

From the Division of International Health (IHCAR)  
Department of Public Health Sciences  
Karolinska Institutet, SE-171 77, Stockholm, Sweden

## BODY AND SOUL

Studies on health and psychosomatic complaints among adolescents in Sweden

Bo Simonsson

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## **ABSTRACT**

**Objective:** The aim of this thesis is to describe the health of the adolescents with special emphasis on psychosomatic complaints.

**Method:** Both quantitative and qualitative methods were used to get a insight into the adolescents health. The results presented in papers I-IV are based on the records from the five cross-sectional school surveys that so far have been conducted under the name of "Survey of Adolescent Life in Vestmanland", SALVe – surveys. For papers I-III, data were collected from the second cross-sectional study performed in 1998. The data of paper IV, came from all five surveys conducted in 1995, 1998, 2001, 2004 and 2006. In paper V, focus group discussions were used to obtain the adolescents views on the cause of psychosomatic complaints.

**Main findings:** The self-reported general health of the adolescents as a group was good. However, when the group was divided; first, by gender and thereafter into weight groups, there were relatively large differences in their perceived health. The large increase in overweight and obesity that was reported by other authors was also found in our study. The obese boys experienced many more symptoms of ill health including those that are related to psychosomatic complaints than the other boys. Sense of coherence had a big influence on the development of psychosomatic complaints. Individuals with a high sense of coherence had fewer psychosomatic symptoms. Boys scored higher than girls in sense of coherence scale, as has been found in other studies. Girls had higher prevalence of psychosomatic complaints than the boys. The increase in reported psychosomatic complaints over a twelve-year period among girls were twofold over the period studied. The boys did not have the same development, there was a slight increase over time but, on the whole, the prevalence remained more or less constant. In the focus group discussions there were big differences in the opinion between the boys and the girls on the causes of psychosomatic complaints. With the boys discussing physical factors while the girls emotional factors.

**Conclusions:** The development of health problems over time between the genders is very different. The girls as a group seems to be suffering from many more health related problems than the boys. This makes it important to consider this in tailoring for any kind of interventions.

**Keywords:** adolescents, psychosomatic complaints, time trend, obesity, sense of coherence, Sweden.

## LIST OF ORIGINAL PAPERS

This thesis is based on the following papers, which are referred to, in roman numerals as follows:

- I. Berg IM, Simonsson B, Brantefors B, Ringqvist I. Prevalence of overweight and obesity in children and adolescents in a county in Sweden. *Acta Paediatrica* 2001; 90:671-676
- II. Berg IM, Simonsson B, Ringqvist I Social factors, lifestyle, body image and relations, school situation, somatic and psychological symptoms in overweight and obese 15-year old boys in a county in Sweden. *Scandinavian Journal of Primary Health* 2005;23:95-101
- III. Simonsson B, Nilsson KW, Leppert J, Diwan V. Sense of coherence and psychosomatic symptoms in adolescents in a county in Sweden. *Biopsychosocial Medicine* 2008,2:4 doi:10.1186/1751-0579-2-4
- IV. Simonsson B, Nilsson KW, Petzold M. Trends in psychosomatic complaints in a county in Sweden (submitted)
- V. Simonsson B, Johansson E The view of the adolescents on psychosomatic complaints (submitted)

## **ABBREVIATIONS**

ANOVA	Analysis Of Variance
BMI	Body Mass Index
CAN	Swedish Council for Information on Alcohol and Other Drugs
CI	Confidence Interval (usually 95%)
DSM-IV	Diagnostic and statistical manual of mental disorder – fourth edition, 1994
ESPAD	European School Survey Project on Alcohol and Other Drugs
GRRs	General Resistance Resources
PSC	Psychosomatic complaints
SOC	Sense of coherence
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organisation

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## 1. INTRODUCTION

At a first glance it can be rather difficult to see the connecting thoughts in this thesis. It starts with obesity and overweight, and then continues with a brief stop with the health of boys and then swerves over to psychosomatic questions where it zigzags among different issues.

The present work started with the analysis of prevalence for obesity that was performed in 1995 and 1998 though there was no thought of a thesis at that time. That came later. The data that I studied were the prevalence of obesity and overweight among children and adolescents, showing prevalence higher than expected. This raised a number of questions about the cause and consequences of obesity. Who are these obese kids? Why are they obese and not others? Is their social situation different from the children with normal weight? Papers I and II deal with this subject and answer the questions raised earlier.

The aim of the subsequent analysis was to identify which social factors affect the health of the adolescents. We saw that the traditional factors did not, in any significant way, influence or explain the changes in the perceived health of the adolescents. This then raised many more new questions.

Following this line of thought, it seemed that most of the studies that had been done all over the world, focused to a large extent only on the health of girls. The focus, therefore, became to study the boys and their self-reported health. This was in line with other studies as the World Health Organisation who published “What about the boys” in the end of year 2000. We saw that there was an increase in the prevalence of psychosomatic symptoms over the years. This “discovery” led to the main topic of this thesis, psychosomatic symptoms and complaints.

This initial research, thus, produced a lot of background knowledge that later have been useful in the analyses of the materials. The three last papers in the thesis all describe the psychosomatic area from different angles. The first paper, is an analysis of the relation between sense of coherence and psychosomatic complaints. The second, studies the time trend of psychosomatic symptoms over the twelve years that the main longitudinal study has been running. The third is a qualitative study of the adolescents’ own view on the causes of psychosomatic complaints.

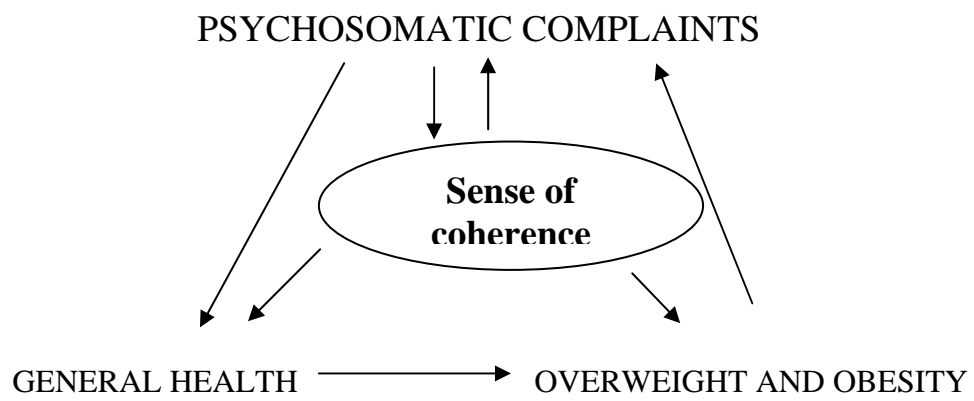
The fifth paper, concerns the adolescent’s views, and their understanding of the problem. It is, in a way, a novel approach to a complex issue. I feel that it is important also to gather information that is non-professional especially on an issue that is more complex than just a “medical” problem. The issue of psychosomatic problem is in the grey zone between psychology, sociology and medicine.

This thesis has given me a better understanding of the lives and problems of adolescents and on how they are shaped by the lifestyles they are living and the rapidly evolving society.

Figure 1, as shown below, is an attempt to visualise the framework of the analysis and the relation between the factors that were included in this thesis. I am very much aware, though, that this can be seen in many different ways and that the figure is over-simplified.

The sense of coherence affects the general health as well as the development of psychosomatic complaints and of overweight and obesity among the adolescents.

Figure 1. Framework of analysis





## 2. BACKGROUND

The way that we treat our children reflects the state of our social structure, a measure of the achievements of our civilisation or even an index of the degree, to which humanism have outstripped the economic motive in everyday life. These facts have been described and emphasised by various organisations, for instance, the United Nations, United Nations International Children Emergency Funds (UNICEF) and the World Health Organisation (WHO) and almost all countries in their visions and goals for the future. The following topics encompass how the five articles/papers dealt with my research.

### 2.1 Adolescents health

Every fifth person in the world is an adolescent, defined by the WHO as a person between 10 and 19 years of age. Out of the 1.2 billion adolescent's world-wide, out of these approximately 85% live in low-income countries.

Based on mortality rate alone, adolescence is one of the healthiest periods in human life. In this second decade of life, adolescents have survived the diseases of early childhood, and the health problems associated with ageing are not thought of at all. For adolescents, death seems remote and is almost unthinkable.

Yet we know that many adolescents do die prematurely. Every year, an estimated 1.7 million young men and women (between ages of 10 and 19) die – mainly through accidents, suicide, violence, pregnancy-related complications and other illnesses that are preventable or treatable. Furthermore, the WHO estimates that 70% of premature deaths among adults are largely due to behaviour initiated during adolescence.

Therefore, there is a growing recognition of the wide-ranging health problems faced by adolescents due to the combinations of biological, psychological and social factors (Windle, Grunbaum, Elliott et.al. 2004). As a child passes into the adolescent years, prevention of behaviours that can lead to health risks grows in importance. Many habits and lifestyle choices that have been made during these critical years contribute greatly to the overall health of an adult.

Major global health problems of the adolescent years are related to: (i) substance use (including use of tobacco, alcohol, and illicit drugs); mental health (including suicide and depression); (ii) obesity and other nutrition-related chronic diseases related to eating patterns and lifestyles; and, (iii) sexual and reproductive health (sexual development and sexuality; sexually transmitted diseases including HIV/AIDS, unwanted and unsafe pregnancies) (WHO 2005).

The present Swedish mortality among children and adolescents is low. The health problems that the Swedish adolescents encounter involve the whole range of the above categories, in particular, overweight and obesity, which are of great concern for Swedish adolescents.

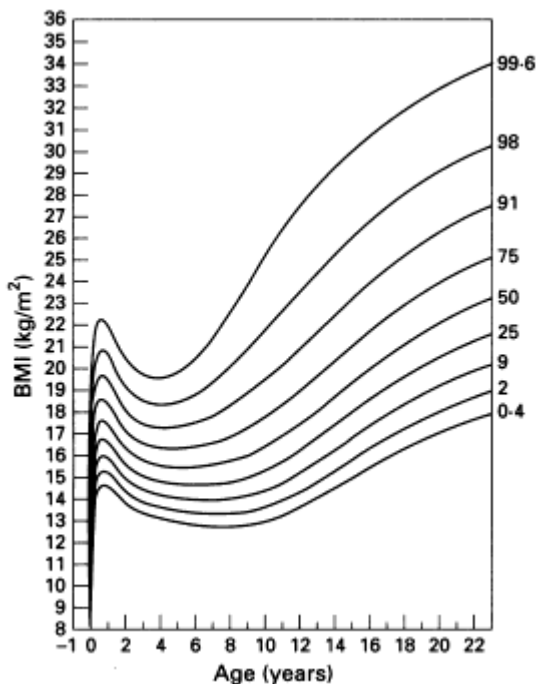
### 2.2 Overweight and obesity

According to WHO (WHO 1998) obesity has become a global public health problem and the prevalence of obesity among children and young persons has, increased dramatically during the last decade. In a Swedish study of 18-year-old men, the prevalence of obesity was found to have increased by more than 3.5 times during a 25-year period from 0.3 % to 3.2 % among military conscripts (Rasmussen, Johansson & Hansen 1999). Reports from both USA and Italy shows that similar increases are found in other age groups as well (Troiano, Flegal, Kuczmarski, et.al. 1995;

Gortmaker, Dietz, Sobol & Wehler 1987).

The most commonly used method of describing overweight and obesity is the Body Mass Index (BMI). It was the Belgian mathematician Lambert Adolphe Jacques Quetelet (1796-1874) who first proposed the establishment of a simple measure for classifying people's weight relative to an ideal weight for their height. His proposal, the Quetelet index,  $\text{weight}/\text{height}^2$ , has endured with minor variations to the present day. He published his proposal in 1870 in *Anthropométrie, ou Mesure des différentes facultés de l'homme*. Ancel Keys reinvented it in the 1950s and called it the body mass index. In 1979 Cole proposed its use also to children, wherein he showed that BMI adjusted for weight for both height and age (Cole, 1979).

There are, since several years, well established cut off points for defining overweight and obesity among the adults. That is calculated body mass index (BMI) value of  $25 \text{ kg/m}^2$  for overweight and  $30 \text{ kg/m}^2$  for obesity. The adult cut off points is related to health risks and is also convenient numbers, easy to remember. Contrary to adults, the BMI for children changes substantially with age due to the rapid growth during childhood into adolescents. At birth the median BMI is  $13 \text{ kg/m}^2$ , increases to  $17 \text{ kg/m}^2$  at the age of one, then decreases to  $15 \text{ kg/m}^2$  at age of six, then increases to  $21 \text{ kg/m}^2$  at the age of twenty (Cole, Bellizzi, Flegal & Dietz, 2000). This shows that a cut off point that is related to age is necessary to define child overweight and obesity. Below is a curve showing the development of BMI from newborn to the age of 18 years.



**Figure 2. BMI curve for boys in United Kingdom (Cole, 1990)**

Several other reports during the past few years have shown an increasing body mass index (BMI) in adults, and similar trends have also been seen in younger age groups (Ogden, Troiano, Briefel et.al. 1997). Similarly, several studies on children and adolescents consider the measurements of height and weight to be of importance as they reflect the individual health status. Since the beginning of the 20<sup>th</sup> century in Sweden, height and weight attributes are regularly measured by the school health service (Cernerud, 1993). The height and weight curves have been used to monitor the growth of children and young adults and to identify those individuals that are under- or overweight (Cernerud & Edding, 1994). During recent years, several countries have shown growing interests in using BMI curves to classify overweight and obesity (Pietrobelli, Faith, Allison, et.al. 1998; Troiano & Flegal, 1998; Rolland-Cachera, Sempé, Guillaud-Bataille et.al, 1982; Rosner, 1998; Dietz & Robinson, 1998; Daniels, Khoury & Morrison, 1997).

An increased energy intake and a reduced level of physical activity are presumed to be the most important factors behind the development of obesity (Prentice & Jebb, 1995; Goran & Treuth, 2001). The physical activity among the adolescents has decreased during the last decades and a more sedentary lifestyle with more time spent watching television and computer games playing is now common (Lazarus, Baur, Webb & Blyth, 1996; Prentice 1998). There is also a genetic predisposition for developing obesity but it is not clear how the susceptibility is expressed in children and adolescents (Pietiläinen, Kaprio, Rissanen et.al 1999). It has also been reported that there is an association between social class and obesity (Jebb, Rennie & Cole, 2004).

Overweight in young people may lead to several physiological and psychological complications. It is also known that psychosocial and physical problems usually follow a large increase in bodyweight. Children and adolescents who are overweight are at risk of developing serious health problems such as type-2 diabetes in young individuals with extreme obesity (Wabitsch, 2000). These young persons have difficulty envisioning this as a problem as some of the complications tend to occur later in life.

The negative consequences of being overweight and obese during adolescence may influence adult socio-economic status (Esposito-Del Puente, Contaldo, De Filippo, Scalfi, et.al, 1996). Obesity may lead to low self-esteem and overweight adolescents are more concerned about their weights and may have more eating disorders than their peers (Kusowska-Wolk & Bergström, 1993). These somatic and psychological symptoms, coupled with being teased, hit or bullied, causing high-risk behaviours, are consequences of overweight and obesity (Rössner, 1998; Fontaine, Cheskin & Barofsky, 1996).

### 2.3 Psychosomatic

It was, Johann Christian August Heinroth (January 17, 1773 - October 26, 1843), a physician and native of Leipzig, Germany, who first studied the interaction between the soul and the body in a medical context. In 1805 he received his medical doctorate from the University of Leipzig, and for most of his career was a university lecturer at Leipzig. In 1827 he became a full professor of physical medicine at this university.

Heinroth is mainly remembered for his seminal work done in the field of psychiatry, although he was never officially trained as a psychiatrist. His views on psychiatric thought have been described as a combination of anthropology and holistic medicine. He introduced the concept of psychosomatic illness where he believed that the soul had supremacy over the body. The body and soul interact in several ways; and as a consequence, mental sickness and many somatic illnesses are originated by abnormalities of the soul (Heinroth 1818).

Although Heinroth introduced the term “psychosomatic” in 1818, the modern psychosomatic medicine was not developed until the early 1930's. Since then this branch of medicine has focused on the study of the interaction between psychosocial and biological factors in health and disease (Lipowski 1975a; Lipowski 1975b).

The concept of this thesis would be better illustrated by giving the differences among the various labels that one encounters in the literature: psychosomatic symptoms, somatisation, somatoform disorders and factitious disorders that are given below:

(i) Factitious disorders are psychiatric conditions and are characterised by patients, knowingly and intentionally, presenting with physical or psychological complaints with no underlying primary medical condition, this is uncommon among children and adolescents;

- (ii) Somatisation is generally defined as the occurrence of one or more physical complaints for which appropriate medical evaluation reveals no explanatory physical pathology or pathophysiological mechanism;
- (iii) Psychosomatic symptoms are by definition clinical symptoms with no underlying organic pathology; and
- (iv) Somatoform disorders are defined as specific psychiatric disorders characterised primarily by somatic complaints that are chronic and cause significant distress and functional impairment for the patient. They are different from malingering and factitious disorders in the sense that somatoform disorders are not considered to be intentional, voluntary, and produced consciously.

A distinction is needed between somatoform disorders, seen mainly in adults, and the psychosomatic symptoms that are seen among the adolescents (Brill, Patel, Mac Donald 2001). The common descriptions of these disorders among adults, found in medical textbooks are that, neither the physical symptoms nor their severity and duration, can be explained by an underlying physical condition. This disorder is often familial, occurring predominantly among women, also with an unknown aetiology. Often, a narcissistic personality characterised by dependency and intolerance to frustration contributes to the physical complaints. Both disorders fluctuate in severity but persist throughout one's life. Rarely there is a complete relief from these disorders. In worst cases depression emerges after many years and the patients suicidal ideation's can become more real (Merck manual 2007). Usually, a variety of neurological symptoms are present, and even though these disorders are physical, there could still be occurrences of anxiety and depression.

True somatisation disorder in adults is relatively uncommon ranging between 0.2–2 % in females and less than 0.2 % in males (American Psychiatric Association, 2001: DSM-IV, Text revision); while the process of somatisation is very common in the general population. This means that more than half of the patients going to the doctors have no signs of organic diseases, and less than a third of the new patients have organic diseases.

The psychosomatic symptoms that adolescents normally present with are vague physical complaints, i.e. recurrent abdominal pain, headaches, fatigue, pain in different parts of the body, dizziness and fainting, problems sleeping, headaches, diarrhoea or constipation, nausea, vomiting and nervousness. It may affect any part of their bodies and specific symptoms and their frequencies can vary among different cultures. The prevalence and characteristics of the psychosomatic symptoms may also vary with age, gender, family situation, developmental stage and culture of the child or adolescent. The reported prevalence rate varies between 10-25 % with a higher prevalence rate among girls (Berntsson, Köhler & Gustafsson, 2001).

Psychosomatic symptoms in adolescents are often explained as a response to stress (Boyce, 1985; Strasburger & Reeve, 1991; Robinson, Greene et.al 1988; Berndtsson & Gustafsson, 2000). The symptoms may be a normal response to excessive stress or a heightened response to normal stress. The reason for this heightened response could be poor coping ability to deal with everyday situations. Stress can arise from the environment that the person lives in (Lazarus & Folkman, 1984; Mason, 1975; McSherry & Holm, 1994). An example of an extremely stressful event is death in the family or among friends. More common reasons are problems in the school like bullying or conflict with teachers or schoolmates. Problems in the relation to parents or peers are also likely causes (Brolin Låftman & Östberg, 2006).

## 2.4 Sense of coherence

The medical sociologist Aaron Antonovsky developed his salutogenic theory of health when he was interviewing Israeli women with experience from German concentration camps during the Second World War. Antonovsky was intrigued that these women despite their horrifying experiences still were in relatively good physical and mental health. His theory was published in the late 1970's. Salutogenesis, implies a description of health as a continuum ranged from total ill health to total health. The bases for his theory, was his studies on the influences of varying types of stress on health and he was able to show that relatively unstressed people had much more resistance to illness than those who were more stressed. Salutogenesis is an alternative concept in medicine that focuses on factors that support human health and well-being rather than on factors that cause disease – pathogenic factors. This term comes from the Latin *salus* = health and the Greek *genesis* = origin.

The salutogenesis theory introduced new concepts; namely, general resistance resources and sense of coherence. The first concept is the general resistance resources (GRRs). These resources are biological, material and psychosocial factors that make it easier to comprehend life as consistent, structured and understandable. The GRRs are for example experience, knowledge, healthy behaviour, self-esteem, social support, intelligence, and view of life. Antonovsky's theory states that one's ability to use GRRs is more important than just to have them (Lindström & Eriksson, 2006). This is known as an individual's "sense of coherence" (SOC) which is closely linked to person's health (Antonovsky, 1987). A solid foundation in terms of GRRs is the ground for a strong SOC, which is the capability to see everyday life as manageable and independent of whatever happens in life. SOC, then, can be seen as the concept that reflects our ability to cope with stress and is the core of the salutogenic theory (Geyer, 1997).

According to Antonovsky, SOC is a global orientation to view the world and interact with the environment in a comprehensive, manageable and meaningful way (Antonovsky, 1987) he postulates that, "SOC is very explicitly not a substantive coping strategy, as mastery orientation or an internal locus of control". Individuals with a strong SOC when coping with a stressor, have the ability to find appropriate solutions to a specific situation. A person of this kind is very flexible and this enables him or her to find ways of successfully resolving conflicts (Antonovsky, 1993). This way of conceptualising SOC, as a mastery orientation or an internal locus of control, characterised by a tendency to see life as ordered, predictable and manageable, can have certain implications when it comes to adolescents and psychosomatic symptoms (Antonovsky, 1987).

A person with a strong SOC is less likely to perceive stressful situations as threatening and anxiety provoking as compared to a person with a weak SOC (Antonovsky & Sagy, 1986). In a systematic review of the literature on the SOC in relation to health, SOC was strongly related to health, especially to mental health and partly explaining health (Eriksson & Lindström, 2005). However, SOC was not the same as health, the variance in health has also other determining factors like age, social support and education (Eriksson & Lindstrom, 2006; Hanson & Chen, 2007; Kristensson & Öhlund, 2005; Rätty, Larsson, Söderfäth & Wilde Larsson, 2005; Takata, 2001; Tanaka, Möllborg, Terashima & Borres, 2005; Smith & Meyers, 1997; Barker, 2007; Aarö, Haugeland, Hetland et.al., 2001; Due & Holstein, 1998).

Furthermore, according to the theory, over a lifetime SOC develops throughout adolescence and the individuals location on the SOC continuum becomes more or less fixed in early adulthood with only minor and temporary changes in patterns of life experiences (Antonovsky, 1987). Only small

differences and variations in means over time have been reported in follow up studies (Kivimaki, Feldt, Vahtera, & Nurmi, 2000; Kuuppelomaki & Utriainen, 2003; Nilsson, Holmgren, Stegmayr, & Westman, 2003; Suominen, Helenius, Blomberg, Uutela, & Koskenvuo, 2001; Virtanen & Koivisto, 2001). There are also gender disparities where females usually have lower SOC especially among adolescent populations (Buddeberg-Fischer, Klaghofer, & Schnyder, 2001; Nilsson, Starrin, Simonsson, & Leppert, 2007).

### **3. OBJECTIVES**

The overall objective of this thesis is to undertake studies on the health and psychosomatic complaints among adolescents in Sweden.

The aims of the five papers included in the thesis are the following:

#### **Paper 1**

To investigate the frequency of overweight and obesity based on body mass index values (BMI) among children 9-,12-,15- and 18 years old children and furthermore to evaluate the validity of self reported height and weight values.

#### **Paper 2**

To compare social factors, lifestyle, body image, relations, school situation, use of tobacco, alcohol and drugs and somatic and psychological symptoms in obese, overweight and non-overweight 15-year-old boys.

#### **Paper 3**

To test the hypotheses that; (i) individuals with weaker sense of coherence will have more psychosomatic complaints; and, (ii) individuals with stronger sense of coherence will have less psychosomatic complaints. Furthermore, our aim was also to test if our sense of coherence – psychosomatic complaints – model was controlling for psychosocial risk factors.

#### **Paper 4**

To determine whether the prevalence of 15-16-year-old Swedish adolescent's somatic symptoms have changed during a twelve-year period, 1995-2006; and to examine if the increase in prevalence of psychosomatic symptoms found in other studies can be confirmed in Sweden.

#### **Paper 5**

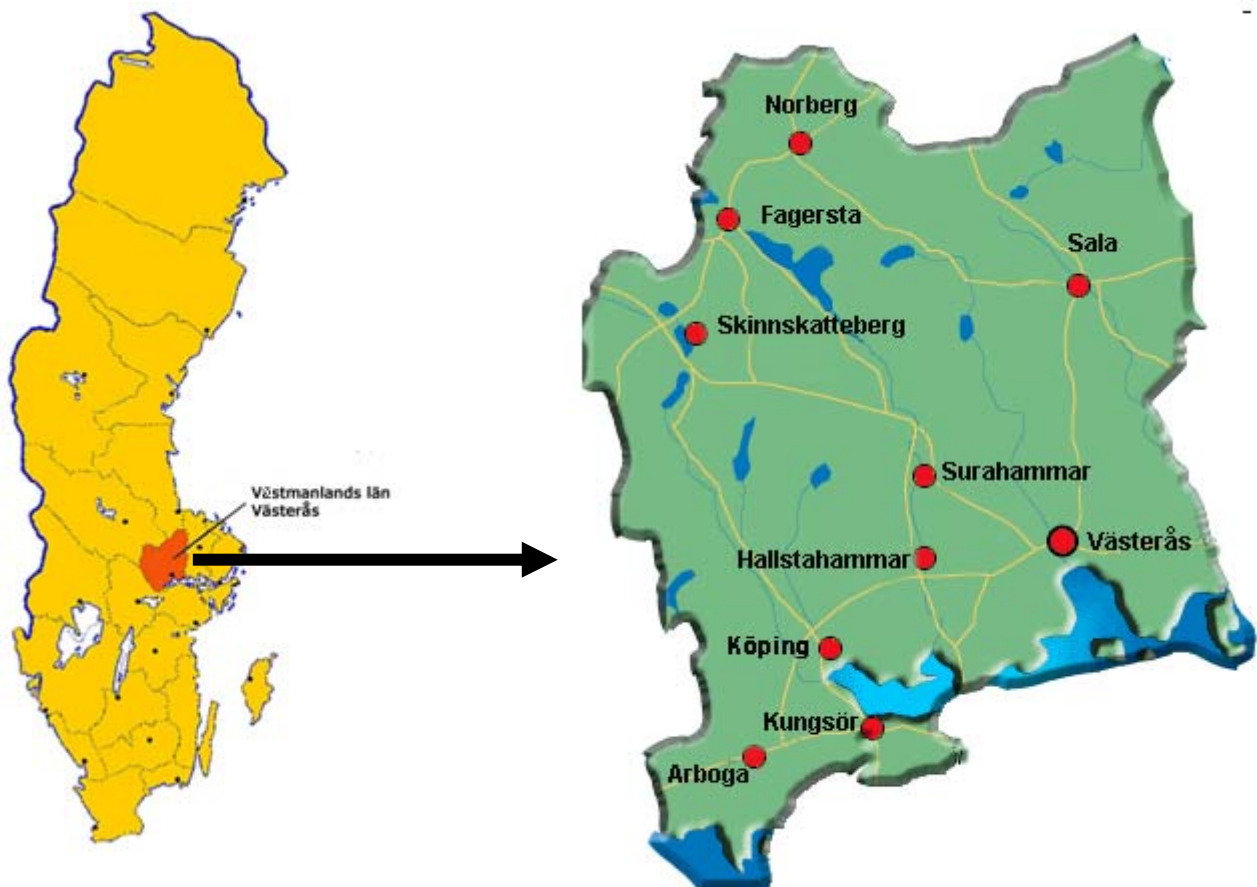
To gather the adolescents' own views on the causes that promote or hinder the development of psychosomatic complaints and to learn more about the principals, teachers and other school personnel's views on the development of psychosomatic complaints among the adolescents

## 4. SETTING

This thesis is based on four cross sectional school based surveys and one qualitative focus group interview study. All of these studies were conducted between 1995 and 2006 in the county of Västmanland. To better understand the context that the studies have been conducted in a brief description of the county and the national school system is warranted.

### 4.1 Västmanland County

The county of Västmanland is a part of the Stockholm-Mälars region and is situated west of Stockholm. There are 2,9 million people living in this region, which is equivalent to almost a third of the population in Sweden. The maps below show the location of Västmanland.



The Västmanland county has almost 250 000 inhabitants covering an area of 5 146 km<sup>2</sup>, equivalent to 48 inhabitants per km<sup>2</sup>. It consists of 10 municipalities: i.e., Arboga, Fagersta, Hallstahammar, Kungsör, Köping, Norberg, Sala, Skinnskatteberg, Surahammar and Västerås. Västerås, the capital city and the sixth largest municipality in Sweden, accounts for more than 55% of the inhabitants of the county.



The County of Västmanland can, in many ways, be considered to be Sweden in miniature, both from an economical point of view and from a social and demographic point. To illustrate this: the county has a diversified economy, with several large multi-national industries and also a growing number of small and medium size enterprises. The service sector has been increasing in volume and importance during the last decade that makes the county an alternative to investors. The populations in this county are about the average of the Swedish population in terms of age distribution and mean age in both men and women. The proportion of immigrants is higher than the Swedish average.

Table 1. Basic population data for Västmanland county and Sweden.

	<b>Västmanland county</b>		<b>Sweden</b>	
	<b>Male</b>	<b>Female</b>	<b>Male</b>	<b>Female</b>
Population absolute numbers	<b>124 126</b>	<b>125 067</b>	<b>4 563 921</b>	<b>4 619 006</b>
Population in %	49,8	50,2	49,7	50,3
0-6 years of age	7,6	7,1	8,1	7,6
7-19 years of age	16,6	15,9	16,4	15,4
20-65 years of age	60,3	57,3	61,2	58,7
66- years of age	15,6	19,7	14,3	18,4
Median age	39,7	42,3	39,0	41,6
Immigrants in %	12,9	13,8	11,2	11,9

#### 4.2 The Swedish school system

The Swedish school system is made up of compulsory and non-compulsory schooling, referred to as the upper secondary school. The 9-year compulsory school program is for all children between the ages of 7-16 years. However, a child may start school one year earlier, at the age of 6, upon the request of the parents. At the time of the study there were in Västmanland county 134 primary schools.

Almost all of the compulsory school students continue to upper secondary school and the majority of these complete their upper secondary education in 3 years. Every municipality in Sweden is required by law to offer all, which have completed compulsory school, an upper secondary education. The upper secondary education is divided into 17 national 3-year programs. All of the programs offer a broad general education and basic eligibility to continue studies at the post-secondary level. In addition to the national programs, a number of specially designed programs exist. They are locally adapted to the demands of the labour market or according to the wishes of the students. Individual study programs for students with special needs also exist. Thirteen of the programs, known as vocational training programs, contain at least 15 weeks at a workplace outside the school, so-called 'workplace training'. The other four programs: arts, natural science, social science and technology are theoretical. There were 10 upper secondary schools in Västmanland in 1998.

## 5. ETHICS

All research concerning human beings must be based on the four cornerstones of ethics: autonomy, beneficence, non-maleficence and justice (Helsinki declaration, 1968). However, ethical principles in epidemiological research can differ to some extent from those in clinical research.

Epidemiological research imposes additional ethical concerns – for example, that the principle of avoiding harm must include consideration of group stigmatisation as well as individuals, and that the definition of harm must include embarrassment, ostracism, or time spent in the research. For the benefit of population public health interventions may require some sacrifices of individual rights for the protection of the public.

Ethical considerations for focus groups discussions are the same as for other methods of research (Homan, 1991). However, when the participants of the focus group are adolescents, the researcher must ensure that clear information about the purpose and use of their contributions is given.

### 5.1 Child rights and International Initiatives

The concept that children possess rights and are entitled to special benefits has been recognised in the international legal arena (Lindström, 1995). Children have received special consideration in international law through a number of declarations and conventions. In 1924, the Fifth Assembly of the League of Nations adopted the Declaration of the Rights of Child, which was the first international document to recognise the rights of the child. The Declaration of the Rights of the Child, (1959) also granted a series of benefits and entitlements and provided that every child shall be protected from all forms of neglect, cruelty, and exploitation. The rights granted in the 1959 Declaration were reaffirmed in the International Covenant on Economic, Social, and Cultural Rights adopted by the UN General Assembly in 1966. The UN Convention on the Rights of the Child (CRC) adopted in 1989 is a comprehensive document, which covers major aspects of children's rights especially on participation and autonomy.

### 5.2 Ethical consideration of our research

During the planning of the thesis, I realised some ethical difficulties with the methods that classifies people into overweight and obese. Classification of adolescents as overweight and obese is a sensitive issue as these individuals already are relegated to a lower position in society. There are a lot of children, who are highly dependent on their families, and are not always able to change their living habits to reduce weight. These consequences of overweight and obesity may lead to increased morbidity and mortality, as well as to a poorer quality of life (Rössner 1998; Fontaine, Cheskin, & Barofsky 1996; DiPietro, Mossberg, Stunkard, 1994). It is, therefore, essential to estimate the prevalence and follow the secular trends of overweight and obesity in children and adolescents.

The first four papers followed the recommendations and principles of the Swedish Council for Working Life and Social Research. The recommendations include: (i) That a person, who participates in research as a subject should be protected against the risk of physical injury, mental injury or the violation of their integrity; (ii) To the extent that the research can involve risks for the subjects of the research, there should be an assessment including, among other things, a weighing-up of the risks involved against the knowledge gained, and, (iii) High standards should be insisted with respect to the quality of the research and to ensure that the subjects involved have understood and accepted the conditions that apply to their participation.

Ethical approval was sought from Karolinska Institute (KI), Stockholm, for the Paper V with Focus group interview study. However, according to the new ethical rules in Sweden of 2004, the Ethical Committee of KI considered that an ethical clearance was not necessary.

In order to follow the basic ethical rules, the following steps were undertaken. Before the interviews started, the scope of the focus group discussions was clarified to each of the participants and that their contributions would be shared with the others in the group as well as with the moderator. The participants were also asked to keep what they heard during the discussions confidential and it was also stressed that the researchers will keep the data confidential from the other groups. Before the commencement of the sessions a form was signed by each participant, giving his/her consent, to participate voluntarily in the interview or leave the session at anytime when they did not feel comfortable.

## 6. METHODS

Research is undertaken to continuously search for the truth, when investigating a phenomenon vis-à-vis reality. New scientific results change the truth over time. The choice of theoretical perspective depends on the aim of the study.

Methods are ways to find answers to questions. The word method derives from the Greek word *metodos*, which literally mean a way or path of transit. In the search for answers several choices have to be made i.e. data collection, research design, data analysis and reporting.

In this thesis I have been using both quantitative and qualitative methods to get a better picture of the actual situation of adolescents' health. The main focus has been on the psychosomatic complaints among the adolescents and it was therefore necessary, to combine the two research methods, descriptive studies and focus group discussions, as they complement each other in drawing out the salient points that enhance the understanding of adolescent health. The first four papers presented used quantitative methods while the fifth one used qualitative method/focus group discussions.

### 6.1 Quantitative studies

Quantitative methods are commonly used in epidemiological research and the techniques used are to gather quantitative data/information that mostly are numbers and measurable. Statistics, tables and graphs, are often used to present the results of these methods.

The results presented in papers I-IV are based on the records from the five cross-sectional school surveys that so far have been conducted under the name of "Survey of Adolescent Life in Västmanland", SALVe – surveys. For the first three papers, we used data collected from the second cross-sectional study performed in 1998. The fourth paper data came from all five surveys conducted in 1995, 1998, 2001, 2004 and 2006.

The questionnaires were distributed to all public and private schools in Västmanland where students voluntarily and anonymously answered the questionnaire items during a 40-60 minute lesson. Those children who were in institutions were excluded.

The questions used in our quantitative studies were all from the questionnaire in the longitudinal survey, SALVe. They were grouped into seven domains: social factors, eating habits and physical activity, body image and relations, school situation, habits concerning alcohol, drugs and tobacco, somatic and psychological symptoms. The questions included in the seven domains are frequently used in scientific research and have been validated, when possible. With the exception of the questions concerning tobacco, alcohol and drugs, all of the questions were used by the Swedish National Institute of Public Health and WHO in a survey conducted in 1995, (WHO, 2003). The questions on alcohol, tobacco and drugs are the same questions that are used by the Swedish Council for Information on Alcohol and Other Drugs (CAN) in their yearly study on the use of alcohol, tobacco and drugs among Swedish adolescents (CAN report - 97).

The whole set comprising 36 questions, was used in paper II. For paper I, the following questions were selected: age, gender, height, weight and dwelling place. To validate the method of self-reported height and weight, a validation study was performed and is included in paper I. In paper III, we used age, gender, social background factors, psychosomatic symptoms and Antonovsky's

short, 13-items version on SOC. Finally, in paper IV, age, gender, and an index of psychosomatic symptoms were included.

The following statistical methods were used besides the more commonly used methods as:

- (i)  $\chi^2$  test to determine if there was an association between the psychosocial background factors and psychosomatic complaints.
- (ii) Bivariate correlation procedure computing Pearson's correlation coefficient or Pearson's  $r$  to determine if there was a covariance between the psychosomatic symptoms.
- (iii) An one-way ANOVA (post hoc. Tukey's test) to test if the means in the psychosomatic index varied with the quartiles in SOC.
- (iv) Factor analysis to analyse the relation between the psychosomatic variables to identify groups with similar symptoms; and,
- (v) Binary logistic regression to control for the influence of various social conditions. The logistic regression resulted in an odds ratio. The  $R^2$  coefficient, a measure of strength of the association in the models used in this study was Nagelkerke  $R^2$ .

Table 2. Summary of study population for the four quantitative studies, excluding validation study

Study year	Paper 1	Paper 2	Paper 3	Paper 4	Age groups
1995				2370	9:th grade Primary school
1998	2023 1918  1437	989	3998	2275	6:th grade 9:th grade Primary school 3:rd year Secondary school
2001				2588	9:th grade Primary school
2004				2871	9:th grade Primary school
2006				3114	9:th grade Primary school
Total study population	5378	989	3998	13 218	

## 6.2 Qualitative study

The rationale for a qualitative research approach is that it facilitates the use of narratives, stories and tales that enables the researchers to place themselves at the crossroad between persons, stories, organisations and even place the person in an emotional and organisational context. A leading author of qualitative research methods, Silverman, (Silverman, 2005) suggests the use of qualitative method when exploring people's life stories or everyday behaviour.

Qualitative content analysis produces both descriptions and expressions from the persons involved in the discussions, reflecting their views of the society. It can also pay attention to unique themes that illustrate the range of the meanings of the phenomenon rather than statistical significance. The method is considered to be one of the most suitable modes to analyse focus group discussions: that is, the unit of analysis is large enough to be considered as a whole and small enough to keep in mind as a context for the meaning unit during the analysis process. With these considerations in mind, I used a qualitative method, focus group discussions, in paper V.

The purpose of the focus group discussions was to explore the respondents' attitudes, feelings, beliefs, experiences and reactions which, of course, can be obtained through other methods as, observation, one-to-one interviewing, or questionnaire surveys (Kitzinger, 1995). Focus groups can sometimes bring out attitudes, feelings and beliefs that are rarely revealed in an ordinary interaction or social gathering (Barbour & Kitzinger, 1999). As compared to individual interviews, where the aim is to obtain individual attitudes, beliefs and feelings, the focus groups can bring forth a variety of views. Individual interviews are, however, easier for the researcher to control than a focus group where interviewees may take over the initiative in the discussion. Compared to observational studies, focus groups enable the researcher to gain a larger amount of information in just a short period of time. Focus group discussions are particularly suited for obtaining several perspectives on a particular topic. An advantage of focus group research is gaining insights into people's shared understanding of everyday life and on how others influence individuals' in-group situation (White & Thomson, 1995). Another benefit is that focus groups elicit information in a way which allows researchers to find out why an issue is salient, as well as what is salient about it (Morgan, 1997). If participants reveal multiple understandings and meanings, multiple explanations of their behaviour and attitudes will be more readily articulated.

Interaction between participants is the crucial feature of focus groups. It highlights the participants' view of the world, the language they use about an issue and their values and beliefs about a situation (Kitzinger, 1994). It also enables participants to ask questions to other members of the group, and help them to re-evaluate and reconsider their own understanding of specific experiences.

Using qualitative content analysis data from the four focus group discussions were read through several times to comprehend the material in its entirety, and thereafter, these texts were read through several times to understand the essence of the discussions from each group (Downe-Wamboldt, 1992; Graneheim & Lundman, 2004).

For paper V we used a sample of students attending second year in secondary high school in a school in Västerås, Sweden. There were 79 persons who volunteered to participate in the focus group discussions, of which, 18 persons were studying at the vocational programs and 61 at the theoretical programs. In order to get an equal representation from both the theoretical and the vocational programs, the groups were purposely selected to get four groups of students, two from each type of program. The objective was to achieve a variety of ideas and views. The random selection of the participants was also done to avoid any bias due to educational direction.

School personnel were also interviewed; two principals, eight teachers and two school social welfare workers, in the school. We used in-depth interviews as the method to reach them due to their busy schedules.

The analysis began by identifying the meaning units describing the adolescent perceptions of PSC. The meaning units were then condensed to shorten the text without losing its message. Thereafter

the condensed meaning units were labelled with an open code representing its content. The open codes were compared with each other to find differences and similarities in order to identify categories. Finally, categories from the different groups were compared. This comparison brought forth sub-themes and themes. The first four steps of the analysis were performed separately for each group. The process of analyses is shown below.

Table 3. Process of Analysis

Theme	Factors influencing adolescents' perceptions of psychosomatic complaints							
Sub-theme	Risk factors					Salutogenic factors		
Categories	Strained relations	Harassment in school	Inactivity	Unrealistic demands	Too little sleep	Supportive relations to peers	Supportive relations to parents	Active leisure time
Open codes	Bad relations to parents	Bullied in school	Sedentary lifestyle	Pressure from home and in school	Sleeplessness	Close friends	On speaking terms	Sports, recreation
Condensed meaning units	Nagging parents demand and never satisfied	Fighting, bullying, verbal abuse	Sitting at home playing computer or watching films	To much to do at home and in school	Tired and slow, difficult to sleep, problem waking up wakes up late in the morning	Someone to talk seriously to, share thoughts, ideas	The parents trust their children, no problems discussing issues	Hanging around, being active

## 7. RESULTS

The main findings from the five papers and additional analyses of the data are presented below.

### **Paper 1 Over-weight and obesity**

The main finding in Paper I was that there was a comparatively high prevalence of overweight and obesity among the adolescents in Västmanland (Berg, Simonsson, Brantefors & Ringqvist, 2001). These results validated the trend in the increase of overweight and obesity among children and adolescents in developed countries during the past decades (Rasmussen, Johansson & Hansen, 1999; Troiano, Flegal, 1998; Gortmaker, Dietz, Sobol & Wehler, 1987; Haude, Lafay, Borys, et.al.2003). In this study, the high prevalence of overweight was seen in all the three age groups (i.e., 12-, 15- and 18-year-olds) included in our survey. The prevalence of overweight, defined as a BMI above the 91st and below the 98th percentile (Cole, Freeman, & Preece, 1995), and the range were in the range 11.4 and 12.4% for boys and 4.8 to 6.8% for girls. On the other hand, the prevalence of obesity, defined as a BMI above the 98th percentile, ranged from 7.0 to 8.9% for boys and 3.9 to 5.1 % for girls. The highest prevalence rate was found among 15-year-old boys while the lowest was among 18-year-old girls. It was only in the 15-year-old boys living in rural areas that we found a significantly higher proportion of obesity.

As mentioned in the method chapter, self-reported measures among adolescents are often considered to be less accurate than measured values. In order to evaluate if self-reported heights and weights can be used in calculating BMI among children and adolescents, a validation study was performed. The results in the validation study confirmed our hypothesis that self-reported height and weight can be used by older age-groups in calculating the BMI with sufficient accuracy.

### Paper 2 Social factors

At the time of the survey, several reports had been published on adolescents health, but most of them focused on the health of girls. We decided that studying the health of boys could give another perspective on the gender health (Nelson Steen, Wadden, Foster & Andersen, 1996). In paper II, we looked at the differences off self-reported health in relation to BMI. The students were divided into, non-overweight, overweight and obese. If the student had a self reported BMI value over the 91<sup>st</sup> percentile he was overweight, and when it is above 98<sup>th</sup> percentile, he was obese. The study showed that obese boys differed from normal-weight boys concerning their lifestyles, health-compromising behaviours, somatic and psychological symptoms. The situation of the overweight boys was not as problematic as among the obese. The overweight boys differed from the normal-weight boys by 14% of the variables examined while the obese boys differed by as much as 66%.

The domains studied were:

#### ***Social factors***

There were no significant differences among the weight groups with regard to social factors.

#### ***Eating habits and physical activity***

Obese boys had more irregular eating habits than the other two groups, as the obese were regularly skipping meals.

#### ***Body image and relations***



Obese boys were less satisfied with their weight and looks as compared to the other weight groups.

#### *School situation*

School situation was more problematic for the obese boys. A larger proportion of them reported that they did not enjoy school and had more absences. They were often teased, kicked or hit and, vice versa, more often hit and kicked their schoolmates.

#### *Use of alcohol, other drugs and tobacco*

Neither the amount of alcohol consumed nor the frequency of being intoxicated by alcohol differed across the weight-groups. The obese boys had tried sniffing glue and other solvents and even used narcotic drugs more often than other boys.

#### *Somatic and psychological symptoms*

Obese boys reported significantly more somatic and psychological symptoms than the other two groups. A higher proportion of obese and overweight boys reported suicide attempts.

These results showed that the obese boys live relatively healthier lives than the other boys do.

### Paper 3 Sense of coherence and psychosomatic complaints

This study is the first to address the relation between psychosomatic complaints (PSC) and sense of coherence (SOC). The results from our study showed that there is a statistically significant association between PSC and SOC. The study also showed that a lower SOC is associated to a higher prevalence of PSC. We conclude that adolescent boys with weak SOC have 15 times higher risk for developing severe psychosomatic complaints, than boys with high SOC. The corresponding increase in risk among girls was ten times. Conversely, higher SOC was associated to lower prevalence of PSC. The findings in our study also suggest that a strong SOC can help adolescents to choose a coping strategy that is appropriate for a situation and thereby may prevent them from developing PSC. It also confirmed previous reports (Bishop 1993; Buddeberg-Fischer B, Klaghofer R & Snyder U 2001) about the effects of a strong SOC.

We performed logistic analyses using two models. In the first model, model A, SOC was tested in relation to an index of psychosomatic symptoms, and in model B, an adjustment for psychosocial background factors was made. In model A, we found that the category of adolescents that reported many and severe PSC was significantly related to SOC-quartiles. The same pattern was found when the model was adjusted for psychosocial background factors; model B. All psychosocial background factors had non-significant relation to psychosomatic symptoms when adjusted for SOC, except among girls living in rented apartments who had an increased risk for developing psychosomatic complaints.

Our results also indicate that the psychosocial background factors used ethnicity, residential type, family constellation and parental employment, did not in any meaningful way explain the variation in PSC, when controlling for SOC. Instead, the reverse pattern was found implying that SOC variable ruled out the psychosocial risk factors used in our model. However, this does not exclude the possibility that other psychosocial factors than those investigated by us could influence or explain the variation in PSC (Craig, Goldberg & Dietz, 1996; Dhossche, Ferdinand, van der Elde & Verhulst, 2001; Due, Lynch, Holstein & Modvig, 2003; Engström, Mattson, Järleborg & Hallqvist, 2008; Zdanowicz, Janne & Reynaert, 2004).

#### Paper 4 Time trends in psychosomatic symptoms among adolescents

Unfortunately very little data is available about the secular trend of psychopathological problems among children and adolescents. This applies also for psychosomatic symptoms. (Aro, 1987; Borge, Nordhagen, Moe, et.al.1994; Rauste-von Wriyth & von Wriyth, 1981; Pine, Cohen & Brook, 1996; Sillanpää & Anttila, 1996; Achenbach, Dumenci, Rescoria, 2003; Sourander, Santalahti, Haavisto, et.al. 2004; Verhulst, van der Ende, Rietbergen, 1997; Santalathi, Aromaa, Sourander, et.al. 2005; Sells & Blum, 1996).

The data from the survey conducted in 2008 has become available after publication of these papers. These data are, therefore, included in this discussion of the study. From our study it can be seen that there was an increase in the prevalence among girls between 1995 and 2001, from 15 – 26 %, there after the prevalence rates levelled of to a plateau that persists from 2004 to 2008 at about 24%. For the boys there is was a minor increase from 5 to 8 % between 1995 and 2001. After that the level has been stable at about 8 %.

If this secular trend in one county is representative for Sweden, as a whole, is uncertain. The results need to be confirmed or negated in other studies before a conclusion can be made about the trend.

#### Paper 5 Focus group discussions with the adolescents

The study showed that there is a large variation in the opinion on the reason why PSC develop. It is obvious from several other studies that stress or stress related factors play an important role in the development of the symptoms; and, among adults in the development of the somatoform diseases. The adolescents brought forward several factors that they considered to contribute to the development of PSC. Problems in the relationship among the adolescents and or their parents and other adults were the first to be brought up as a contributing factor to PSC. On the other hand, good relations with parents were considered to a positive factor in preventing the development of PSC (Noller & Callan, 1986). Peers were considered an important protective factor to the development of PSC. This is understandable as the adolescents are in the process of developing their own personalities and detach themselves from their parents, while older peers are often seen as role models for the adolescents.

Another factor that the adolescents considered as contributors to PSC was unrealistic demands from their parents (Marcotte, 1996). Naturally, such unrealistic demands are difficult to objectively evaluate, although they could still be considered as a possible contributing factor to the development of PSC.

The boys and the school personnel discussed the effect of an active sportive lifestyle (Hills, King, Armstrong, 2007). In both groups, there was a common view on the importance of exercise. The girls, on the other hand, felt that leisure times should be used for relaxation and being with friends. This difference in opinion could be attributed to the physical development of the boys and to the Swedish upbringing of children. The boys are expected to participate in sports to a much larger extent than the girls. Boys are often taking part in sports until the age of 16-18 years of age, while the girl's often loose interest in sports when they are 13-14 years of age.

## 8. DISCUSSION

### 8.1. Methodological considerations

#### Quantitative studies (Papers I-IV)

School surveys are commonly used in extracting information about the adolescent's perceived health. In Sweden, school surveys are easy to perform because of limited bureaucracy. Each principal has the authority to decide if the study can be performed in his or her school. The costs for this kind of study are very low and the study population is readily available. The situation is most often controlled, with a teacher present while the students voluntarily and anonymously answers the questionnaire items during a lesson hour (Berg-Kelly, 2003; Gibson & Cook, 1997; Erginoz, Alikasifoglu, Ercan, et.al. 2004; Wolk & Rössner, 1996).

The main drawback with school surveys is that the answers given by the adolescents are self-reported with the possibility of reporting bias. Self-reported data are considered to have questionable validity, especially if the questions concern unacceptable social behaviour. It has been shown that anonymous self-reports from adolescents are generally valid if confidentiality has been stressed (Campanelli, Dielman & Shope, 1987).

In our studies we have been following the same method as described above. One of the strong points with our studies is that, we have been using validated questions that have previously been included in several large studies, on adolescents, like the WHO and European School Survey Project on Alcohol and Other Drugs (ESPAD) surveys. Another strength in our studies is the large sample size and that the same age cohort that are being surveyed at regular intervals. Despite the large sample size of data from the adolescents in these studies, it only represents one county in Sweden and this limits its generalisability. However, the county of Västmanland does not differ from other Swedish counties with regard to socio-economic or demographic factors.

It is evident that one of the limitations is the use of cross-sectional study design. This type of studies only gives a glimpse of the situation in just that moment when that the study was undertaken. Our results only represent relations among variables and not causations. These relations presented are associative where conclusions on the directions of cause and effect are tentative.

In the first of the quantitative studies conducted, a validation study with acceptable results was performed. The study evaluated if self-reports about height and weight can be used in calculating BMI among children and adolescents.

#### 8.2. Qualitative study (Paper V)

There are a number of different approaches to qualitative inquire with different perspectives on how the results obtained should be evaluated. We selected two methods for our study; firstly we used focus group discussions as our mode of inquiry among the adolescents and give us opportunity to obtain their insights on attitudes, feelings, beliefs, experiences and reactions on psychosomatic complaints. According to my experience it is often easier to interview adolescents in a group rather than individually.

Although focus group research has many advantages, there are also limitations. Careful planning and moderating can overcome some, but others i.e., no control of the discussions, are unavoidable and inherent to this approach. The moderator has to allow participants to talk to each other, ask

questions and express doubts and opinions, while having limited control over the interactions other than generally keeping participants focused on the topic. The moderator, also, has less control over the data produced than in either quantitative studies or one-to-one interviews (Morgan, 1997). By its nature focus group research is open-ended and cannot be entirely pre-determined.

The benefits of participating in focus group discussions are obvious. The participants feel empowered and are given the opportunity to be taken seriously and valued as experts on their own situation in life. However, not every one of them will experience these benefits, especially to the shy and inarticulate ones. Occasionally, focus group discussions can be intimidating (Webb & Kevern, 2001).

The second mode chosen was the in-depth interviews with school personnel. In depth interviews is one of the most common used qualitative methods. One reason for its popularity is that they are very effective in giving a human face to research problems. In addition, conducting of and participating in interviews can be a rewarding experience for both the participants and interviewers as in-depth interviews offer them the opportunity to express themselves in a way ordinary life rarely affords them.

They are similar to group discussions, but with only one person interviewed at a time (Kvale, 1977). The format of the interview remained unstructured. In-depth interviews are valuable for researching people with busy lifestyles who would be unlikely to attend a focus group - e.g. as in our case, the school personnel. On the other hand, its disadvantage is that the respondent may feel like being scrutinised and be less willing to open up than in the relaxed atmosphere of a group. In our study, the issues discussed were not of controversial in nature, thereby, created a relaxed situation.

### 8.3. Trustworthiness/validity

Trustworthiness in qualitative research is the equivalent to validity in quantitative research. Trustworthiness can be referred to as the correctness of the description and conclusions of the study. The term reflexivity refers to how knowledge is shaped by the researcher and how this is accounted for in the research process. In qualitative inquiry, the researcher gets involved, and uses his or her interview skills, creativity and empathic ability to collect data during the qualitative inquiry.

Triangulation of methods and sources involve comparing data from the different methods and comparing the perspectives of people from different points of views. For practical reasons the focus group discussions were conducted only by myself. The analysis of the results was discussed by other researchers. I used the data from a quantitative cross-sectional study as bases for forming my research question that in turn needed a qualitative approach to answer it.

### 8.4. Transferability/generalisability

There is a big difference between transferability in qualitative inquiry and the concept of generalisability or external validity in quantitative studies. Transferability refers to the degree to which the results of qualitative research can be generalized or transferred to other contexts or settings. Since individual subjective meaning is central for qualitative inquiry, findings are not seen as facts that are applicable to the whole population. Rather, it is an analytical description of theories that could be applied only within the setting under study and thereby enhancing our understanding of the studied topic. From a qualitative perspective, transferability is primarily the responsibility of the one doing the generalizing.

## 8.5. Health of adolescents (Paper II)

With increased complexity of our society and with the advancement of knowledge about health constitutions, health has become a difficult concept to define and also to operationalise in a way that is not controversial and open to criticisms. A major issue is whether health should be seen as the opposite of disease/ill-health or as a partly independent concept including aspects such as wellbeing and resources to withstand threats to the organisms. In practise, the main ways to conceptualise health, which has been discussed both in the scientific literature and in the public debates, is lack of manifest disease and the subjective wellbeing and health. Other resources in terms of relative lack of biological, psychosocial and behavioural risk factors, working capacity and health related autonomy has also been discussed. Concerning the adolescents, these factors can be translated into the issues included in our studies.

For a better understanding of the health of the whole age-group of adolescents, a description of perceived differences of health between boys and girls using the results from the same cross sectional study of 1998 is given. The results are presented with the same division into weight groups. Interestingly, among girls there is no real difference in their perceived health, among weight groups, as compared with the boys (Berg-Kelly & Kullander, 1999). The reported prevalence of somatic and psychological symptoms did not differ at all among girls, as it did among the boys, where the obese reported a significant higher prevalence of these symptoms than the overweight and normal weight.

Overweight girls reported that they were teased and afraid to go to school because of fights or being bullied by schoolmates (Olweus, 1994a; Olweus, 1994b). Among boys, obese individual had similar had experience. Concerning smoking, drinking alcohol and abuse of drugs and other chemical substances, there were no differences among the girls, while the obese boys had used drugs and sniffed glue or other solvents to a much larger extent than the other normal weight boys.

In the United Kingdom it has been noted the adolescents have had experienced little or least improvement in overall health over the past 40 years, and that the health problems seem to be increasing (Viner & Booy, 2005). Also in a study where data from three cities in three countries, Turin (Italy), Groningen (the Netherlands) and Västerås (Sweden) was compared, the adolescents were reportedly in general good health (Ciairano, Bonino, Jackson & Simonsson, 1999). There were, of course, differences that can be attributed both to disparate cultural and social norms. The relations with the parents differed, in that, the adherence to family rules were much stronger in Italy and Sweden than in the Netherlands. Only in Sweden the students felt support from the parents when they experienced strained relations with peers and teachers and needed help with the homework. There were also differences in the use of drugs as well as in smoking and drinking habits. Satisfaction with the school situation was very low in Italy. These are just a few of the results from this study and are included here to show that there is no conclusive formula on how to gain or even perceive good health. It clearly differs in each and every society and is also largely due to the expectations and norms that prevail in a specific place.

There is also a social dilemma in the society today, where the overall situation for the adolescents is rather confused, where the society that gives ever-increasing possibility of choices. As a concrete example, in Sweden, the variety of free educational possibilities, where there are little or no directions for the future. This can make the lives for the youngster stressful.

## 8.6. Overweight and obesity (Papers I and II)

In spite of strong social pressure that emphasises on thinness and fitness, with well trained bodies, in combination with a high prevalence rate of dieting for weight loss, the prevalence of obesity among adolescents, unfortunately, is still high (Neumark-Sztainer, Story, French, et.al.1996). There are several theories why overweight and obesity is a major problem despite the vast amount of knowledge that we have about the aetiology of obesity. One of the problems is how to transfer this knowledge to the recipients themselves and to internalise it to make the needed changes in habits as trendy and sexy as their present lifestyles (Berg, Simonsson & Ringqvist, 2005).

There is a consensus that food and physical activities are key factors in maintaining a normal weight. Irregular eating habits can play an important role in the development of obesity. Such habits may be an expression of a disorganised way of life as a whole or as a sign of the busy schedule that families have which makes it difficult to have meals together. The easy access to fast food promotes unscheduled meal patterns. Our data do not give any information about the energy-intake per day. This would be of interest, as we know that many obese over-consume food and this irregular eating pattern could give the extra caloric intake that leads to their obesity. Usually, disordered eating and dieting have been reported among girls (Neumark-Sztainer & Hannan, 2000) but we also found that obese boys reported significantly more signs of anorexia and bulimia than the normal-weight boys did.

The physical activity in Swedish schools has been reduced during the last decade while physical activity outside the schools is more organised than spontaneous and often costs money. This possibly prevents many adolescents from taking part in physical activities. There is, therefore, a need for alternative activities for these adolescents. The increase in television viewing and computer game playing (Gortmaker, Must, Sobol, et.al.1996), in addition, to the technological developments in society, possibly contribute to a more sedentary lifestyle. However, boys who play computer games two hours a day are more physically active than those who do not play computer games or play more than two hour a day (Nilsson, 2007).

Since the time of our study in 1998, the prevalence of overweight and obesity has dramatically increased among children and adolescents in Sweden. The same trend had been seen in other countries. Subsequent studies conducted with-in the SALVe – surveys in 2004 and 2006 as well as in other studies have indicated that this trend of overweight and obesity has declined and even come to a halt (Sundblom, Petzold, Rasmussen, et.al. 2008). It is too early to conclude if this decline is a temporary phenomenon. It is disputable whether the development is a result of preventive programmes, or if it is the result of an increased awareness by the public due to an interest from media and other sources.

There is a problem with the validity in using BMI as the measure for overweight and obesity as BMI cannot distinguish if the overweight is due to fatness or muscularity. We can see this among the boys, who are training bodybuilding, weightlifting or boxing and were considered to be overweight although their high BMI depended on a high muscle mass associated with training.

Validation of a questionnaire is a multifaceted method that determines the accuracy, dependability and consistency of an instrument and the scientific theories supporting it. Validation measures how closely a test score correspond to measurable behaviours or characteristics. It also establishes the reliability of the instrument, ensuring that the nature of the instrument does not significantly affect the outcomes. The process of validating an instrument is compartmentalised into each different processes measuring different aspects of the instrument.

To obtain health data through self-report techniques is a commonly used method in health surveys. There is a common notion, however, that anthropometric data obtained through a self-reporting procedure may sometimes under- or overestimate the dimensions of height and weight (Kuskowska-Wolk & Rössner, 1989; Fortenberry, 1992; Hauck, 1995; Crawley & Portides, 1995; Roberts, 1995; Brener, McManus, Galuska, et al. 2003). Therefore, self-reported data can be of limited value. The sample for the validation study was drawn from the same group that participated in the school survey. The number of students in the validation study was 160, 172, 163 and 159 in the 9, 12, 15, and 18 year-old age groups, respectively. To avoid recall bias, the validation study took place 9 months after the main survey.

The students were given a short questionnaire dealing with leisure time activities and height and weight. After filling in the questionnaire, the students were asked to visit the school nurse to measure their heights and weights. The nurse collected the questionnaire and filled in the measurements on the form immediately after taking the measurements. The height and weight measurements were performed according to the WHO recommendations (World Health Organisation, 1995).

The correlation between the self-reported and the objective height and weight measurements for calculating BMI were good in the three oldest age groups. The results ranged for boys from 0.96 to 0.88 with a 95 % confidence interval (C.I.) of  $\pm 0.04$  and for girls from 0.98 to 0.89 with a 95 % confidence interval (C.I.) of  $\pm 0.05$ . But for the 9-year-old age group, the results showed that the self-report procedure for height and weight was not a reliable method for calculating BMI. The correlation for the boys was  $0.37 \pm 0.09$  and for the girls  $0.72 \pm 0.1$ . Consequently, the 9-year-old age group was excluded from all statistical analyses. Contrary to other researchers (Fortenberry, 1992) we found that the age of the children or adolescents surveyed is important in order to verify the accuracy of the self-reported weight and height.

The specificity and sensitivity of the self-reported height and weight compared with the actual measurement, was acceptable. These results confirmed our hypothesis that the self-reported height and weight in older age groups can be used in calculating the BMI with sufficient accuracy.

### 8.7. Psychosomatic complaints (PSC) (Papers III-V)

There has been little systematic information collected about gender differences in self-reported somatic discomforts during adolescence (Rauste-von Wright & von Wrigth, 1981). People may differ in their sensitivity to physical symptoms; this may be due to cultural, individual or situational differences on how psychological activation or stress is interpreted as bodily symptoms. One of our studies, paper IV, has shown that there is an increase in the trend of PSC among the adolescents and this trend is higher among girls than among the boys. There is an increase in the prevalence of PSC in adolescents, especially among the girls, during the years 1995-2006 from 16 to 26 percent; while among boys, it was a modest increase from 6 to 7 percent.

The changes that occur in our society today especially in the social environment could be one of several possible explanations to the increased prevalence of PSC found among the adolescent in our study. A potential cause of increasing PSC is the reduction of school personnel that occurred in Sweden during the recession in the early – mid –90s. The staffs that were laid off were welfare workers, psychologists and teachers' assistants, and this decreased in the number of adults in schools taking care of children that needed an adult to talk to. According to this theory, the decrease

in the prevalence seen during the last surveys can be explained with the increase in new staff that has occurred during the last five years.

Our study, paper III, on the relation between PSC and SOC, is the first study published in Sweden. The results showed that there was a statistically significant association between PSC and SOC, and also that lower SOC was associated with a higher prevalence of PSC. This was expected, as we have found in other areas like frequency of alcohol intoxication vis-à-vis SOC. Persons with high SOC, despite frequent intoxication with alcohol, were protected to a large degree from experiencing alcohol-related problems (Nilsson, Starrin, Simonsson & Leppert, 2007). Bishop has shown that SOC can act as a buffer against stress (Bishop, 1993). He also pointed out that the notion of a direct stress-illness link is oversimplified, and although stress can lead to illness there are several of factors as social support or personality that can moderate that relationship.

By analysing the relation between SOC and PSC, I looked at the relation between educational direction and SOC. Contrary to my expectation I found that it was a group of girls that scored highest on the SOC scale. This was the girls that for upper secondary school had made active choices that were contrary to the expected norm, it was girls that were studying to become car mechanics, construction workers and painters. This results, although still unpublished, shows that self-esteem plays a significant role in the development of SOC.

As in most epidemiological studies cited here there were no medical assessments done, although they are crucial to confirm that there are no medical conditions present or insufficient to explain the complaints present and the associated impairments. Therefore, the validity of the reported complaints depends on the understanding of the questions by the respondent.

There are, of course, problems when SOC is used indiscriminately. One is that the results should be regarded as complementary to and not a substitute for information already known to be associated with increased risk of present or future ill health (Davey Smith & Egger, 1997).

There is obviously change in the attitudes of adolescents to discuss PSC more openly, as it has become accepted and acknowledged, that these problems exist. Discussing problems openly gives an opportunity to get relief of symptoms. This is in accordance with the common medical psychological theory that patients suffering from PSC often have a narcissistic personality, characterised by their dependency and intolerance to frustrations, more often, contributes to physical complaints. When we are trying to find explanations to the increase in PSC we should not forget that there have been societal changes in Sweden during the 1990s with an increase in “minor” psychiatric complaints in the Swedish population as a whole (Hendrikx, Nilsson & Westman, 2008). This could be one explanation to the increase in PSC that we have seen.

The complexity of PSC cannot be understood merely from a medical point of view, as there are other explanations that should be considered like psychological as well as sociological issues. To gain a more comprehensive picture of the development of psychosomatic symptoms, we set out to compare the views of the adolescents and the school personnel, on what might be the factors behind the development of PSC. We found that the adolescents differed both between genders and from the school personnel on what might be the causes behind the development of the complaints and also on how to prevent the development of these symptoms. The school personnel had acquired the common medical view of the problem of the psychosomatic symptoms. On the other hand, the adolescents had a more pragmatic view on explanation of the primary causes of psychosomatic symptoms rather than trying to explain and understand the whole chain of events that led to this development of symptoms.



When looking into the difference of opinions on psychosomatic symptoms between the genders, it came up that the girls were thinking more in terms of relations and demands. Meanwhile, the boys were thinking in terms of physical activities as active leisure times and the harassment that happened in schools. This difference in opinion is not surprising as the same results can be read in the results from paper II where the boys, for instance, are more exposed to harassment in schools than the girls.

Young people's perceptions of their health problems can give ideas and inputs when trying to develop an understanding of some of the causes of PSC. It can also give an insight into how to address the questions of prevention and health promotion of general health as well as psychosomatic problems. A similar approach was used in a program where the aim was to prevent teenage pregnancies (Chambers, Boath & Chambers, 2002) and also in a project on treatment management for children living with juvenile arthritis (Guell, 2007) in UK.

#### 8.8. General comments

More research is needed for us to understand the relation between somatic symptoms and the onset of PSC. The differences we found between the boys and girls suggest that different pathways and mediators exist in boys and girls. There are many different pathways that need to be explored before we can come to explanations and conclusions on the relation between somatic symptoms and PSC. These pathways would include hormonal changes, morphological changes, environmental stresses, and cultural expectations that affect the different associations between physical pathology and psychopathology in girls and boys (Nilsson, 2006). We also need to increase our knowledge of the role of gender in the aetiology and course of psychosomatic disorders. There is a clear gender difference in the development of psychosomatic complaints with the girls experiencing these complaints 3-4 times more often than boys.

## 9. CONCLUSIONS AND RECOMMENDATIONS

Although the findings, in this thesis are just scratching on the surface of the problems adolescents encounter in their daily lives, they highlight the need for a multidisciplinary approach when studying their health problems. The health problems seen today are becoming more and more complex and thus need a new approach to solve as they are in many cases no longer solely medical.

Concerning obesity a lot of research has been done and several preventive programs have been implemented. The results can now be seen with a decline in the number of overweight and obese. However, I am convinced that the decline could have been bigger if we had taken the understanding and knowledge of the young into account when the preventive programs were prepared.

The focus group interviews showed how important it is to get the perception of the group under study, may it be, adolescents or other groups. The focus group interviews give a better understanding of the lives of the adolescents; and also about their ideas concerning psychosomatic symptoms/complaints more than what is possible to gain from by just reading medical textbooks. The focus group discussions also gave idea on how to communicate with the adolescents with gender tailored messages.

It is necessary, however, to await the results from other studies to confirm or negate our findings.

In summary:

As a group the girls are experiencing more health related problems than the boys, with more psychosomatic complains than the boys. We should to a much larger extent, than now, use focus group discussions or similar methods to obtain the target groups' views and knowledge about health and related issues.

## 10. APPENDIX

### Antonovsky's 13-item Sense of Coherence Questionnaire

Here is a series of questions relating to various aspects of your lives. Each question has seven possible answers. Please mark the number, which expresses your answer, with number 1 and 7 being the extreme answers. If the words under 1 are right for you, circle 1: if the words under 7 are right for you, circle 7. If you feel differently, circle the number which best expresses your feeling. Please give only one answer to each question.

1. Do you have feeling that you don't really care about what goes on around you?

1	2	3	4	5	6	7
very seldom never						very often or never

2. Has it happened in the past that you were surprised by the behaviour of people whom you thought you knew well?

1	2	3	4	5	6	7
never happened						always happened

3. Has it happened that people whom you counted on disappointed you?

1	2	3	4	5	6	7
never happened						always happened

4. Until now your life has had:

1	2	3	4	5	6	7
no clear goals or purpose at all						very clear goals and purpose

5. Do you have the feeling that you're being treated unfairly?

1	2	3	4	5	6	7
very often						very seldom or never

6. Do you have the feeling that you are in an unfamiliar situation and don't know what to do?

1	2	3	4	5	6	7
very often						very seldom or never

7. Doing the thing you do every day is:

1	2	3	4	5	6	7
a source of deep pleasure and satisfaction						a source of pain and boredom

8. Do you have very mixed-up feelings and ideas?

1	2	3	4	5	6	7
very often						very seldom or never

9. Does it happen that you have feelings inside you would rather not feel?

1	2	3	4	5	6	7
very often						very seldom or never

10. Many people – even those with a strong character – sometimes feel like sad sacks (losers) in certain situations. How often have you felt this way in the past?

1	2	3	4	5	6	7
never						very often

11. When something happened, have you generally found that:

1	2	3	4	5	6	7
you overesti- mated or under- estimated its importance						you saw things in the right proportion

12. How often do you have the feeling that there's little meaning in the things you do in your daily life?

1	2	3	4	5	6	7
very often						very seldom or never

13. How often do you have feelings that you're not sure you can keep under control?

1	2	3	4	5	6	7
very often						very seldom

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