

Headache and alexithymia in children and adolescents: what is the connection?

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Introduction on Primary Headache

Primary headaches are the most frequent complaints among the pediatric population with migraine and tension type headache (TTH) being the most common type. This disorder causes individual suffering and impairments in quality of life, daily activities ([Dyb et al., 2015](#)), school attendance ([Rousseau-Salvador et al., 2014](#)) and a variety of serious family issues ([Wöber-Bingöl, 2013](#)). Moreover, primary headache can be associated with several comorbid conditions which may worsen headache symptomatology, prognosis, therapeutic selection and post- therapeutic outcomes ([Mark, 2015](#)). In the pediatric population, tension type headache, and migraine are commonly associated with various diseases. For instance, psychiatric and neurological comorbidity, in particular sleep disorders, anxiety and depression, epilepsy and ADHD ([Bellini et al., 2013](#)). It has also been shown an association with medical disorders such as atopy, cardiovascular disease, especially ischemic stroke and Patent Foramen Ovale (PFO) ([Bellini et al., 2013](#)). In some studies, it has been shown that children with migraine had significantly higher levels of internalizing and somatic symptoms, as well as social and family problems relative to those without headache and had higher levels of somatic symptoms than children with tension-type headache ([Anttila et al., 2004](#) ; [Arruda and Bigal, 2012](#)). In recent years, alexithymia has been studied among the emotional disturbances associated with somatic symptoms including primary headache, and there are some different opinions about this relationship.

Alexithymia Construct

Alexithymia has also been recognized to be associated with several somatic illnesses and mental disorders. The term alexithymia was coined by Sifneos in 1973 ([Sifneos, 1973](#)) (from the Greek; a = lack, lexis = word, thymos emotion), concerning a cognitive-affective disturbance that affects the way individuals experience and express their emotions, internal states and feelings ([Taylor, 1984](#)). There is a reduced ability to identify and describe feelings, a limited imagination, and a concrete, externally- oriented way of thinking. Recently, it has been proposed a two-dimensional alexithymia. The affective dimension refers to the level of subjective emotional experience and comprises of a reduced ability to experience emotional feelings (emotionalizing factor), and diminished imaginative capabilities (fantasizing factor) ([Vorst and Bermond, 2001](#) ; [Koelen et al., 2015](#)). The cognitive dimension refers to the more verbal-explicit aspects, such as the inability to verbalize emotions and to differentiate between emotions, as well as between emotions and somatic sensations and the presence of an “externally oriented thinking” style ([Bermond et al., 2010](#) ; [Goerlich-Dobre et al., 2014](#)). Many studies have highlighted the association between alexithymic traits and psychiatric diseases. Most of them have found a positive association with internalizing disorders such as depression and anxiety traits ([Leweke et al., 2012](#) ; [Scimeca et al., 2014](#) ; [Li et al., 2015](#)). Additionally, alexithymia is co-present with eating ([Lulé et al., 2014](#)), behavioral disorders (e. g., severe disruptive behavior) ([Manninen et al., 2011](#)) and personality disorders such as borderline personality ([Loas et al., 2012](#)). Other studies focused on the association between alexithymia and

mother's little or lack of education and broken family, disadvantageous living conditions in childhood ([Joukamaa et al., 2007](#)) and insecure attachment strategies ([Besharat and Khajavi, 2013](#) ; [Koelen et al., 2015](#)). Finally, some studies have noticed that children with recurrent pain disorders (i. e., migraine, tension type headache, skeletal muscle pain, abdominal pain) compared to healthy controls, show higher level of alexithymic features ([Allen et al., 2011](#) ; [Cerutti et al., 2016](#)). For example, in one study conducted by [Burba et al. \(2006\)](#) , adolescents with somatoform disorder had higher levels of alexithymia and anxiety than healthy adolescent control subjects.

Relationship between Alexithymia and Primary Headache in Children and Adolescents: What We Know and What We Can Hypothesize?

There are a few studies devoted to the investigation of the possible link between headache and alexithymia in adults ([De Andrade et al., 2013](#)), and even fewer on children and adolescent populations. For example, it has been observed that adults with migraine or TTH had a higher alexithymia level, compared to healthy controls ([Wise et al., 1994](#)). Furthermore, there would seem to be no difference between the severity of alexithymia among the cases of experiencing episodic vs. chronic TTH ([Yücel et al., 2002](#)). The association between alexithymia and primary headache in children and adolescence is not well-known yet. Some authors have tried to study the phenomenon and provide some hypotheses. In a pilot study conducted by [Gatta et al. \(2011\)](#) , the aim was to analyse alexithymic features in children with primary headache (both TTH and migraine). They found a significant association between TTH and alexithymia in the experimental group.

Children with TTH had major alexithymic problems compared to children with migraine and the control group. Two dimensions were particularly compromised in children with headache: recognizing their own feelings and tendency for operatory thought. On account of these results, the Authors supposed alexithymia to create a condition in which feelings or emotions (emotive or somatic), when not distinguished, may undergo a process of reinforcement and become a symptom of disease. Moreover, there were some children with high level of alexithymia in their control group and the authors suggested that they may still be in a developmental phase also regarding emotional recognition and awareness, in accordance with the Lane and Schwartz ([Lane and Schwartz, 1987](#)) cognitive-developmental model of emotions. In a more recent study, [Gatta et al. \(2015\)](#) investigated alexithymic features in children and adolescents with primary headache (both migraine and tension type headache) and in their mothers, in order to examine the possibility of a relationship between headache and emotional regulation, in particular alexithymia. They have confirmed their prior results: a significant relation between TTH and alexithymia was found, but not between Migraine and alexithymia. They assumed that the differences between TTH and migraine may be due to different pathogenesis of the two disorders. Genetic factors may underline the etiology of migraine more than TTH, while TTH has a more complex multifactorial pathogenesis, influenced also by the familial and social environment. In fact, primary headache is more common in families with a history of psychological disorders ([Galli et al., 2009](#)). Lastly, their results partially support the hypothesis that alexithymia in a child may correspond to a similar kind of emotional

dysregulation in the mother, emphasizing a connection between these two factors ([Jørgensen et al., 2007](#)). Even if they have not found significant alexithymic differences between mothers of the three groups (Migraine, TTH and control), they believed that emotional difficulties may lie in other aspects of emotional regulation implied in mood and anxiety disorders, which have a high prevalence in parents of children with headache ([Feldman et al., 2010](#)). In line with this study, [Cerutti et al. \(2016\)](#) examined the association between migraine and alexithymia, exploring the hypothesis of alexithymia predicting psychopathological symptoms in adolescents and mothers with migraines. Furthermore, determining any differences between adolescents and their mothers suffering from migraine vs. adolescents and mothers in the control groups (and the relation with both mother and child with migraine). In contrast with Gatta's results, they discovered that adolescents and their mothers with migraine had higher rates of alexithymia. Additionally, they demonstrated that both adolescents and mothers, both suffering from migraine, also appear to experience greater psychological distress than the adolescents and mothers in the control groups. In light of these results, they supposed a possible intergenerational transmission of alexithymia and a child's alexithymia may reflect the mother's deficit in regulating emotions and expressing feelings ([Yürümez et al., 2014](#)). At this point, it is fundamental to analyse the relationship between headache, attachment style and alexithymia. It has been observed a connection between migraine features (high attack frequency and severe pain intensity) and attachment style, especially the ambivalent one ([Tarantino et al., 2017](#)). Moreover, children with migraine and with ambivalent attachment style

report higher symptoms of anxiety, depression, and somatization. Also, Williams et al ([Williams et al., 2017](#)) showed that the somatic condition of migraine acted as a stressor, reducing children's perception of the security of their parental attachments. It seems that children with migraine exhibit a significantly higher prevalence of avoidant attachment and a lower prevalence of secure attachment ([Esposito et al., 2013](#)). From these evidence, a potential influence of attachment style on emotional expression and primary headache may be taken into consideration. Some genetic studies have attempted to understand whether alexithymia is a transmissible construct. For example, Baughman et al., have found different results in two separate studies. In the first one ([Baughman et al., 2011](#)), the phenotypic correlations between alexithymia and emotional intelligence traits seemed to be attributable to correlated genetic and correlated non-shared environmental factors. In the second one ([Baughman et al., 2013](#)), they found that, in addition to the antecedent factors, there was also an influence by shared-environment. The genetic component observed supports previous suggestions that biological base may contribute to the development of alexithymia ([Larsen et al., 2003](#)). However, [Picardi et al. \(2011\)](#) suggested that emotional distress may confound the estimation of the heritability of alexithymia, corroborating the notion that alexithymia is substantially heritable and enhancing the role of unshared environmental factors.

Cerebral anomalies may be underlying both alexithymia and migraine, but there is still no certainty and accuracy about this correlation. In a research conducted by [Liu et al. \(2013\)](#) gray matter and white matter changes have been compared in a group of the early clinical stage of migraine patients

without aura for 1 year. When they re-examined the patients, a year following the first observation, gray matter reduction was observed in the dorsolateral and medial part of the superior frontal gyrus, orbitofrontal cortex, hippocampus, precuneus, and primary and secondary somatosensory cortices. However, no differences in white matter changes were found. Thus, a possible connection between migraine and alexithymia may be due to changes in specific cerebral areas. In fact, altered gray matter volume ([Kano and Fukudo, 2013](#) ; [Grabe et al., 2014](#)) and a reduced activation in the posterior cingulate cortex ([Mantani et al., 2005](#)) seem to be related to lower alexithymia levels.

Conclusions

Mechanisms through which psychological mechanisms influence a physical disorder are complex and difficult to detect with the available tools ([Kano and Fukudo, 2013](#)). Studies on children and adolescents are often not simple and with *bias* . Indeed, the majority of studies involve children and adolescents together (aged between 8 and 15 years), and since childhood and adolescence are ages of change and the psychological characteristics are constantly developing, some children might find it difficult to verbally express themselves. This might depend on their incomplete emotional development and immature brain areas (i. e., 28). Moreover, some bias can influence the assessment of alexithymia. Alexithymia Questionnaire for Children is the only tool for measuring the alexithymic construct at a developmental age, but it has some critical issues ([Rosenberg et al., 2016](#)). The major problem is the validity of self- report measures of alexithymia.

Especially in childhood there are several problems with self-report

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measurement due to problems in understanding questions, reading difficulties, social desirability, and last but not least, the lack of a general understanding of their internal states. Expressing emotions, feelings and using imagination is more simple for an adult in respect to a child, on account of their experience and acquired competences (both verbal and emotional) ([Lumley et al., 2005](#)). The concept that the headache and alexithymia in children are connected is supported by the literature, however, this is rather limited. Further studies on children and adolescents and more accurate instruments are necessary to better understand this relationship and to help children in reducing headache and improve emotional consciousness. Research psychologists and physicians have to work together to improve the existent questionnaire and knowledge about the origins of both alexithymia and primary headache in order to reduce severity of headache and psychological suffering of children and adolescents.

Author Contributions

GN, NF, and VG conceived and designed the study. DC, RC, PV, and VG were responsible for critical revision of this manuscript. All authors approved the final version of this manuscript.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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