Scale
[a]General Linear Model

Table 6. Multivariate analysis of the association of the Parental Bonding Instrument (PBI) Care and Overprotection scores with the 20-Item Toronto Alexithymia Scale (TAS-20) total and subscale scores in the paediatric sample

Model 1 (TAS-20)				Model 2 (DIF)				Model 3 (DDF)			
	F	df	P[a]		F	df	P[a]		F	df	P[a]
PBI Mother Care	9.906	1	0.002	PBI Mother Care	5.319	1	0.024	PBI Mother Care	9.278	1	0.003
PBI Mother Overprotection	0.020	1	0.887	PBI Mother Overprotection	0.659	1	0.420	PBI Mother Overprotection	1.829	1	0.181
PBI Father Care	3.498	1	0.066	PBI Father Care	3.317	1	0.073	PBI Father Care	5.428	1	0.023
PBI Father Overprotection	1.700	1	0.197	PBI Father Overprotection	0.619	1	0.434	PBI Father Overprotection	0.992	1	0.323
OASIS	11.617	1	0.001	OASIS	6.565	1	0.013	OASIS	7.601	1	0.007
Gender	0.579	1	0.449	Gender	6.631	1	0.012				
Intercept	11.122	1	0.001	Intercept	1.461	1	0.231	Intercept	2.055	1	0.156
Adjusted R^2	0.345			Adjusted R^2	0.272			Adjusted R^2	0.318		

DIF=Difficulty Identifying Feelings, DDF=Difficulty Describing Feelings, PBI=Parental Bonding Instrument, OASIS=Overall Anxiety Severity and Impairment Scale
[a]General Linear Model

DISCUSSION

First, a main finding in this study was that high alexithymic features were prevalent in adolescents entering either specialized mental healthcare (48.3%) or somatic care (19.7%). Second, low parental care was significantly related to alexithymic features in both patient groups. Additionally, high maternal overprotection had a significant association with alexithymic features in the adolescent psychiatry sample, whereas in the paediatric sample, parental overprotection was not significantly related to alexithymic features. To our knowledge, these associations including the three dimensions of alexithymic features have not been previously studied in these types of adolescent patient samples.

Alexithymia was more than twice as common among adolescent psychiatry patients as among paediatric patients (48.3% vs. 19.7%). In the adolescent psychiatry sample, the distribution of primary diagnoses reflected quite well a typical clinical profile, whereas musculoskeletal diseases and disorders were over-represented in the paediatric sample. Compared with previous studies of general adolescent populations, the prevalence of alexithymia in both samples was relatively high, particularly in the adolescent psychiatry sample. However, comparing the paediatric sample with the prevalence reported by Säkkinen et al. (2007) among Finnish 14-year-old adolescents (15.9%), the difference is relatively small (7). Owing to the lack of comparable studies in this age group, direct comparisons are difficult to make. Nevertheless, compared to adult studies, similar prevalence rates for alexithymia have been reported for adult patients with depression or an anxiety disorder (21,22). Interestingly, no significant gender differences in the prevalence of alexithymia were observed in either sample, which is consistent with findings from previous studies in adolescents (5,7).

Low maternal care was significantly associated with DDF scores in the adolescent psychiatry sample. In the paediatric sample, the maternal Care subscale score was linked to the TAS-20 total score and the DIF and DDF dimension scores. Overall, these findings are consistent with previous studies in adults demonstrating robust association between low maternal care and both the TAS-20 total score and its dimensions (35). Interestingly, in a previous study of Finnish adolescents, the association between parental care and alexithymia became non-significant after controlling for current social support (40). However, social support could not be controlled for in the present study. Comparing the two patient groups, the correlation

coefficients between parental and alexithymia were somewhat larger in the paediatric sample. However, in the multivariate analyses, maternal care explained approximately the same proportion of variance in both groups. Although alexithymic traits are clearly influenced by factors beyond parental care, the models including maternal care explained 27−35% of the variance in TAS-20 scores, indicating a medium to large effect size (56).

In the adolescent psychiatry sample, maternal overprotection was associated with both TAS-20 total scores and DIF scores. These findings are supported by the meta-analysis by Thorberg et al. (2011), which demonstrated associations between maternal overprotection and TAS-20, DIF and DDF scores, although these associations were weaker than those observed for maternal care (35). Furthermore, in a study of adolescents from the general population, the association between maternal overprotection and alexithymia was primarily attributable to the DIF and DDF dimensions (40). However, contrary to our expectations, no significant associations between maternal overprotection and alexithymic features were found in the paediatric sample. This was somewhat surprising, given that parental overprotection has been linked to, for example, functional somatic symptoms in adolescents (57). One possible explanation is the over-representation of musculoskeletal diseases and disorders in the sample. However, this interpretation remains speculative.

Paternal care showed no significant associations with TAS-20 scores in the adolescent psychiatry sample. However, low paternal care was significantly associated with higher DDF subscale scores in the paediatric sample. In a study by Mason et al. (2005), higher paternal Care subscale scores were associated with lower TAS-20, DIF and DDF scores in a sample of undergraduate students (58). Furthermore, a previous meta-analysis reported a weak but significant association between paternal Care scores and the TAS-20 total score, whereas associations with the TAS-20 dimensions were non-significant (35).

Taking into account the higher overall paternal Care scores in the paediatric sample, one of the main differences between the two groups appears to be the level of experienced paternal care. This difference may be related to the younger age of the paediatric sample and the fact that these adolescents more often lived with both biological parents. Due to the lack of comparable studies, this interpretation remains speculative. Nevertheless, the role of fathers in the development of alexithymic features during adolescence warrants further investigation. The important role of both mothers and fathers in adolescents' emotional and psychological development has also been emphasized in previous studies assessing alexithymia and parental bonding (41). It is also possible that paternal bonding has specific associations with alexithymic features. In a previous study of adolescents with mental health disorders, those who perceived their fathers as neglectful reported greater difficulties with emotions, which may adversely affect psychiatric outcomes (59).

Associations between EOT scores and the PBI subscales were generally weak, which is consistent with findings from previous studies (40,58). This may reflect the fact that the EOT subscale has repeatedly demonstrated lower reliability and internal consistency than the other dimensions of the TAS-20 questionnaire (49,50). In the present study, the internal consistency of the EOT dimension was also questionable.

In addition to the novel context, a strength of this study was the opportunity to investigate these phenomena in two distinct patient populations. In particular, the paediatric sample was a completely new context for this type of assessment. The attempt to recruit samples that reflect actual patients entering specialized healthcare is also a strength. However, this approach comes with certain limitations, as some selection bias was unavoidable. OASIS scores were strongly associated with TAS-20 scores, particularly in the adolescent psychiatry sample. Given the previously reported strong association between alexithymia and anxiety (16), this is not surprising. Although anxiety was beyond the scope of the present study, controlling for current anxiety symptoms can be considered an additional strength. Nevertheless, some limitations should be acknowledged. Data on both alexithymia and parental bonding were collected solely through self-report questionnaires. Thus, parental care and overprotection reflect participants' subjective experiences rather than objective assessment. Furthermore, the psychometric properties of the TAS-20 in younger adolescents have been questioned. However, the confirmatory factor analysis conducted as a part of the present study supported its psychometric properties, at least in this sample. Another limitation is the relatively small sample size, particularly in the paediatric group.

To conclude, the findings of the present study suggest that alexithymia is common in adolescents entering specialized healthcare. In adult patients, alexithymia has been associated with poorer treatment outcomes in mental disorders (11,60). Therefore, although routine screening for alexithymia in all adolescent patients may not be warranted, considering alexithymic features when evaluating suitability for psychotherapy or inadequate treatment response may be beneficial. Regarding parental bonding, the present findings are consistent with earlier studies and suggest that the associations between alexithymia and parental bonding in adolescents are largely similar to those observed in adults. Furthermore, the links between alexithymia and both mental and somatic illnesses

should be investigated in adolescent patient samples, not only in non-clinical populations. It is plausible that, as in adults, alexithymic features are also related to illness trajectories and recovery in adolescents.

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Declaration of interest

None

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