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ORIGINAL

Alexithymia in juvenile primary headache sufferers: a pilot study

Michela Gatta · Elisabetta Canetta · Maria Zordan · Andrea Spoto · Emilia Ferruzza · Irene Manco · Alessandra Addis · Lara Dal Zotto · Irene Toldo · Stefano Sartori · Pier Antonio Battistella

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Abstract Starting in the 1990s, there has been accumulating evidence of alexithymic characteristics in adult patients with primary headache. Little research has been conducted, however, on the relationship between alexithymia and primary headache in developmental age. In their research on alexithymia in the formative years, the authors identified one of the most promising prospects for research, as discussed here. The aim of this study was to verify whether there is: (a) a link between tension-type headache and alexithymia in childhood and early adolescence; and (b) a correlation between alexithymia in children/preadolescents and their mothers. This study was based on an experimental group of 32 patients (26 females and 6 males, aged from 8 to 15 years, mean 11.2 ± 2.0) suffering from tension-type headache and 32 control subjects (26 females and 6 males, aged from 8 to 15 years, mean 11.8 ± 1.6). Tension-type headache was diagnosed by applying the International Headache Classification (ICHD-II, 2004). The alexithymic construct was measured using an Italian version of the Alexithymia Questionnaire for Children in the case of the juvenile patients and the Toronto Alexithymia Scale (TAS-20) for their mothers. Higher rates of alexithymia were observed in the children/preadolescents in the experimental group (EG) than in the control group; in the EG there was no significant correlation between the alexithymia rates in the children/preadolescents and in their mothers.

Keywords Alexithymia · Toronto alexithymia scale · Primary headache · Tension-type headache · Children and adolescents

M. Gatta (✉) · E. Canetta · M. Zordan · L. Dal Zotto · I. Toldo · S. Sartori · P. A. Battistella
Paediatrics Department, University of Padua, Padua, Italy
e-mail: michela.gatta@unipd.it

A. Spoto
Department of General Psychology, University of Padua, Padua, Italy

E. Ferruzza
Department of Developmental Psychology and Socialization, University of Padua, Padua, Italy

I. Manco · A. Addis
Faculty of Psychology, University of Padua, Padua, Italy

Introduction

Primary headaches in developmental age

The World Health Organization has recognized primary headache as one of the twenty most significant causes of disability and it has begun to promote a global campaign to reduce the burden of headache worldwide [1].

Investigations on cases in the infant–youth age range confirm that headache is a common phenomenon. It represents the ailment most frequently reported to general pediatricians and is the primary reason for neurological consultation [2]. The diagnostic tool used to identify the various types of headache was the 2nd edition of the International Classification of Headache Disorders (ICHD-II) [3]. A prevalence ranging between 4 and 20% of headaches in developmental age reportedly involves primary forms [4, 5], which increase when children start school [6]. The prevalence continues to increase during school-going years, with no substantial differences between males and females [7], registering a peak between 12- and 14-years-old [8]. With puberty, there is a differentiation between the sexes for migraine patients, with an

increase in the proportion of females [9, 10]. Data on the prevalence of tension-type headaches (TTHs) in pediatric age can vary considerably due to differences in the classification criteria used in recent decades.

After the earliest epidemiological data on a Scandinavian population reported a prevalence of 4% for migraine and 6.8% for "frequent non-migrainous headaches" [4], subsequent data on primary headache have reported rates varying between 11 and 73% [11–15].

Recent studies on a Scandinavian population of pediatric subjects set the prevalence of TTH at 10–12% [16, 17], with a tendency to increase in adolescence [12, 17]. A large study recently conducted on a pediatric population (involving 5,562 subjects) showed that 49% suffered from recurrent headaches, which were more often TTHs (24.7%) than migraines (10.4%) [18].

A study on Turkish adolescents also demonstrated a higher prevalence of frequent episodic TTHs (25.9%) than of migraines (14.5%) [19].

In a recent estimate, the overall prevalence of TTH was estimated at around 10–25% [20]. As concerns chronic TTH, the percentages for the general pediatric population range between 0.9% (ages 5–17) [21] and 1.5% (ages 8–16) [18].

One Swedish epidemiological study on a school-aged population of nearly 2,000 subjects between the age of 7 and 15 years recorded TTH in 9.8% of the subjects, with a trend that increased with age [17]. A study conducted in the same year on a Norwegian population of pediatric subjects found an even higher prevalence of TTH (18%), possibly attributable to the older age of the sample (12–18 year-olds), though the same diagnostic criteria were used as in the Swedish study (ICHD-I, 1988) [22], and there was a higher incidence for the female sex [15]. TTH prevalence estimates for (18.5%) similar to those of the Norwegian study were reported by a large German study conducted using the new diagnostic criteria (ICHD-II) [23].

The alexithymia construct

Between the 1970s and the 1990s, the thinking substantially abandoned the interpretation of the alexithymic construct as a defense mechanism relating to neurotic conflicts [24, 25], and confirmed the hypothesis of an affective deficit [26, 27]. Various studies have investigated the relationship between alexithymia and attachment, since affect regulation and quality of attachment are closely linked according to attachment theorists. Taylor said that the development of affects and the capacity to regulate them is facilitated in very early infancy by the experience of sharing affects and reflecting emotional expressions with the primary caregiver, and subsequently by the playful interactions in which children learn how to name and express sentiments [28]. Crittenden's theories [29] are also particularly relevant to the alexithymia construct because they provide an original and interesting conceptualization of the developmental importance of very early relations of attachment, when subjects learn to regulate not only their interpersonal functioning, but also their mental and emotive functioning. Thanks to a secure bond of attachment, and to a good sensitivity, responsiveness and "tuning" on the part of the caregiver, children learn to use cognitive assessments to modulate affects, and affects to enrich cognition [29]. As a personality trait associated with deficits in the cognitive processing and regulation of affects, alexithymia has thus been seen as correlating with insecure attachment. Several studies found a significant association between low alexithymia and secure attachment style [30, 31], and a relationship between "ambivalent clinging", "ambivalent withdrawing" and insecure attachment styles and more marked alexithymia features [32, 33]. Despite finding that perceived parenting did seem significant in the development of alexithymia (optimal parenting by one parent may protect against the onset of alexithymia when the other parent's parenting is perceived as sub-optimal), other Authors claimed that it other factors—besides parental care—are likely to play an important part in the development of an adequate affect regulation, e.g. more severe traumatic experiences, such as physical and sexual abuse, and childhood adversities [34, 35].

Various studies have looked into the possibility of an etiology linked to people's socio-economic and cultural differences [36–39]. While it is true that the verbal expression of emotion is partly influenced by prevailing cultural attitudes and by the possibilities or limitations inherent in a given language, it would seem unfeasible to attribute the poverty of imaginative processes characteristic of alexithymia to cultural influences alone [40]. According to recent research on the factors contributing to the development of alexithymia and the nature of its relation with trait negative and positive affectivity, the different facets of alexithymia are influenced by family-related factors. In particular, it was found that shared environmental factors contributed to the difficulty of identifying and communicating emotions, while shared genetic factors contributed to externally oriented thinking [41, 42]. Another study that examined the association between the alexithymia characteristics of mothers and their children confirmed a likely transmission of alexithymia and related factors from mothers to their children [43].

As for the nature of the construct, Taylor et al. [40] emphasized that alexithymia cannot be considered a transient state secondary to stressful conditions, or a phenomenon in the "all or nothing" category. It is a dimensional construct, i.e. a stable personality trait with a normal distribution in the population. In line with this hypothesis, the

currently preferred concept of alexithymia is as a transnosographic clinical dimension extending along a continuum proceeding from the normal to the pathological according to the level of difficulty of comprehending and communicating emotional experiences [44]. Since this construct was thus defined, various studies have identified multiple features of the alexithymic subject, and it is generally agreed that four characteristics can be considered fundamental: (a) difficulty in discriminating between one emotion and another, with difficulty in distinguishing somatic states from emotions; (b) difficulty in communicating one's own emotions to others; (c) restrictedness of imaginative processes, with a deficient or absent activity of the imaginative faculty; and (d) an externally oriented cognitive style [45].

With rare exceptions, the alexithymic dimension has only been studied in adults. It is well known that poor emotion identifying skills coincide with poor emotion regulating strategies in adults [46]. A recent study on adolescents that also considered their emotion identifying capacities showed that a scarce ability to identify emotions predicted an increase in fear, and decreases in positive affect and social support [47]. Another recent study investigating the relationship between alexithymia, depressive symptoms and self-reported self-image profiles in seven thousand 13–18 year olds demonstrated that, regardless of sex, the alexithymic youths reported more internalizing and externalizing problems than the others, indicating that alexithymic adolescents are at high risk of mental disorder and need to receive treatment [48]. Concerning the formative years, Rieffe et al. [49] support the hypothesis that alexithymia has its own particular significance in this age range, which can be evaluated and measured; in the absence of an ad hoc tool, they developed the Alexithymia Questionnaire for Children, after obtaining the approval of the Canadian authorities and in line with the Toronto Alexithymia Scale (TAS-20) [45]. The result is that the alexithymic construct highlights children's different emotive skills and can predict the somatic symptoms reported by the subjects. Studies on the Northern Finland Birth Cohort in 1986 investigated the prevalence of alexithymia in a sample of Finnish adolescents and confirmed the validity of the TAS-20 for this age group too [50, 51]. The prevalence of alexithymia tended towards the corresponding values in adult age, but with no gender-related differences in its distribution (in adults, the alexithymic trait is more prevalent in males). The decline in the rate of alexithymia recorded from early to mid adolescence is consistent with the gradually improving cognitive skills relating to the processing of emotions [50]. It has also emerged that disadvantaged living conditions (a mother's low education, broken childhood home, living in a rural area) are associated with alexithymia: in a way, this association in developmental age resembles the association of alexithymia with poor social conditions in studies on adults [51]. Another, more recent Korean study examined the factor structure and internal consistency of the Korean version of the 20-item Toronto Alexithymia Scale (TAS-20K) in 290 normal adolescents, finding that the TAS-20K seemed appropriate for assessing alexithymia in such a sample [52]. As for Italian young people, it is worth mentioning that Di Trani et al. [53] decided to develop an Italian Alexithymia Questionnaire for Children, based on the tool proposed by Rieffe et al. [49], and to examine its factor structure and reliability [53]. The English version of the questionnaire was translated into Italian and administered to 576 children recruited from primary and secondary schools (mean age 10.78, SD 1.67; 357 males and 219 females). As concerns its reliability, the Cronbach alpha indicated an adequate internal consistency, and Pearson's correlations between the total score and the various factors were statistically significant.

Tension-type headache and alexithymia: how are they related?

Certain evidences are available from the early 1990s points to the presence of alexithymic traits in adult patients suffering from primary headache.

Wise et al. [54] administered the Illness Behavior Questionnaire (IBQ) and the TAS to 100 patients with primary headache, finding higher values among the primary headache patients than in a control group. On the other hand, no significant differences in levels of alexithymia, depression, or anxiety emerged between tension-type headache patients and migraine sufferers.

In a case–control study conducted repeatedly in adult headache patients to investigate the association between alexithymia and assertiveness (i.e. the capacity to express personal sentiments and opinions explicitly and appropriately), Yuecel et al. [55] administered various psychometric tests and the TAS. Compared to controls, the primary headache patients (especially those with chronic TTH) scored significantly higher for depression (Beck Depression Inventory, BDI), frequency of negative automatic thoughts connected with depression (Automatic Thoughts Scale, ATS), and alexithymia (Toronto Alexithymia Scale, TAS), and lower for assertiveness (Rathus Assertiveness Schedule, RAS). Another study involving adults with migraine showed that alexithymia is frequent in migraine patients and it is associated with anxiety [56].

Alexithymia might therefore be an important psychological dimension in primary headache patients.

As for developmental age, there are too few studies correlating alexithymia with primary headache. In their work to review the construct, when they were studying alexithymia of developmental age, Taylor and Bagby [46]

identified one of the most interesting prospects for future developments of the paradigm, which is analyzed in the present paper.

Aims

By means of a case–control study, we investigated pediatric patients TTH for any signs of alexithymic traits. Assuming that the construct might depend on the relationship with the primary caregiver, the alexithymic dimension (significant in terms of affective competence) was also investigated in the patients' mothers, comparing the scores obtained by mothers in the tests measuring the alexithymic construct with those of their children.

We therefore had two objectives:

- to establish whether a statistically significant difference existed between the alexithymia values in our experimental group (EG) (children and preadolescents with tension-type headache) and those of a control group (CG) (healthy children and preadolescents without primary headache); and
- to seek any statistically significant correlation between the scores obtained by the children/preadolescents on the Alexithymia Questionnaire for Children and those obtained by their mothers on the TAS-20.

Procedures

Patients and methods

Experimental group (EG)

This study involved 32 subjects with tension-type headache (26 females and 6 males) aged between 8 and 15 years (mean 11.2 ± 2.0; SD = 2.0), attending the Center for the Diagnosis and Treatment of Juvenile Headache at the Pediatrics Department (Salus Pueri), University of Padua, between December 2008 and August 2009.

Inclusion criteria were episodic or chronic TTH diagnosed at least 6 months previously, without pharmacological prophylaxis. The diagnosis was based on the ICHD-II criteria [3], and 23 subjects were identified as having frequent episodic TTH, while 9 had chronic TTH.

Control group (CG)

The control group consisted of 32 subjects, 26 females and 6 males, matched for age and gender with members of the EG (8–15 years, mean 11.8 ± 1.6; SD = 1.6). They were recruited from among the patients of three medical practitioners in Padua who cooperated in the study, during a routine pediatric check-up at the practitioners' outpatient office. Discriminating criteria for inclusion were no medical history of headache or organic diseases.

None of the mothers of the subjects in either group suffered from primary headache.

All the parents and/or their children in the EG and CG gave their informed consent prior to their inclusion in the study.

A semi-structured clinical interview was conducted with the mother to gather information on their clinical-medical history (including their family, physiological and both recent and long-term pathological medical history, particularly focusing on any history of headache).

After a specialist visit performed by a child and adolescent neuropsychiatrist expert in the field of headache in developmental age, new data were collected as follows: while the child/preadolescent answered the Alexithymia Questionnaire for Children, the mother was administered the semi-structured medical history interview and then answered the TAS-20.

The Alexithymia Questionnaire for Children [49], using the validated Italian version [53], was administered to all subjects in the EG and CG. This 20-item self-rating questionnaire measures the following factors: F1, difficulty identifying feelings; F2, difficulty describing feelings; and F3, externally oriented thinking. The results from the questionnaire were used to classify the subjects into three groups: non-alexithymic (score < 51); borderline (score between 51 and 60); and alexithymic (score $= >61$).

The mothers answered the Toronto Alexithymia Scale, TAS-20 [57], Italian version [58], which is a self-rating questionnaire validated for assessing alexithymia in adults. Like the previous scale, it measures the factors F1, F2, and F3 to classify subjects as non-alexithymic, borderline, or alexithymic.

Statistical analysis

Data were analyzed using SPSS (Statistical Package for the Social Sciences) rel. 14. The diagnostic distinction between frequent episodic TTH and chronic TTH was only considered in the descriptive analysis of the data, not for statistical processing purposes, because the results would have been less effective due to the relatively small number of subjects in the two groups. The *t* test was used for inferential analysis of the scores obtained on the Alexithymia Questionnaire for Children and the TAS-20, applied in this case to seek any statistically significant difference in the level of alexithymia between the samples considered. A correlation test was also performed on paired samples to establish the nature of any correlation between the alexithymia levels in the children/preadolescents, and those of their mothers. Finally, a variation analysis was performed

for factor F3, and for the total scores obtained on the TAS-20.

Results

Concerning the first objective, 44% of the EG cases and 9% of the CG were classified as alexithymic; only 22% of the EG were classified as non-alexithymic, as opposed to 50% of the CG; and 34% of the EG and 41% of the CG were borderline.

The scores obtained by the EG on the Alexithymia Questionnaire for Children are consistent with the initial diagnosis: all 9 patients with chronic TTH had significant scores for alexithymia, while only 8 (35%) of the 23 patients with frequent episodic TTH were classed as alexithymic, 8 (35%) being borderline and 7 (30%) non-alexithymic.

Table 1 shows the mean scores obtained on the subscale of overall point values for the Alexithymia Questionnaire for Children, as well as the *t* test results for independent samples used in the comparison between the two groups of children.

It is worth noting the significant difference between the means of the total scores for the two groups. When the subscales were considered separately (F1: difficulty identifying feelings; F2: difficulty describing feelings; F3: externally oriented thinking), significant differences emerged not only for F1 but also for F3. In both cases, the EG had higher scores than the CG.

In the light of the above data, we can say that there was evidence of an association between tension-type headache and alexithymia in our EG.

When the levels of alexithymia found in the mothers of the two groups were compared, the percentage of mothers classified as alexithymic was the same (6%). There was a difference in the percentages of non-alexithymic subjects, but it was not statistically significant (85% for the EG mothers, 66% for the CG mothers), while 9% of the mothers in the clinical sample and 28% of those in the control sample were classed as borderline.

Our second aim was to seek any correlation between the scores obtained by the patients and controls on the Alexithymia Questionnaire for Children and those obtained by their mothers on the TAS-20.

In the data analysis for the EG, the *t* test for paired samples revealed a statistically significant difference by comparison with the CG in the scores obtained for all three subscales (F1: difficulty identifying feelings; F2: difficulty describing feelings; F3: externally oriented thinking) and in the overall level of alexithymia.

The differences in the pairs of scores for mother and child were much lower in the CG than in the EG. Closer analysis showed a greater symmetry between the CG and EG in the scores for F1 and F2, while for F3 they differed more noticeably. In the CG, the *t* test for paired samples showed a statistically significant difference in the scores for F3 and overall alexithymia level.

The analysis of the correlation between the scores obtained by the two groups of children on the Alexithymia Questionnaire for Children and their mothers scores on the TAS-20 are given in Table 2.

Our results do not support the hypothesis that a child's alexithymia corresponds to a limited emotive competence (in the alexithymic sense) in the child's mother.

Below, we summarize some of the significant elements that emerged in the four groups considered (the children/preadolescents in the EG and the CG, and their respective mothers).

F3 (externally oriented thinking) has a determining role in discriminating between:

- children/preadolescents in the EG and those in the CG;
- children/preadolescents in the EG and their mothers;
- children/preadolescents in the CG and their mothers;

whereas F3 does not discriminate between:

- mothers of children/preadolescents in the two groups EG and CG.

Table 1 Comparison of mean point values obtained for individual factors and overall on the Alexithymia Questionnaire for Children for the two groups considered (EG vs. CG)

Factors	Experimental group (EG) mean ± SD	Control group (CG) mean ± SD	*t* test	
			df	*t*
F1	18.56 ± 5.58	15.03 ± 5.32	62	−2.59*
F2	15.28 ± 4.72	13.94 ± 4.08	62	−1.22
F3	24.28 ± 4.20	20.88 ± 4.19	62	−3.25*
TAS, Total	58.13 ± 10.64	49.84 ± 8.63	62	−3.42*

* $p < 0.05$

Table 2 Mother–child correlations for the three F factors in the two groups considered (EG vs. CG)

Couples	*r* (Pearson's PMCC)	
	Experimental group (EG)	Control group (CG)
F1B, F1M	0.32	0.17
F2B, F2M	0.02	0.18
F3B, F3M	−0.07	0.24
TotB, TotM	−0.26	0.38*

* $p < 0.05$

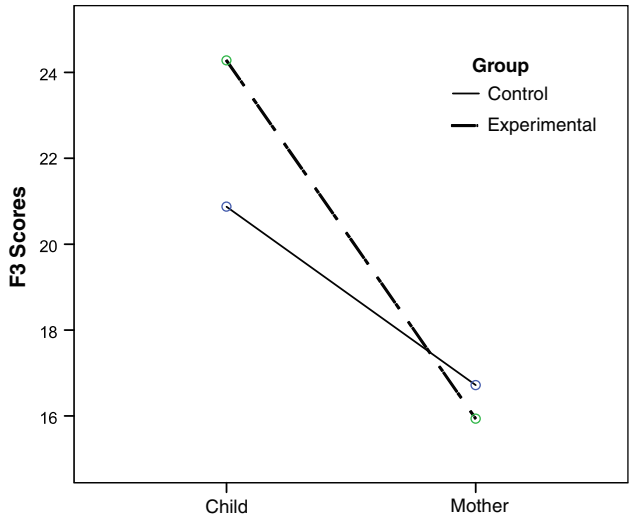

Fig. 1 Point values for factor F3 for the four groups considered

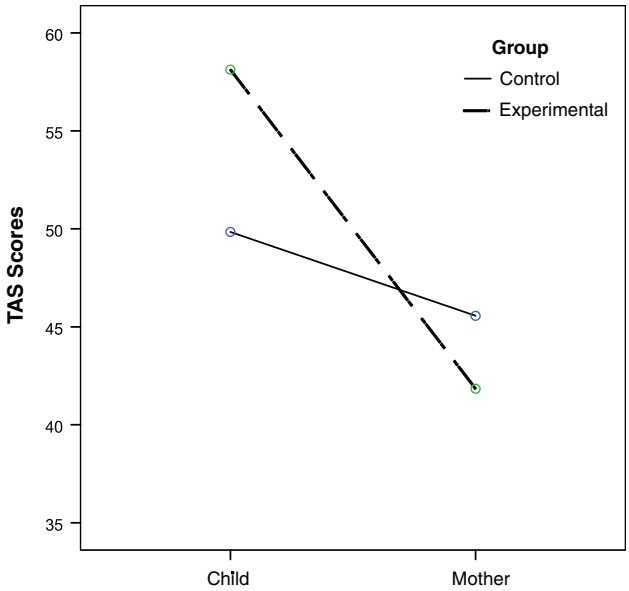

Fig. 2 Total level of alexithymia for the four groups considered

When the EG and CG children's mothers' mean scores for F3 were compared (in the same way as for the children in the two groups), we found a greater difference between the two groups of children (EG vs. CG) than between the two groups of their mothers.

Figure 1 shows the scores of F3 for all four groups (EG and CG children and their mothers).

A general linear model (GLM) was adopted, using mixed models (within factor: mother–child; between factor: EG–CG) to test the effects between subjects and the contrasts within subjects, and a significant interaction emerged between the two factors considered in the model ($F_{(1,62)} = 7.23$; $p < 0.01$). Concerning the scores for F3, the result indicates that children with higher scores for the F3 subscale were associated with mothers with lower scores, and vice versa. We also found a significant effect of the within factor ($F_{(1,62)} = 64.38$; $p < 0.01$); in other words, we generally found higher scores for the children than for their mothers.

The overall alexithymia level had a determining role in discriminating between:

- children/preadolescents in the EG and those in the CG;
- children/preadolescents in the EG and their mothers;
- children/preadolescents in the CG and their mothers;

whereas it did not discriminate between:

- mothers of children in the EG and mothers of children in the CG.

Figure 2 shows the alexithymia scores for the four groups considered.

Here again, an analysis with the mixed-model GLM showed a very similar situation to the case of F3, i.e. a significant interaction between the factors ($F_{(1,62)} = 16.18$; $p < 0.01$), and a significant effect of the within factor ($F_{(1,62)} = 47.50$; $p < 0.01$). In other words, the children generally scored higher than their mothers, and children with the highest scores tended to be associated with mothers with the lowest scores.

In short, the statistical analysis on the data collected showed that:

- the children/preadolescents in the EG had significantly higher levels of alexithymia than those in the CG;
- there were no statistically significant differences between the levels of alexithymia in the two groups of mothers;
- the levels of alexithymia in both groups of children/preadolescents exceeded those of their mothers;
- in the EG, there was no correlation between the levels of alexithymia in the children/preadolescents and their mothers; in the CG, there was a modest correlation for the overall alexithymia score.

Discussion

The first significant finding of our study is the association found between TTH and alexithymia in the EG. A statistically significant difference emerged between the alexithymia scores in the two groups of children: the clinical sample (children/preadolescents with tension-type headache) scored higher for factor F1 (difficulty identifying feelings) and factor F3 (externally oriented cognitive style).

Although few publications provide data on the association between TTH and alexithymia in juvenile patients, our

findings are nonetheless consistent with evidence from studies on adults reporting alexithymic traits in patients with TTH. Wise et al. [54] compared 100 adult patients with migraine or TTH with a group of healthy controls and found higher alexithymia scores in the former, with no differences between patients with TTH and those with migraine. A study conducted by Yuecel et al. [55] on 105 individuals aged 18–65 years suffering from episodic or chronic TTH showed higher levels of alexithymia in the clinical sample than in controls without headache, again with no differences in the level of alexithymia between cases of episodic versus chronic TTH.

Our finding, pathological scores in the Alexithymia Questionnaire for Children (~78% alexithymic, ~22% borderline) in all cases of chronic TTH, suggests that the severity of alexithymia may differ as a function of the frequency of headache episodes. The hypothesis is in line with Demjen et al. [59], who said that affective distress and difficulty in expressing feelings correlate with the "dimensions" of headache, such as intensity and duration of attacks. This reminds us of a recent study investigating alexithymia that compared children with numerous somatic complaints with cases with few somatic complaints: the former had difficulty communicating negative internal states and experiencing indefinable internal states, as well as revealing greater intensities of fear and sadness [60].

The two factors for which a statistically significant difference emerged between our two groups of children/preadolescents are F1 and F3, so presumably the alexithymic dimension of the headache cases in our sample is basically manifested in two main aspects, i.e. difficulty in recognizing their own feelings (factor F1) and a tendency for operatory thought, which indicates a greater concentration on acting out (F3).

The former difficulty (F1) may be inherent in a limited capacity to distinguish somatic states from emotive states [41]; the latter (F3) could have to do with the subject focusing on the "somatic" symptom, and thereby reinforcing it [61]. The characteristics observed in our clinical sample would confirm the impression that alexithymia creates a condition in which feeling (be it emotive or somatic), when poorly discriminated, can undergo a process of reinforcement and become a symptom of disease.

It is noteworthy that the number of borderline subjects accounted for over a third of the sample in both the EG and the CG: this seems to be consistent with Cotton's suggestion [62] that the process of affective regulation, and the cognitive maturation of an "emotive competency" in particular, is still incomplete in developmental age. The cognitive-developmental model of emotions developed by Lane and Schwartz [63] places alexithymic individuals in the early, "sensorimotor" stages of organizing and understanding emotional experiences, which are perceived essentially on a level of bodily sensations and tendencies to take action; the "psychological" experience of the emotions is limited and not very sophisticated, and the verbal descriptions are often stereotyped. It is easy to imagine the above as a gradual process that develops physiologically as the child grows up and moves on from infancy to childhood and from latency to adolescence, when the operatory thinking—first concrete, then abstract—facilitates (among other things) the awareness of the complexity and multidimensionality of one's own emotional experiences. In this sense, we can assume that the prevalence of alexithymic individuals in our CG—which was statistically lower than in the EG, but nonetheless impressive, involving half of the sample—represents a physiological trend in the developmental curve relating to the acquisition of an "emotional ABC" with the ability to identify, explore and express one's own internal experiences. On the other hand, the unequivocal evidence of a statistically significant difference between the EG and the CG in the scores on the Alexithymia Questionnaire for Children bears witness to the feasibility of measuring alexithymia in children and preadolescents, as demonstrated by the works by Rieffe et al. [49].

A second significant outcome of our research consists in the absence of a correlation between the scores obtained by the EG children/preadolescents on the Alexithymia Questionnaire for Children and those obtained by their mothers on the TAS-20. According to the researchers in the Toronto Group [40], alexithymia should be considered a dimensional construct, meaning a stable personality trait, not a transient state in response to emotionally intolerable events, as McDougall [64] and Krystal [65] have claimed. In the view of Taylor et al. [40, 46], alexithymia reflects a disturbance within the context of affective regulation, i.e. in the capacity to cognitively make use of and regulate feelings; such a skill ought to be acquired in the early years of development and, in this sense, it has a role in determining the quality of the relationship with the primary caregiver. This is the theoretical premise behind the hypothesis that a child's alexithymia may correspond to a mother's deficient emotive competence.

Our results (the absence of a significant correlation between the alexithymia levels in the children in our EG and their mothers) do not support the above hypothesis. Our clinical sample of children/preadolescents with headache had significantly higher levels of alexithymia than controls, but their mothers were not alexithymic—they even had slightly lower alexithymia levels than in the mothers of the children in our CG. This finding fails to confirm studies reporting that alexithymia is transmitted from mother to child [43] or claiming genetic grounds for alexithymia [41, 42]. Moreover, since we found a mother–child correlation of the alexithymic construct in our CG

too, it would be reasonable to doubt whether tension headache really influences this correlation in our EG, becoming an important factor in the child's cognitive-affective development and in the relationship between the child and the primary caregiver.

Whatever this data may confirm, the impression that alexithymia is not an "all or nothing" phenomenon, but rather a dimensional construct with a normal distribution throughout the population.

Conclusions

This study has an element of novelty because there have been few studies on the relationship between TTH and alexithymia in adults, and even fewer studies on alexithymia in developmental age, while studies investigating the relationship between TTH and alexithymia in the young are completely lacking.

What emerged from our study is consistent with the theoretical foundations and evidence from other studies, i.e. alexithymia should not be underestimated when dealing with headache patients. The innovative element, despite the limited size of our sample, lies in that these results confirm the hypothesis of an association between TTH and alexithymia in developmental age too.

This association is consistent with the interpretation of somatic disturbances according to the paradigm of emotional dysregulation, which is gaining more and more consent in current psychosomatic research [26, 36, 40]. Alexithymia would thus represent a risk factor for the onset of medical or psychiatric, organic or functional disorders [47, 48, 60].

The Alexithymia Questionnaire for Children [49] merits one further consideration: it is the only tool for measuring the alexithymic construct in developmental age. The questionnaire proved reliable in assessing alexithymia in this age bracket, though further confirmation is needed (the present study may thus contribute towards its validation as a diagnostic tool—especially in the Italian version).

The results of this study cannot be taken as final, of course, given that the issue has been little explored to date, but it can serve as a starting point for further research. In the light of our findings, future research in this context might involve: (a) larger samples, to confirm association between TTH and alexithymia; (b) larger sample populations would also enable alexithymia to be assessed in relation to the diagnosis of episodic TTH or chronic TTH, identifying any correlation between level of alexithymia and frequency of headache episodes; (c) a long-term follow-up, to establish whether and how TTH and alexithymia change over time; and lastly, (d) this type of research ought to include other forms of primary headache (particularly migraine), although a sample of adults revealed no differences between TTH and migraine patients in terms of the prevalence or severity of alexithymia [54].

In conclusion, the findings of the present research should also be seen as an opportunity to take a translational approach to children and preadolescents with TTH. Moreover, reference to factors that are not strictly organic (these words aim to emphasize the primarily emotional nature of the construct, not to mean that it has no biological and particularly genetic correlates [41–43, 66])—such as the psychological dimension—in contextualizing and managing TTH in developmental age should be considered important, even if this does not mean relying on a causal (exclusively psychological) interpretation of the headache as a disorder; instead, these considerations point to an opportunity to take a holistic and multidisciplinary approach to the problem.

Conflict of interest None.

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