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Somatic Complaints in Adolescence: Prevalence Patterns Across Gender and Age

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Abstract

The aim of the study was to determine the age- and gender-specific prevalence, at symptom level and cluster level, of somatic symptoms in a sample of 1512 participants (52.7% females) aged 10 to 25 years old.

Somatic complaints were measured with the *Psychosomatic Symptoms Scale* (PSS)**,** a 35-item scale that inquires about 35 somatic symptoms and sensations in the last 3 months. PSS shows acceptable internal consistency (Cronbach alpha=.89), and factor analysis resulted in 5 meaningful factors: Pain-Musculoskeletal, Pseudoneurological, Gastrointestinal, Cardiovascular-Respiratory and Dermatological. The most commonly reported symptoms were upper respiratory symptoms, lack of energy and fatigue, headaches and back pain. Gender differences were found in 22 of the 35 symptoms, with males having only one symptom (pain in the joints) more prevalent than females.

Four age-specific prevalence patterns were established: increasing, decreasing, curvilinear and stable shape. Most of the somatic symptoms show stable shape across different age groups. At the cluster level, females achieved significantly higher scores on all five somatic symptom clusters. With regard to age-specific pattern shape, mostly stable and curvilinear patterns are observed in the various clusters.

The article emphasizes the necessity of taking a multilevel view of somatic symptoms.

Keywords: somatic symptoms, age and gender differences, cluster pattern shape

Introduction

A number of children, adolescents and adults experience various somatic symptoms that cannot be explained by organic pathology. These symptoms are diffuse, nonspecific and ambiguous, and they are also highly prevalent in healthy nonclinical populations. Although they are very common, they can be very distressful to experience and bring a lot of feelings of misunderstanding,

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guilt and shame. In the clinical literature, these symptoms are referred to as functional somatic symptoms (FSS) or medically unexplained symptoms (MUS). It is estimated that about 50% of all patient visits to physicians are due to these symptoms (Garber, 1998). Depending on the research methodology, the prevalence of somatic symptoms in children and adolescents has been estimated at from 20% to 83% (Eisman, Fogel, Lazarovich, & Pustilnik, 2007; Romero-Acosta et al., 2013; Steinbrecher, Koerber, Frieser, & Hiller, 2011), with prevalence increasing from childhood to adolescence. If these symptoms are serious enough and cannot be fully explained as medical symptoms, a person can be diagnosed with various somatoform disorders (Eisman et al., 2007), somatization being the most prevalent. It is estimated that somatization problems are present in 20% of children aged 7–12 years who come into contact with school health physicians, and in 47% of those who come into contact with paediatricians. In the general population, about 15% of school children have multiple reoccurring symptoms of pain, and more than 4.5% of boys and 10.7% of girls aged 12–16 years meet the criteria for somatization disorder (Pustilnik, Eisman, Price, & Fogel, 2006). Nevertheless, somatization in children and adolescents is sometimes difficult to identify, due to high comorbidity (up to 20% of cases) with anxiety and depressive disorders and behavioural problems such as aggression, hyperactivity etc.

In line with these difficulties, and as a result of many recent findings (Creed et al., 2012; Rosmalen, Tak, & de Jonge, 2011; Tomenson et al., 2013), new changes in DSM-5 (APA, 2013) have been made with the aim of improving understanding in the field. Somatization was included in the DSM-4 category of Somatoform Disorders, and it was characterized by physical or somatic complaints with no demonstrable organic findings to explain these complaints, or without any known physiological mechanism to explain the medical findings. There was also an assumption that these complaints are associated with psychological factors, or unconscious conflicts that explain the existing syndrome. Symptoms that occur included pain in various body localizations: gastrointestinal symptoms, sexual symptoms and pseudoneurological symptoms. But DSM-5 made some changes in the field, attempting to emphasize the distressing somatic symptoms together with the abnormal thoughts, feelings and behaviours, instead of focusing on the absence of medical explanation of these symptoms. So the DSM-4 term *Somatoform disorders* has been replaced by *Somatic symptom and related disorder*. Further explanation for this reconceptualization is as follows: "The previous criteria overemphasized the centrality of medically unexplained symptoms. Such symptoms are present to various degrees, particularly in conversion disorder, but somatic symptom disorders can also accompany diagnosed medical disorders. The reliability of determining that a somatic symptom is medically unexplained is limited, and grounding a diagnosis on the absence of an

explanation is problematic and reinforces mind-body dualism. It is not appropriate to give an individual a mental disorder diagnosis solely because a medical cause cannot be demonstrated. Furthermore, the presence of a medical diagnosis does not exclude the possibility of a comorbid mental disorder, including a somatic symptom and related disorder" (APA, 2013, p. 309). In line with this explanation is an interesting finding of Nettelton (2006). In a small qualitative interview-based study of patients with medically unexplained symptoms, she describes their problems of falling beyond the boundaries of appropriate medical care or living in "diagnostic limbo". Living with symptoms for which there is no explanation, diagnosis, prognosis and treatment generates significant uncertainty and anxiety.

During the past decade the problems of somatic symptoms in children and, especially, adolescents have become more common. For example, fatigue among preadolescents in the 1970s was not considered a problem, whereas in 2001 over 40% of children in the same age group felt tired at least once a week (Petersen, Bergstrom, & Brulin, 2003) and the prevalence of abdominal pain, sleep problems and fatigue increased significantly between 1989 and 2005 (Luntamo, Sourander, Santalahti, Aromaa, & Helenius, 2012). The results of a very large investigation in Finland indicated significant increase in the number of psychosomatic symptoms (Santalahti, Aromaa, Sourander, Helenius, & Piha, 2005). The authors suggested that some of the reasons for that could be in the increased number of stressful life events (especially in the case of somatic symptoms like headaches, abdominal pains, nausea, fatigue etc.), changes in the family system and ways of living during adolescence. For some somatic symptoms it is well documented that they are connected with activities during leisure: sitting in front of the computer and playing games appeared to be a risk factor for the developing of headaches and back pain.

Due to this complexity, it is important to analyse results at different levels (single-symptom level, total-score level, cluster level etc.). The single-symptom level is very important in the clinical setting, and the total number of symptoms seems to be a more important dimension in population studies. If data analyses are based on the one total-sum score, it could happen that some crucial information is left out, especially when we are trying to explain gender and age differences. It could remain unclear whether females are more likely to report all or most symptoms, or only certain specific symptoms. But, on the other hand, by assuming that complaints reflect several clusters, one may waste effort and take analyses that are too detailed, and sometimes, because of age and gender differences, interpretation can be insufficiently clear. It should be noticed that single-symptom count is in accordance with the DSM-5 proposal underlining a dimensional approach in diagnosing somatization. Moreover, it has been proven that the number of symptoms is important for the prediction and outcome of somatization, and, on the other hand, there has never been

formal proof of the existence of DSM-4 symptom constellations based on four organ systems (Rosmalen et al., 2011; Tomenson et al., 2013).

Adolescence is a very specific age period for researching somatic complaints. It is a critical period for early onset of numerous psychological problems and disorders. Besides psychosocial changes, adolescents' health-related symptoms are influenced by physical maturation and a changing body, followed by increased self-awareness and attentiveness to these changes. In many adolescents it could contribute to inner distress and greater symptom reporting. Later, if an adolescent has difficulty coping with specific life situations, these symptoms can become very uncomfortable, interfere with a person's daily functioning, and require the attention of clinicians.

In research of somatic symptoms in adolescence, it is of great importance to consider age and gender changes. Very often the first symptoms appear during childhood and adolescence. As many as 55% of adults diagnosed with somatization disorder report the appearance of the first symptoms before the age of 15 (Garber, 1998). Social aspects of the relationships between gender, experienced stress and health problems is a recently raised topic in research on adolescent stress. With the aim of pointing out how important it is to consider these relationships as separate pathways in males and females, Salmela-Aro and Tynkkynen (2012) talk about *gendered pathways in school burnout among adolescents.* Although studies of the prevalence of somatic symptoms and different age- and gender-specific patterns are common in adults (Klemenc-Ketiš, Krizmarić, & Kersnik, 2013), they are not so frequent in adolescents. Usually, in the adult samples, four types of symptom prevalence pattern are recognized: increasing, decreasing, curvilinear (with a peak at some age point) and stable across age. One of the aims of this study is to investigate whether these patterns could be observed in adolescents, separately for males and females, at the level of single symptoms, and at the level of somatic symptom clusters.

The occurrence of somatic symptoms is often assessed by using self-report symptom questionnaires. Nowadays, there are a lot of questionnaires for measuring physical symptoms, some of them especially designed for children and adolescents (For an overview and comparison of questionnaires, see Zijlema et al., 2013). But the self-reporting of somatic symptoms is not a simple process. Besides body-symptom awareness it includes the person's beliefs, personality traits, emotions and needs, as well as their reporting abilities (Pennebaker, 1982, 2000). Additionally, questioning about symptoms is always delicate because of the so-called *Heisenberg principle*, meaning that measuring the construct may radically alter the construct itself (Tibblin, Bengtsson, Furunes, & Lapidus, 1990). In the study of somatic symptoms this means that a person may not be aware of the symptoms until he or she is asked about them. In comparison with well-defined diseases, measurement and management of

somatic symptoms is particularly challenging and difficult, because the causes of the somatic symptoms are less clear-cut, and they could be associated with substantial disability and healthcare utilization.

Preparing a good measurement of somatic complaints is very demanding, especially in deciding how many and which symptoms to include. There are several reasons for this statement: 1) somatic symptoms are very numerous, and they can include various body parts; 2) their intensity and discomfort are reported by the person, and that is why they depend on subjective perception and sensitivity to bodily changes; 3) somatic symptoms are usually manifested together with other physical and psychological symptoms; 4) somatic symptoms often occur as the dominant feature of certain mental disorders beginning in early years, childhood and adolescence (e.g. eating disorders, sleep, elimination, breathing etc.), and most internalizing disorders, particularly anxiety and depression; 5) additional somatic symptoms can occur in response to an acute or chronic physical illness as a part of psychological adjustment (e.g. asthma, diabetes, epilepsy, leukaemia etc.).

In this study statistical analysis is performed to answer questions about (1) the prevalence of single symptoms and their cluster constellation, and (2) gender and age differences – whether they are restricted to certain symptoms or they are observable across different types or clusters of symptoms.

The questionnaire used in this research is the Psychosomatic Symptoms Scale for Children and Adolescents (PSS) (Vulić-Prtorić, 2005, 2016). The PSS is a part of the *algorithm of self-report somatic symptoms* for somatic psychodiagnostic procedure (Vulić-Prtorić & Cifrek-Kolarić, 2012). In line with the new diagnostic criteria in DSM-5 which require, besides the presence of somatic symptoms, misattributions, excessive concern or preoccupation with symptoms and increased healthcare use, we proposed this algorithm for differential diagnosis and evaluation of various somatic problems in childhood and adolescence. First of all, a medical assessment is necessary to ensure that a child does not have some kind of health problem. Information that follows after that can mostly be gathered from the child, although some clinicians still doubt that children are reliable sources of information when it comes to their internal processes. But a number of previous empirical studies have shown that children from the age of seven onwards are able to describe their headaches reliably and assess their intensity, frequency and duration (Andrasik, Powers, & McGrath, 2005). So the *algorithm of self-reported somatic symptoms* included four aspects of somatic complaints measured with four questionnaires: 1) The somatic aspect is predominantly represented by the Psychosomatic Symptoms Scale. This is designed to measure the number of somatic symptoms a child or adolescent has experienced in the last 3 months, the frequency during this period, and the degree to which these symptoms interfere with the child's or adolescent's daily life. In addition, it provides information about the child's or

adolescent's health status, i.e. perception of his/her own health, and the presence of other, already diagnosed, physical illness for which the child or adolescent needs to see a doctor on a regular basis. Recall time is the previous 3 months. The ideal time frame for a symptom questionnaire still has to be investigated, but, in accordance with some previous findings, we decided that 3 months would be an appropriate time to avoid risk of excessive recall bias and the detection of meaningful fluctuations. 2) The emotional aspect is measured with the Anxiety Somatic Symptoms Scale, one of the subscales of the Fear and Anxiety Scale, SKAD-62. The somatic symptoms described in this scale generally occur in situations where a child or adolescent is experiencing some emotional tension and distress. In this way, this scale provides information as to whether the child or adolescent tends to react to stressful situations predominantly with somatic symptoms. In some previous research, significant and positive correlations between the scores of the PSS subscales (*Frequency* and *Severity*) and the SOMA scale were obtained: r=.41 for the *Frequency* subscale and r=.40 for the *Severity* subscale. 3) The cognitive aspect is measured with the Anxiety Sensitivity Scale, AS, which includes the concept of somatosensory amplification, which makes the symptoms more alarming through cognitive intensification. Anxiety sensitivity was significantly and positively related to the number of physical symptoms (r=.36) and the perceived degree of their interference in daily life (.33). The correlations are higher for girls than for boys. In particular, high correlations between anxiety sensitivity and symptoms of pain (back, joints, hands and feet), fatigue, lack of energy, and weakness were observed. 4) For the behavioural aspect we used the Coping Strategies Inventory, SUO, with the aim of examining the way the child or adolescent is coping with his/her somatic problems. With the use of this self-report algorithm in the clinical setting, the whole picture regarding somatic complaints could be obtained. In that sense, information about somatic complaints that is provided with PSS is one part, but a very important one, of the insight into somebody's somatic difficulties (Vulić-Prtorić & Cifrek-Kolarić, 2012).

This algorithm is in line with approaches and models for understanding somatic complaints that include anxiety and depression. For example, Kallivayalil and Punnoose (2010, p. 242) said that there are 6 possibilities when encountering medically unexplained somatic symptoms: 1) symptoms which are in excess of (disproportionate to) the ‘real disease'; 2) anxiety disorders and depressive disorders presenting with physical symptoms; 3) no known physical or common mental disorders to account for the somatic symptoms; 4) acute and dramatic presentation, or physical symptoms without a medical cause; 5) concern over and conviction of a disease when none exists; 6) deliberate feigning of diseases.

Given the numerous effects that somatic problems could have on a young person's quality of everyday life, it is very important to improve our understanding of somatic variations and patterns in the adolescent population. The findings of numerous research projects have indicated that prolonged somatic problems reduce quality of life in all domains of functioning – psychological, physical and social (Hunfeld et al., 2001; Romero-Acosta et al., 2013). They are found to be associated with numerous emotional and behavioural difficulties, as well as stress within the family and at school, including sleeping problems, fatigue, depression and anxiety, functional impairment, absence from school, increased psychological symptomatology, use of health services, less enjoyment of everyday activities, problems with concentration, less social contact, etc. (Beck, 2008; Danielsson et al., 2012; Glise, Ahlborg, & Jonasdottir, 2014; Strine, Okoro, McGuire, & Balluz, 2006; Vila et al., 2009).

As no studies on symptom- and cluster-level prevalence and pattern shape in samples of adolescents have been known, the main aim of this study was to determine the age- and gender-specific prevalence pattern of somatic symptoms in adolescents.

Method

Participants

The present study comprises data from 1512 participants (52.7% females), between 10 and 25 years (mean age 15.39; *SD*=3.62), from primary and secondary schools, as well as the University of Zadar, in Croatia.

In accordance with the definition of medically unexplained symptoms, the first step was to exclude those somatic symptoms that may be associated with possible diagnosed illnesses. The exclusion criterion was the answer to the third question in the PSS (*Do you have a disease such as asthma, allergies, diabetes etc.?*). A positive answer to this question was given by 222 of the participants, reporting suffering from an illness *(disease)* for which they often seek medical help. The most commonly-experienced problems include allergies, asthma, diabetes, thyroid disease, skin diseases, kidney disease etc. This group of participants had significantly more symptoms on the PSS scale than participants who did not have such health-related problems (F=26.103; p=.00). These participants were excluded from the following statistical analysis, along with 54 participants that did not give data on age and gender. After that, the sample consisted of 1236 participants. For the purposes of statistical analysis of age differences, five age categories were created and are presented in Table 1.

Table 1. *Characteristics of the Sample with Regard to Age and Gender*

Age groups	*N* Males	*N* Females	*N* Total	M_{age} in years	SD_{age}
Group 1=Elementary Schools, 5th and 6th Grade	162	170	332	11.82	.67
Group 2=Elementary Schools, 7th and 8th Grade	170	172	342	13.82	.70
Group 3=Secondary Schools, 1st and 2nd Grade	71	114	185	15.89	.76
Group 4=Secondary Schools, 3rd and 4th Grade	103	115	218	17.56	.75
Group 5=University Students	51	108	159	22.47	2.7
Total	557	679	1236	15.39	3.62

Instrument

The *Psychosomatic Symptoms Scale for Children and Adolescents* (PSS) (Vulić-Prtorić, 2005, 2016) is a 35-item scale that inquires about 35 somatic symptoms and sensations from seven *body organ systems*: cardiovascular, respiratory, muscular, gastrointestinal, dermatological, pseudoneurological, and pain/weakness. The subjects scored each symptom for frequency (*How often have you had these problems in the last 3 months?)* as 1 (never), 2 (a few times a month), 3 (a few times a week), 4 (almost every day) and then for the degree to which each symptom interferes with their daily activities (distress) (*How much does it bother you in daily activities?)* as 1 (does not bother me at all), 2 (it bothers me a little) and 3 (it bothers me a lot). A total score can be computed by summing the scores across all items, with higher scores indicating a higher intensity (frequency scale) and higher distress (severity scale) of somatic complaints. Thus, in determination the PSS score, the total score for the frequency subscale ranges from 35 to 140, and the total score for the severity subscale ranges from 35 to 105. The mean scores and standard deviations for frequency and severity scale items are presented in Table 1 of the Appendix. The PSS has demonstrated good psychometric properties in different samples with Cronbach alphas of .89 for the Frequency scale and .91 for the Severity scale. Correlation between total score on these two scales is r=.73. Although the results of the Severity scale are of great importance because they include the dimension of emotional response to somatic symptoms, for the purposes of this study, only the results from the Frequency subscale are analysed.

Some changes were made in the calculation of results for overall symptom prevalence. We created prevalence values "symptoms not present" (0) and "symptoms present" (1). Participants who reported the symptom as not present at all were allocated to the category "symptoms not present", and all others – those reporting symptoms present from at least a few times a month to almost every day within the last 3 months – were allocated to the category "symptoms present".

PSS also contains three additional questions**:** the first question refers to general self-rated health status (*How would you rate your health in general?*) and is rated on a 4-point Likert-type scale (1=*Bad*, 2=*Not so good*, 3=*Very good*, 4=*Excellent*); the second question enquires about the symptom's severity (*Have you had to see the doctor because of your health-related problems?*) and is rated on a dichotomous scale (Yes/No); the third question refers to possible illnesses (*Do you have a disease such as asthma, allergies, diabetes etc.?*).

Since its development, the PSS scale has been used extensively, primarily in research on the relationship between somatic symptoms and depression, anxiety sensitivity, family relationship and coping strategies, as well as for the selection of children for control samples, which allowed the comparison of healthy children with those who had certain health problems, e.g. asthma, headaches, diabetes etc. (For an overview of results, see Vulić-Prtorić & Cifrek-Kolarić, 2012).

Procedure

The self-report questionnaire was group-administered in community samples during a regularly scheduled classroom period. The study presented here is part of a larger research project that was organized in collaboration with several schools and universities in Croatia. The questionnaire presented in this paper was part of a broader battery of instruments dealing with health problems in childhood and adolescence, as well as various personal and contextual risk and protective factors.

The research was approved by the Ethical Committee of the University of Zadar and was carried out according to the ethical principles of the Croatian Psychological Society.

Statistical Analysis

The statistical package STATISTICA 8.0 was used for carrying out statistical analysis. *Z* Test Calculator for 2 Population Proportions was used to inquire whether males and females differ significantly on single somatic symptom.

Principal-components factor analysis was conducted using Varimax rotation following the procedure that was employed in previous factor-analytic studies of the somatic symptom questionnaires (see Meesters, Muris, Ghys, Reumerman, & Rooijmans, 2003). Allocation of individual items to the designated factor was based on item-factor loading that exceeded .30.

Reliability (internal consistency) of the PSS and extracted factors was assessed by means of Cronbach's alpha. To establish differences between

scores of males and females, as well as between age groups, analysis of variance was calculated.

Results

Level of Somatic Symptoms

For the statistical analysis of overall symptom prevalence in the 3-month period, we created prevalence values "symptoms present" (1) and "symptoms not present" (0). The average number of symptoms in the sample of 1236 adolescents was 11.7 (*SD*=6.31). Males and females showed significantly different total numbers of symptoms (*F*=60.55; *p*=.00): for males (*N*=557) the average number was 10.15 (*SD*=6.00), and for females (*N*=674) it was 12.9 (*SD*=6.30). Since gender differences were significant for all age groups, all further analysis was carried out separately for males and females. This finding is supported by the correlation results. Association between gender and total symptom number is low, but positive and significant (*r*=.22; *p*<.05).

According to the prevalence of total number of symptoms, the data presented in Figure 1 shows that about 50% of respondents had experienced between 1 and 10 symptoms (out of 35) in the last three months. It could be noticed that females were more prevalent in the groups of participants with higher total number of somatic symptoms.

Given that most phenomena associated with somatic prevalence differ with respect not only to gender but also to age, age differences in total symptom number were examined. The results are shown in Figure 2.

Figure 1. *Number of Respondents (%) with Respect to Total Number of Symptoms on the Psychosomatic Symptoms Scale (PSS)*

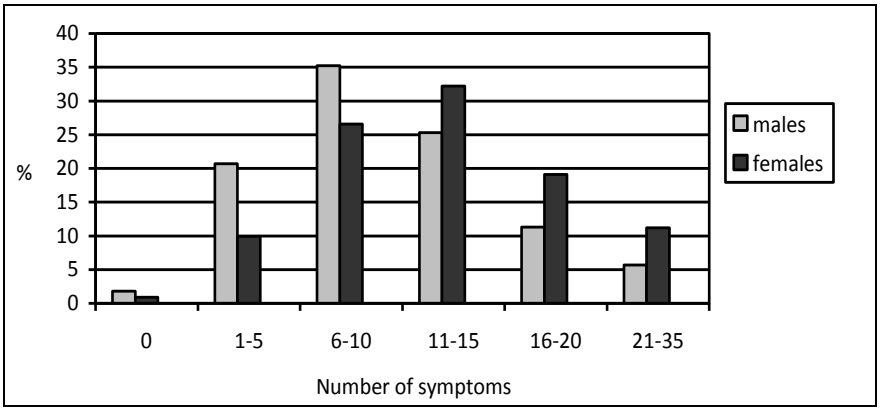
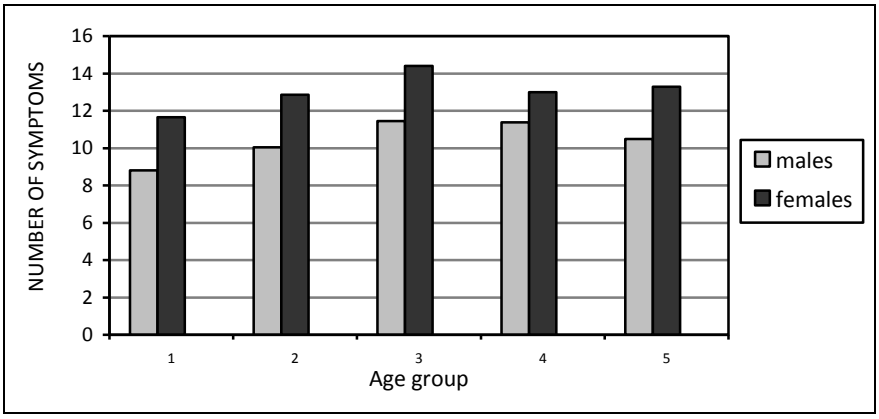


Figure 2. *Gender and Age Differences in the Total Score on the Psychosomatic Symptoms Scale for Children and Adolescents (PSS)* (N_{males}=557; $N_{females}$=674)



*Age groups: Group 1=elementary schools, 5th and 6th grade; Group 2=elementary schools, 7th and 8th grade; Group 3=secondary schools, 1st and 2nd grade; Group 4=secondary schools, 3rd and 4th grade; Group 5=university students

Figure 2 shows a weak inverted U shape of symptom distribution, peaking for participants aged between 15 and 16 years old. Across all age groups, females achieved significantly higher scores on the PSS scale. Furthermore, analysis of variance found statistically significant differences between female and male participants in all age groups (F=10.152; p=.000). The Scheffe test indicated that these differences are significant between the following groups of participants: female groups of all ages and male groups from the first age group; female groups from the second, third and fifth age groups in comparison with males from the second age group.

With regard to the total number of symptoms, a small but significant positive association was found between age and total symptom number (r=.13; p<.05), indicating that somatic complaints increased as the adolescents became older.

Level of Single Somatic Symptoms

Specific symptom prevalence was calculated separately for males and females, and it is presented in Table 2. The most common symptoms in males were upper respiratory symptoms (cold, sore throat, cough etc.), lack of energy and fatigue, headaches and back pain. More than 50% of participants had experienced these symptoms in the past three months. In the female sample more than 50% of participants reported the following symptoms: lack of energy (83.4%), symptoms of upper infections (cold, sore throat, cough etc.),

headaches, nausea, back pain, dermatological problems like acne and pimples, rapid heartbeat and pain in arms and/or legs.

Table 2. *The Prevalence of Symptoms in the Past 3 Months (a Few Times a Month, a Few Times a Week and Almost Every Day) in the Whole Sample, in Males and Females Separately, with Z-Test Results*

Somatic symptoms	*N* (%) SAMPLE (*N*=1236)	*N* (%) MALES (*N*=557)	*N* (%) FEMALES (*N*=679)	*z*-test	*p*
Cold (Sore Throat, Cough Etc.)	962 (77.8)	419 (75.2)	539 (79.4)		
Lack of Energy / Fatigue	953 (77.1)	388 (69.5)	562 (83.4)	-5.42	.00
Headaches	874 (70.7)	345 (61.9)	525 (77.9)	-5.89	.00
Back Pain	711 (57.5)	283 (50.8)	425 (63.1)	-4.17	.00
Nausea	699 (56.5)	255 (45.8)	441 (65.4)	-6.76	.00
Heart Beating too Fast	676 (54.7)	261 (46.8)	413 (61.3)	-4.91	.00
Acne and Pimples	623 (50.4)	206 (37.0)	416 (61.7)	-8.49	.00
Pain in Arms and/or Legs	616 (49.8)	259 (46.5)	355 (53.0)	-2.02	.04
Food Intolerance	601 (48.6)	275 (49.4)	323 (47.9)		
Over-Perspiration	557 (45.1)	244 (43.8)	309 (45.8)		
Appetite Loss	515 (41.6)	184 (33.0)	329 (48.8)	-5.47	.00
Pain in Joints	497 (41.0)	241 (43.3)	253 (37.4)	2.15	.03
Muscle Tenseness	489 (39.5)	212 (38.1)	274 (40.7)		
Pain in Chest	436 (35.3)	120 (21.5)	315 (46.7)	-9.10	.00
Lump in Throat	434 (35.1)	133 (23.9)	299 (44.4)	-7.39	.00
High Body Temperature	425 (34.4)	190 (34.1)	232 (34.4)		
Pain in Stomach	415 (33.6)	134 (24.1)	280 (41.5)	-6.37	.00
Vertigo	413 (33.4)	145 (26.0)	268 (39.8)	-4.98	.00
Diarrhoea	372 (30.1)	169 (30.3)	203 (30.1)		
Muscle Weakness	332 (26.8)	127 (22.8)	203 (30.2)	-2.81	.00
Bloated Stomach	324 (26.2)	103 (18.5)	220 (32.6)	-5.54	.00
Blurred Vision	293 (23.7)	96 (17.2)	197 (29.2)	-4.84	.00
Vomiting	279 (22.6)	118 (21.2)	160 (23.7)		
Breathing Difficulties	268 (21.7)	103 (18.5)	165 (24.5)	-2.47	.01
Heartburn	245 (19.8)	117 (21.0)	127 (18.8)		
Skin Itching/Redness	245 (19.8)	93 (16.7)	152 (22.6)	-2.49	.01
Loss of Balance	195 (15.8)	71 (12.8)	124 (18.4)	-2.65	.01
Constipation	187 (15.1)	60 (10.8)	127 (18.8)	-3.87	.00
Double Vision	161 (13.0)	68 (12.2)	93 (13.8)		
Sudden Memory Loss	160 (12.9)	77 (13.8)	83 (12.3)		
Skin Rash	132 (10.7)	42 (7.5)	90 (13.4)	-3.24	.00
Sense of Choking	128 (10.4)	41 (7.4)	87 (12.9)	-3.13	.00
Sudden Loss of Sight	70 (5.7)	31 (5.6)	39 (5.8)		
Fainting	61 (4.9)	27 (4.8)	34 (5.1)		
Sudden Loss of Voice	46 (3.7)	15 (2.7)	31 (4.6)		

*only significant *z*-test values are presented

Gender differences were found in 22 of the 35 symptoms, with males having only one symptom (pain in the joints) more prevalent than females. More precise insight into these differences can be obtained from the results presented in Table 3. In the distribution of symptom prevalence through the age groups, four pattern shapes could be observed: increasing, decreasing, curvilinear and stable. Generally, 12 symptoms in males and 15 symptoms in females show an unstable prevalence pattern across the five age groups. Four symptoms show the same increasing prevalence pattern in males and females: back pain, lack of energy, a lump in the throat and bloated stomach. A decreasing pattern was not observed in males' symptom prevalence, and in females it was observed for only two symptoms: diarrhoea and food intolerance. A curvilinear pattern was usually presented in two ways: ups and downs across age or an inverted U pattern, i.e. increasing in younger participants with a peak in the middle age group and then decreasing in older groups (as for symptoms of pain in the chest and food intolerance in males, or muscle weakness in females).

It is interesting to notice that 17 symptoms had stable age prevalence pattern in both males and females. There is no obvious connection between these symptoms – they are from various body organ systems and with various prevalence – some are very prevalent (like upper respiratory infections and nausea), and some are very rare (like a sense of choking, sudden loss of sight, fainting). This finding about symptoms that show persistence during development is important for understanding the gender- and age-specific prevalence stability of somatic difficulties.

Table 3. *The Type of Symptom Prevalence Pattern in Males and Females Across the 5 Age Groups*

Males			*Females*		
	F (4,552)	*p*		*F*(4,669)	*p*
Increasing Prevalence					
Back Pain	9.750	.000	Back Pain	8.550	.000
Lack of Energy / Fatigue	6.553	.000	Lack of Energy / Fatigue	12.781	.000
Lump in Throat	4.909	.000	Lump in Throat	6.604	.000
Bloated Stomach	6.384	.000	Bloated Stomach	18.805	.000
Muscle Tenseness	4.903	.000	Headaches	3.075	.016
Muscle Weakness	2.644	.032	Heart Beating too Fast	2.928	.020
Blurred Vision	4.742	.000	Constipation	3.163	.014
Heartburn	3.463	.008			
Acne and Pimples	19.710	.000			
Decreasing Prevalence					
None			Diarrhoea	3.743	.005
			Food intolerance	7.161	.000
Curvilinear Prevalence					
Double Vision	4.669	.001	Vertigo	3.493	.008
Pain in Chest	6.241	.000	Muscle Weakness	4.455	.001
Food Intolerance	4.622	.001	Vomiting	3.884	.004
			Heartburn	3.873	.004
			Skin Rash	4.472	.001
			Acne and Pimples	12.492	.000
Stable Prevalence Across Age					
Males			*Females*		
Headaches, Vertigo, Heart beating too fast, Diarrhoea, Vomiting, Constipation, Skin rash			Muscle tenseness, Double vision, Blurred vision, Pain in chest		
Stable Prevalence Across Age in Both Sexes					
High body temperature, Pain in joints, Pain in arms and/or legs, Loss of balance, Sudden loss of sight, Sudden loss of voice, Fainting, Sudden memory loss, Nausea, Pain in stomach, Appetite loss, Breathing difficulties, Sense of choking, Skin rash, Skin itching/redness, Cold (sore throat, cough etc.), Over-perspiration					

Level of Somatic Clusters

Principal-components factor analysis was performed to investigate the underlying structure in reported somatic complaints. In the construction of the PSS, seven groups of symptoms were gathered according to body organ systems – three groups being formed according to the 3 main domains of the symptoms described in DSM-4 for somatization disorder: pain symptoms, gastrointestinal symptoms and pseudoneurological symptoms. The group of

sexual symptoms was excluded because it was planned to use the questionnaire in samples of younger children, and these items would make the PSS less applicable to them. Menstrual symptoms were also excluded from the analyses, since one of the main aims of the study with the PSS is to compare males and females. Another four groups consisted of symptoms from the cardiovascular, muscular, respiratory and dermatological body organ domains.

The factor-analysis results indicate that somatic complaints in the adolescent population reflect five underlying factors with corresponding proportion of the variance (Table 4): Pain-Musculoskeletal (8.57%), Pseudoneurological (7.55%), Gastrointestinal (7.14%), Cardiovascular-Respiratory (10.24%) and Dermatological (5.68%). According to the content of all factors it can be concluded that all the items show appropriate loadings on a certain factor, except for two items (high body temperature and cold) that have loading on the gastrointestinal cluster, although it would be more logical for them to belong to the respiratory group of symptoms. Each factor had a Cronbach's alpha between .47 and .76, indicating that, except for the dermatological factor, the internal consistency of the PSS scale was good (Table 5).

All factors were significantly related to PSS total score, with males reporting slightly higher correlations between all factors and total score. Correlations between factors are from .31 to .66 in males and .24 to .56 in females (Tables 6 and 7).

Analysis of variance found statistically significant gender differences in all somatic symptom factors, with females reporting higher scores. The higher differences are for the groups of Cardiovascular-Respiratory factor (F=51.31; p=.00) and Dermatological (F=44.93; p=.00), followed by Gastrointestinal (F=14.67; p=.00), Pain-Musculoskeletal (F=11.69; p=.00) and Pseudoneurological (F=4.80; p=.00).

To compare results between females and males on different factors, PSS scores are calculated as an average value for each symptom factor as ‘total factor *M* / number of items on that factor', and this is presented in Figure 3. It can be observed that the pain-musculoskeletal group of symptoms is most prevalent in both sexes.

Table 4. *Factor Loadings (Varimax Rotated) Obtained with Principal-Components Factor Analysis of the PSS Results (N=1236)*

Item number	PSS ITEMS / FACTORS	F1	F2	F3	F4	F5
	Pain-Musculoskeletal					
7.	Pain in arms and/or legs	.709				
6.	Pain in joints	.665				
9.	Muscle tenseness	.603				
4.	Lack of energy / Fatigue	.528				
10.	Muscle weakness	.525				
3.	Back pain	.494				
	Pseudoneurological					
14.	Sudden loss of sight		.654			
16.	Fainting		.598			
12.	Double vision		.585			
13.	Blurred vision		.517			
8.	Loss of balance		.487			
15.	Sudden loss of voice		.373			
17.	Sudden memory loss		.300			
	Gastrointestinal					
23.	Vomiting			.619		
22.	Diarrhoea			.588		
5.	High body temperature			.568		
26.	Food intolerance			.484		
20.	Nausea			.461		
34.	Cold (sore throat, cough etc.)			.451		
25.	Appetite loss			.365		
21.	Pain in stomach			.349		
	Cardiovascular-Respiratory					
24.	Bloated stomach				.604	
19.	Pain in chest				.534	
11.	Lump in throat				.522	
18.	Heart beating too fast				.489	
1.	Headaches				.446	
30.	Sense of choking				.423	
28.	Heartburn				.415	
29.	Breathing difficulties				.403	
2.	Vertigo				.400	
27.	Constipation				.351	
35.	Over-perspiration				.298	
	Dermatological					
32.	Skin itching/redness					.737
31.	Skin rash					.719
33.	Acne and pimples					.298
Eigenvalue		2.999	2.641	2.499	3.584	1.988
Percentage of variance		8.57	7.55	7.14	10.24	5.68

Table 5. *Descriptive Statistics for the Somatic Symptom Factors in the Psychosomatic Symptoms Questionnaire, PSS (N=1236)*

Factor / Symptom factor	No. of items	*M*	*SD*	Min–Max	α	r_{it}
F1 - Pain - Musculoskeletal	6	10.16	3.16	6–23	.74	.33
F2 - Pseudoneurological	7	8.09	1.91	7–21	.66	.23
F3 - Gastrointestinal	8	12.22	3.02	8–30	.70	.23
F4 - Cardiovascular - Respiratory	11	15.91	4.05	11–41	.76	.24
F5 - Dermatological	3	4.2	1.48	3–12	.47	.31
PSS TOTAL SCORE	35	50.58	10.58	35–119	.89	.19

Table 6. *Pearson Correlations Between Symptom Factors and Total Number of Somatic Symptoms* ***in Males*** *(N=557)*

	PSS total score	1.	2.	3.	4.	5.
1. Pain - Musculoskeletal	.77	-				
2. Pseudoneurological	.70	.41	-			
3. Gastrointestinal	.81	.51	.44	-		
4. Cardiovascular - Respiratory	.90	.57	.59	.66	-	
5. Dermatological	.56	.31	.38	.34	.47	-

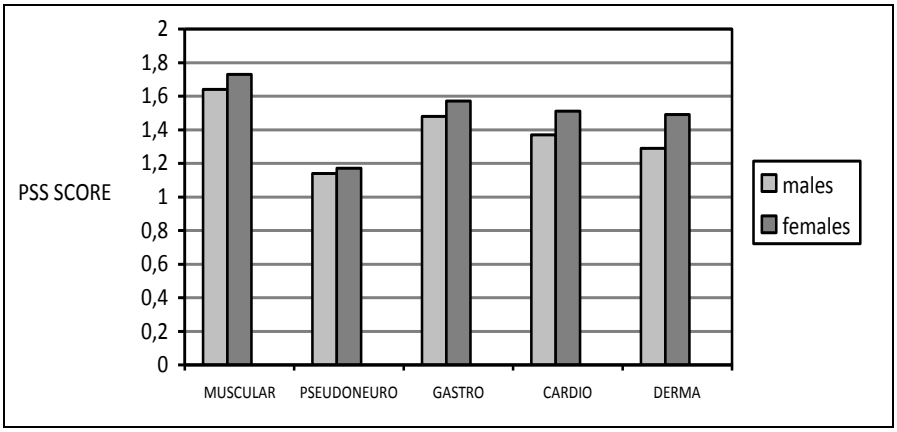
p<.05.

Table 7. *Pearson Correlations Between Symptom Factors and Total Number of Somatic Symptoms* ***in Females*** *(N=679)*

	PSS total score	1.	2.	3.	4.	5.
1. Pain - Musculoskeletal	.77	-				
2. Pseudoneurological	.70	.46	-			
3. Gastrointestinal	.76	.45	.43	-		
4. Cardiovascular - Respiratory	.87	.56	.55	.56	-	
5. Dermatological	.49	.26	.24	.32	.33	-

p<.05.

Figure 3. *Gender Differences in Somatic Symptom Factors (N_{males}=557; $N_{females}$=674)*



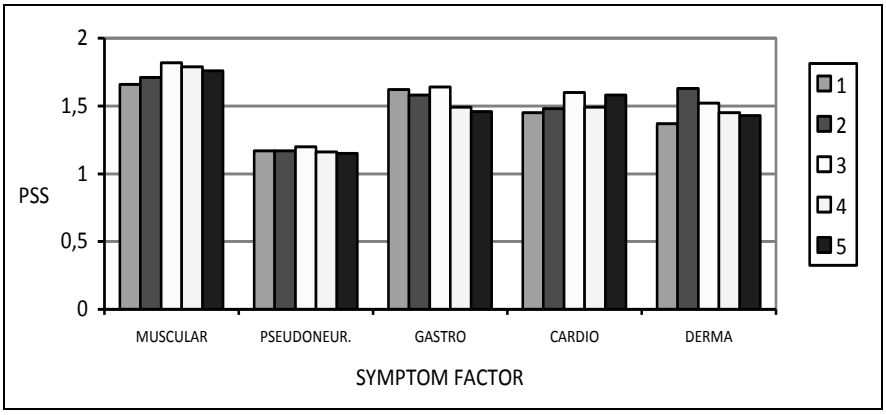
Note. For the purposes of comparing results between factors, PSS scores are calculated as an average value for each symptom factor as: *total factor M / number of items on that factor.*

In the distribution of factor prevalence through the five age groups, one-way ANOVA was performed for each factor. Results are presented for all factors in Figures 4 and 5, separately for males and females.

According to the results, for the females, significant age differences were found in 3 factors: gastrointestinal (F=5.04; p=.000), with females from the first and third age groups (average 11.8 and 15.9 years old) having more symptoms than females from other age groups; cardiovascular-respiratory (F=4.08; p=.003), with females from the third and fifth age groups (average 15.9 and 22.5 years old) having more symptoms than females from other age groups; and dermatological (F=6.29; p=.000), with a peak in females from the second age group (average 13.8 years old) and then decreasing in older groups.

In males, significant age differences were found in 2 factors: pseudoneurological (F=2.73; p=.038), with a peak in the middle age group (average 13.8 years old), and dermatological (F=7.65; p=.000), with an increasing pattern until the fourth age group (average 17.6 years old) and then decreasing in the oldest group. These differences between age groups were curvilinear in pattern.

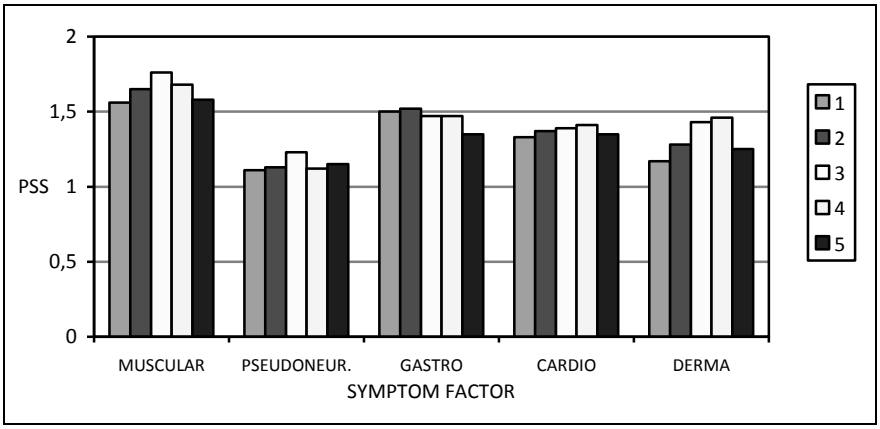
Figure 4. *The Type of Factor Prevalence Pattern in* ***Females*** *(N=669) Across the 5 age groups*[*]



[*]Age groups: Group 1=elementary schools, 5th and 6th grade; Group 2=elementary schools, 7th and 8th grade; Group 3=secondary schools, 1st and 2nd grade; Group 4=secondary schools, 3rd and 4th grade; Group 5=university students.

Note. For the purposes of comparing results between factors, PSS scores are calculated as an average value for each symptom factor as: *total factor M / number of items on that factor.*

Figure 5. *The Type of Factor Prevalence Pattern in* ***Males*** *(N=552) Across the 5 age groups*[*]



[*]Age groups: Group 1=elementary schools, 5th and 6th grade; Group 2=elementary schools, 7th and 8th grade; Group 3=secondary schools, 1st and 2nd grade; Group 4=secondary schools, 3rd and 4th grade; Group 5=university students

Note. For the purposes of comparing results between factors, PSS scores are calculated as an average value for each symptom factor as: *total factor M / number of items in that factor*.

Somatic Symptoms and Health Status

One question in the PSS was about general health status. According to the results, younger participants and males self-reported better general health status than older participants and females. On the 4-point scale (from 1=*Bad* health status to 4=*Excellent* health status), the average result for males was 3.44 (*SD*=.67), and for females was 3.26 (*SD*=.66). For the first age group, the average result was 3.47 (*SD*=.62), and for the fifth age group it was 3.03 (*SD*=.74). Correlation between score for total somatic symptoms and health status was -.32 ($p<.05$), with cardiovascular and respiratory symptoms contributing most to this correlation, in both males and females. The correlations of somatic symptom factors and health status are calculated for the whole sample and separately for males and females (Table 8).

Table 8. *Pearson Correlations Between Symptom Factors and Health Status*

		Sample (*N*=1236)	Males (*N*=557)	Females (*N*=679)
1.	Pain - Musculoskeletal	-.25	-.25	-.23
2.	Pseudoneurological	-.23	-.17	-.27
3.	Gastrointestinal	-.21	-.25	-.15
4.	Cardiovascular - Respiratory	-.33	-.33	-.30
5.	Dermatological	-.15	-.18	-.09
	Total Score	-.32	-.32	-.29

$p<.05$

Discussion

This study provides information about a 3-month prevalence of somatic symptoms in a sample of 1512 adolescents aged from 10 to 25 years old (mean age 15.39). Due to the definition of unexplained somatic symptoms, 222 (15.2%) of the participants reported suffering from an illness for which they often sought medical help, and their results were excluded from further analysis.

Prevalence pattern – symptom level. The overall number of somatic symptoms reported by participants ranged from 0 to 35, with an average of 11.7 symptoms out of the total of 35 inquired complaints listed in the *Psychosomatic Symptoms Scale for Children and Adolescents* (PSS**).** Fifty percent of the respondents had experienced between 1 and 10 symptoms (out of 35) in the last three months. The most common symptoms were upper respiratory symptoms (cold, sore throat, cough etc.) (77.8% of the participants), lack of energy and

fatigue (77.1%), headaches (70.7%), back pain (57.5%), nausea (56.5%) and heart beating too fast (54.7%). These findings are in line with some other research results in the field. For example, in the research of Romero-Acosta et al. (2013), 37.6% of children and adolescents reported at least one symptom. Between 40 and 75% of children and adolescents experience headaches at least monthly, and 10–43% complain of frequent abdominal pains. Back pain prevalence that lasted for at least 1 month was 24%, and it is often related to lifestyle influences on postural habits (e.g. slouching), load-bearing on the back (e.g. school bags) or engagement in sedentary activity (e.g. computer use) (Clinch & Eccleston, 2009). Strine et al. (2006) reported headaches in about 10.6% of children aged 5 to 15 years old and 28% of adolescents between the ages of 15 and 19. In general, headaches are most prevalent (10–30% or even more, up to 70%), followed by abdominal pains (10–20%), pains in muscles and joints (5–20%), pain in the chest (7–15%), fatigue (30–50%), etc. (Garber, 1998; Egger, Angold, & Costello, 1998; Egger, Costello, Erkanli, & Angold, 1999; Santalahti et al., 2005).

Analysis at the symptom level is very important in the clinical setting, and especially in accordance with the changes in the approach to the somatization issues in the DSM-5. It was found that total somatic symptom score is a good predictor of health status and healthcare use, and it was an even better predictor over the effects of anxiety, depression and general medical illness (Tomenson et al., 2013).

Prevalence pattern – cluster level. Besides the interpretation at the single-symptom level, the results of the PSS questionnaire can be interpreted on three additional cluster levels.

The first level is that of clinical clusters that include certain somatic syndromes and diseases that are usually stress-related, such as chronic fatigue syndrome, exhaustion disorder, recurrent abdominal pain, musculoskeletal pain syndrome, illness anxiety disorder, etc. For example, the most common symptoms of chronic fatigue syndrome were lacking energy, needing rest, multiple joint pain and unrefreshing sleep (Afari & Buchwald, 2003; Farmer, Fowler, Scourfield, & Thapar, 2004); symptoms of recurrent abdominal pain (RAP), besides abdominal pain episodes, includes a variety of symptoms such as nausea, vomiting, headaches and pain in the joints (Scharff, 1997); exhaustion disorder consists of a number of somatic symptoms that also appear on the PSS list of symptoms, such as complaints of impaired memory, emotional instability and irritability, insomnia or hypersomnia, physical weakness or fatigue, muscular pain, chest pain, palpitations, gastrointestinal problems, vertigo, increased sensitivity to sounds (Glise et al., 2014). A specific symptom constellations for the syndromes mentioned above could be derived

from the PSS list of symptoms. This level is very useful in the clinical setting, especially in differential diagnostic procedures.

The second level is that of PSS items that describe seven groups of symptoms originating from body organ systems: cardiovascular, respiratory, muscular, gastrointestinal, dermatological, pseudoneurological, and pain/weakness. In some cases, the five groups of symptoms derived through factor analysis would not be appropriate, and the user will need to analyse the symptoms that are connected with a specific organ area. The PSS manual offers this possibility as well (Vulić-Prtorić, 2016).

The third level at which interpretation could be performed is that of clusters of symptoms yielded through factor analysis. In this study, factor analysis on the PSS data yielded five factors with *eigenvalues greater than 1*, which accounted for 39.18% of the variance: cardiovascular-respiratory, pain-musculoskeletal, pseudoneurological, gastrointestinal and dermatological (Table 4). Factor analysis yielded factors that have been reported in previous research, describing factors that correspond to the symptom clusters described in DSM-4, usually syndromes such as pain/weakness, gastrointestinal and pseudoneurological symptoms (Meesters et al., 2003). Each factor had a Cronbach's alpha between .47 and .76, indicating that, except for the dermatological factor, the internal consistency of the PSS scale was good (Table 5). A higher association between PSS total score and somatic symptom factors was found for the cardiovascular and respiratory group of symptoms. This factor consists of 11 symptoms, mostly those connected with stress reactions (bloated stomach, pain in the chest, lump in the throat, etc.). In both females and males, higher intercorrelations between factors were found for the cardiovascular-respiratory and pseudoneurological factors of symptoms (r_{males}=.66 and $r_{females}$=.56) (Tables 6 and 7).

Gender differences in somatic symptoms and cluster prevalence. This study showed that, in a three-month period, female adolescents experienced more symptoms than male adolescents, this being in line with other studies in the field. At the *total score level* we found significant differences between females and males in 24 symptoms, of the 35 symptoms listed in the PSS, with only one (pain in the joints) being more prevalent in males (Table 2). Additionally, correlations between gender and total symptom number were positive and significant (r=.22; p<.05).

Statistically significant gender differences were also found at the level of somatic symptom factors, with females reporting higher scores in all cases. The highest differences are for the group of cardiovascular-respiratory and dermatological factors, followed by gastrointestinal, pain-musculoskeletal and pseudoneurological. In both sexes, the musculoskeletal group of symptoms has

the highest prevalence, and the pseudoneurological group of symptoms has the lowest. This finding was expected, because the diseases that include musculoskeletal symptoms are also highly prevalent in the adolescent population, while pseudoneurological problems are amongst the less expected because they are not often diagnosed in primary care.

Theories that account for gender differences include physiological, sociocultural and psychological explanations (Beck, 2008; Kroenke & Spitzer, 1998). According to physiological theories, gender differences are due to pubertal maturity, which in turn provokes physiological, psychological and cognitive changes. Findings that females tended to report more somatic symptoms, specifically pseudoneurological, cardiovascular and dermatological symptoms (see Garber, 1998, for a review of the literature), were interpreted in the context of puberty onset and menarche in females, and after that period the number of somatic complaints is on the increase. Additionally, for some somatic symptoms, gender differences are expected because these symptoms are part of the clinical manifestations of specific clinical clusters, i.e. psychopathological or physical disorders. For example, gender difference in chest pain or abdominal pains was expected because coronary artery diseases are more prevalent in adult men, and upper gastrointestinal symptoms such as nausea, indigestion and gas, as well as irritable bowel syndrome, are more prevalent in females. The same holds regarding stress-related symptoms, such as heart beating too fast and breathing difficulties, which are somatic symptoms in anxiety disorders, which are more prevalent in females.

Psychological interpretations of gender differences are mostly associated with symptom reporting, with females being generally more attentive to their well-being and more sensitive in perceiving and reporting symptoms of illness **(**Bardel, Wallander, Wedel, & Svärdsudd, 2009; Tibblin et al., 1990). In *Symptom perception theory* Pennebaker (1982, 2000) sees the source of these differences as related to differences in symptom perception, with females having more social influences and expectations in reporting symptoms, and being more prone to internalize their psychosocial problems, than males. Females are more oriented towards external environmental clues (i.e. stressful life events) and males to internal physiological clues. Recent studies on Croatian samples have revealed psychosocial factors that differently relate to the adolescents' level of somatization tendencies (Vulić-Prtorić & Cifrek-Kolarić, 2012). In a sample of boys, the correlations between somatization and stressful life events were not significant for any of the stressful life events examined. In contrast, high correlations between somatization and stressful life events, especially for the social, family and school domains, were observed among girls.

Sociocultural theories explain gender differences by the permission for greater expression of emotions and complaints for females and, consequently,

easier seeking of medical care. But the results of some research show that, besides anxiety and depressive disorders, gender has a very strong independent effect (Kroenke & Spitzer, 1998) and that the threshold for seeking medical care was unlikely to explain the gender differences in symptom reporting. Results in this study also suggest that symptom reporting in females is not merely an artefact of higher healthcare utilization. In our sample of participants, 30% were seeking health care for their somatic difficulties, and 43% of them were males and 57% were females (the difference being not significant, $p<.01$). So this is unlikely to explain gender differences in symptom reporting by the tendency to seek for medical care.

Age differences in symptom- and cluster-level prevalence of somatic symptoms. With regard to age, a small but significant positive association was found between age and total symptom number ($r=.13$; $p<.05$), indicating that somatic complaints increased as adolescents became older. That is in line with the general finding in almost all studies of a higher mean level of somatic symptoms over time. The results presented in Figure 2 also indicate that there is a peak age for total symptom prevalence, and it is about 15-16 years. The same finding was made in some other research. Hetland, Torsheim, & Aaro (2002) found that the peak age for somatic complaints is 15 years for females, while there is no peak age for males. According to Romero-Acosta et al. (2013), somatic symptoms are more prevalent during adolescence than childhood, with headaches and stomach ache more frequently reported by females than by males, and with differences that start at the age of 13 and stop at the age of 15 years. Wiklund et al. (2012), in large Swedish samples, found that perceived stress and psychosomatic health problems peak in adolescent girls at 16–18 years of age. In this age group, 37% of the girls and 22% of the boys considered themselves to be "very often" stressed. But, besides the number of symptoms, in some cases it is more important to follow the changes in the pattern of symptom presentation across age.

In this study, four prevalence patterns across the five age groups were observed: increasing, decreasing, curvilinear and stable (Table 3). In single-symptom prevalence, 12 symptoms in males and 15 symptoms in females show different prevalence patterns across age groups. An increasing pattern was found for four symptoms in both males and females: back pain, lack of energy, a lump in the throat, and bloated stomach. A decreasing pattern was not observed in males, and in females it was observed for only two symptoms. A curvilinear pattern is presented in two ways: ups and downs across age, or an inverted U pattern, i.e. increasing in younger pupils with a peak in the middle age group, and then decreasing in older groups (such as symptoms of pain in the chest and food intolerance in males or muscle weakness in females). Seventeen of the total of 35 symptoms have a stable pattern across age.

Although this study is cross-sectional, and it is not permissible to describe actual change as a function of age, the results indicate the stability of some somatic reactions in different stages of development. A detailed review of these symptoms indicated their diversity. They originate from different organ areas, and they belong to different clusters yielded in factor analysis. This finding is very important, because it was found that adolescents who report diffuse symptoms from different symptom clusters need our special attention. They are more likely to suffer fatigue, poor sleep pattern and extremely low mood. In contrast to adults, a low mood in adolescents is reactive to a pain-associated disability rather than a primary depression (according to Clinch & Eccleston, 2009).

In the distribution of factor prevalence through the five age groups, few specific patterns were observed: in both males and females, a stable factor pattern was found for the musculoskeletal group of symptoms. It appears that these symptoms are very common in all age groups during adolescence. Describing musculoskeletal pain syndrome, Clinch and Eccleston (2009) indicated that about 83% of school-aged children experienced an episode of pain in a three-month period, with musculoskeletal pains accounting for 64% of all pains that were reported. The peak age for the incidence of chronic musculoskeletal pain is 14 years.

A stable age-specific factor pattern was also observed for the pseudoneurological factor in females, and the gastrological and cardio-respiratory factors in males. Other factors prevalence, e.g. the gastrointestinal and cardiovascular-respiratory factors in females and the pseudoneurological in males, distributed in curvilinear shape (Figures 4 and 5). There is an interesting finding for the dermatological factor, which demonstrated a similar pattern in males and females, a kind of inverted U pattern, increasing from younger participants, having a peak at some point and then decreasing in older ages. But the peak for females was at the age of 13–14 years old, and for males it was at the age of 17–18 years old.

Specific symptom patterns were found from childhood to adulthood. For example, it was found that about 25%–50% of adults with recurrent abdominal pain had the same symptoms during childhood (Walker, Garber, & Greene, 1994). Abdominal cramps and vomiting are not uncommon among pre-schoolers in situations of psychological tension; recurring abdominal pain is most common at the age of 9 years, and headaches at the age of 12 years (Garber, 1998). However, until puberty, and especially before the beginning of menstrual problems in young girls, these symptoms rarely meet the criteria for somatization, as described for adults. Klemenc-Ketiš et al. (2013) reported sleeping problems, hearing problems and joint and leg pain increasing with age, general fatigue, headache and nausea decreasing with age, sweating and impaired concentration having a curvilinear pattern with a peak at some age

point, and a pattern stable across age was observed for symptoms such as coughing, breathlessness, diarrhoea, chest pain, constipation, poor appetite and nervousness.

Conclusions

This study provides information about the 3-month prevalence of somatic symptoms in a sample of 1512 adolescents aged from 10 to 25 years old (mean age 15.39). Of the participants, 222 (15.2%) reported suffering from an illness for which they often seek medical help, and their results were excluded from further analysis.

The overall number of somatic symptoms reported by participants ranged from 0 to 35, with an average of 11.7 symptoms out of the total of 35 inquired complaints listed in the *Psychosomatic Symptoms Scale for Children and Adolescents* (*PSS*). Fifty percent of the respondents had experienced between 1 and 10 symptoms (out of 35) in the last three months. The most common symptoms were upper respiratory symptoms (cold, sore throat, cough etc.) (77.8% of the participants), lack of energy and fatigue (77.1%), headaches (70.7%), back pain (57.5%), nausea (56.5%) and heart beating too fast (54.7%).

Regarding gender, somatic symptoms are reported more by females than by males. Of the 35 symptoms listed in the PSS, we found significant differences between females and males in 24 symptoms, with only one (pain in the joints) more prevalent in males (Table 2). Additionally, correlations between gender and total symptom number were positive and significant (r=.22; p<.05).

Regarding age, a small but significant positive association was found between age and total symptom number (r=.13; p<.05) indicating that somatic complaints increased as adolescents became older. Four age distribution patterns were observed: increasing, decreasing, curvilinear and stable. Generally, 12 symptoms in males and 15 symptoms in females show different prevalence patterns across the five age groups. Four symptoms show the same increasing prevalence in males and females: back pain, lack of energy, a lump in the throat and bloated stomach. A decreasing pattern was not observed in the symptom prevalence of males, and in females it was observed for only two symptoms. A curvilinear pattern was usually presented in two ways: ups and downs across age, or an inverted U pattern, i.e. increasing in younger pupils with a peak in the middle age group, and then decreasing in older groups (such as symptoms of pain in the chest and food intolerance in males, or muscle weakness in females).

The results are important for improving, recognizing and understanding the self-perception of somatic symptoms across gender and age groups.

Moreover, the study findings provide some support for separate pathways of somatic symptoms in males and females, with the necessity of being aware of the different outcomes of analyses of these pathways at the level of total number of symptoms, or at the single-symptom level, or at the level of a particular constellation of symptoms, i.e. the cluster level.

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Molestias somáticas en adolescencia: Patrones prevalecientes por grupos de sexo y edad

Resumen

El objetivo de este estudio fue determinar la prevalencia por grupos de edad y sexo, al nivel sintomático y de clúster, de síntomas somáticos en la muestra de 1512 participantes (52.7% mujeres) de 10 a 25 años.

Para medir los síntomas somáticos se usó el Cuestionario de síntomas psicosomáticos (CSPS), una escala de 35 ítems que examina unos 35 síntomas somáticos y sensaciones en los últimos 3 meses. CSPS demuestra una consistencia interna aceptable (alfa de Cronbach = .89) y el análisis factorial dio 5 factores significativos: dolor músculo-esquelético, pseudoneurological, gastrointestinal, cardiovascular-respiratorio y dermatológico. Los síntomas más presentados fueron los síntomas respiratorios superiores, falta de energía y fatiga, dolor de cabeza y espalda. Diferencias por grupo de sexo se encontraron en 22 de 35 síntomas, y los hombres tenían sólo un síntoma (dolor de articulaciones) más frecuente que las mujeres.

Se establecieron 4 patrones prevalecientes por grupo de edad: forma creciente, decreciente, curvilínea y estable. La mayoría de los síntomas somáticos muestran la forma estable por diferentes grupos de edad. Al nivel de clúster, las mujeres consiguieron los resultados significativamente más altos en todos los cinco grupos de síntomas somáticos. En cuanto a la forma del patrón por grupo de edad, se confirmaron principalmente los patrones estables y curvilíneos en varios clústeres.

El artículo enfatiza la necesidad de tener una visión de los síntomas somáticos al multinivel.

Palabras claves: síntomas somáticos, diferencias por grupos de edad y sexo, forma del patrón de clúster

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Appendix

Table 1. *Symptom Frequency and Severity: Mean and Standard-Deviation Values (N=1512)*

	Frequency scale (Range 1-4)		Severity scale (Range 1-3)	
	M	*SD*	*M*	*SD*
1. Headaches	1.94	0.76	1.79	0.65
2. Vertigo	1.45	0.71	1.44	0.63
3. Back Pain	1.88	0.93	1.65	0.65
4. Lack of Energy / Fatigue	2.29	0.96	1.93	0.69
5. High Body Temperature	1.39	0.56	1.46	0.63
6. Pain in Joints	1.57	0.79	1.48	0.61
7. Pain in Arms and/or Legs	1.69	0.81	1.57	0.62
8. Loss of Balance	1.23	0.58	1.22	0.47
9. Muscle Tenseness	1.54	0.75	1.40	0.56
10. Muscle Weakness	1.34	0.61	1.31	0.51
11. Lump in Throat	1.47	0.71	1.43	0.62
12. Double Vision	1.19	0.56	1.20	0.47
13. Blurred Vision	1.36	0.72	1.33	0.58
14. Sudden Loss of Sight	1.09	0.41	1.13	0.42
15. Sudden Loss of Voice	1.06	0.30	1.11	0.37
16. Fainting	1.07	0.29	1.12	0.38
17. Sudden Memory Loss	1.18	0.51	1.21	0.49
18. Heart Beating too Fast	1.79	0.85	1.47	0.61
19. Pain in Chest	1.48	0.71	1.43	0.60
20. Nausea	1.69	0.70	1.65	0.66
21. Pain in Stomach	1.43	0.66	1.48	0.67
22. Diarrhoea	1.34	0.54	1.33	0.55
23. Vomiting	1.26	0.51	1.31	0.56
24. Bloated Stomach	1.35	0.64	1.29	0.53
25. Appetite Loss	1.55	0.75	1.35	0.55
26. Food Intolerance	1.71	0.88	1.48	0.65
27. Constipation	1.22	0.56	1.18	0.43
28. Heartburn	1.27	0.59	1.25	0.50
29. Breathing Difficulties	1.32	0.62	1.34	0.58
30. Sense of Choking	1.17	0.48	1.21	0.49
31. Skin Rash	1.16	0.48	1.18	0.46
32. Skin Itching/Redness	1.28	0.62	1.25	0.51
33. Acne and Pimples	1.79	0.98	1.56	0.72
34. Cold (Sore Throat, Cough etc.)	1.98	0.71	1.79	0.67
35. Over-Perspiration	1.74	0.96	1.52	0.68