



**Sense of coherence as a mediator of stress
among high school students in Tromsø,
Norway.**

Lise Sand Mellem

*Master Thesis in Psychology
Faculty of Social Sciences
University of Tromsø
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Investigating human beings always unavoidably will be coloured by a complex matrix of influences. Targets have been defined and narrowed down, and compromises have been made, in order to capture parts of the phenomena of stress, health and the sense of coherence in youth.

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.....
Lise Sand Mellem
Student

.....
Professor Martin R. Eisemann, PhD.
Supervisor

Preface

The phenomena under investigation are stress, health and the sense of coherence among 125 youth in the Norwegian high school in Tromsø. After having been through the Norwegian public school system myself, both as a pupil and as a teacher while studying pedagogy, I have got the impression that there is a lot of stress among the youth, and that many of them have a low sense of coherence in life. I became interested in finding out whether their stress could be reduced by increasing their sense of coherence. I believe this can be done through focusing more on the influence of mental health and emotions in the learning process, personal relevance in subjects being taught, and a contemporary, global and universal outlook in pedagogy models and in the educational system. This decreased stress and increased sense of coherence, I reflected, might also be beneficial not only for learning, but also for reducing health complains caused by stress.

The motivation for the topic is a belief in continually improving educational systems in relation to particularly youth mental health and development in a complex, changing and multifaceted world. The study is to a large extent inspired by positive psychology (Sheldon et al., 2002) and eco-philosophy (Drengson, 1999).

Because of an early awareness of the theme for the theses, it has been open for exploration from different angles during the entire master study. This has given ideas and valuable insights in research touching the theme from different perspectives. More specific; placebo studies by professor Magne Arve Flaten, inspired to follow my interest in how stress and mental aspects might affect health, and introduced me to W. R. Lovallo and behavioural medicine. Professor Susanne Wiking's lectures on working memory taught me more about how memory might be affected by emotions and introduced the Global Workspace Theory. Professor Bruno Laeng's lectures about consciousness made me ponder upon which stimuli human consciousness need to develop and what it is, in relation to education, youth stress and health. I wanted to make this study local, so that the results could be of practical use to the group tested, but also comparable to previous studies.

Abstract

School adaptation seems to have an impact on social, psychological, and behavioural outcomes. Empirical evidence on the stress moderating role of the sense of coherence (SOC), which implies to which degree one find life meaningful, comprehensible and manageable, may offer a scope for development of prevention policies.

The aim of this study was to examine the relationship and interactions between high school students perceived stress (PSQ), sense of coherence (SOC-13), perceived health condition (HBSC), memories of childhood upbringing separate for mother and fathers parenting style (s-EMBU), locus of control (LOC) and degree of conformity (NC). All respondents were at least 18 years during semesters 2007/08. Three high schools in Tromsø, here referred to as school A, B and C, participated in the study. Results were analysed for total group, for each gender and also individually for each school. The study included 125 respondents, 61 females and 64 males, who completed a test battery in paper form.

The results revealed that youth with a high sense of coherence report less perceived stress, whereas youth with high perceived stress report more health complaints. Males with the highest sense of coherence and females with lowest sense of coherence (SOC) report the strongest correlation between the sense of coherence and health complaints. There were only very weak correlations, in particular for males, between SOC and factors from experienced childhood upbringing, no statistically significant correlations were found. There were no statistically significant correlations between SOC and youths locus of control. Significant gender differences were found in that perceived stress and level of health complaints is significantly higher in females. Health complaints and sense of coherence has the largest predictive power for females and males perceived stress. For males their sense of coherence has an almost equally strong predictive power as perceived health. Evaluation of parallelism shows that SOC and HBSC do not have a significantly different effect on perceived stress in males and females. But the overall level of stress and health complaints is reported as higher in females. Due to methodological limitations, any conclusions about causality cannot be drawn from the present results.

Keywords: Youth, gender differences, perceived stress, sense of coherence, perceived health, emotional memory of childhood upbringing, locus of control, behavioural medicine.

1.Introduction

”Behavioural medicine calls for removal of the metaphysical dichotomy between the mind and the body. It calls for us to theorize differently about the influence of perceptions, thoughts, and emotions on our biology. Ultimately, it may allow us to consider social processes and culture as causal agents in health and disease” (Lovallo, 2005).

1.1. The purpose of the present study

Antonovsky suggests that adolescent sense of coherence (SOC) may affect level of health complaints indirectly by preventing school-related stress appraisals, interactively by moderating the impact of stress, and directly by reducing the likelihood of sustained activation (Antonovsky, 1987, cited in Eriksson & Lindström, 2006). Previous research has paid little attention to comparing the importance of these mechanisms at different developmental stages in life. However Torsheim et al. (2001) have investigated whether SOC is related to appraisals of school-related stress, whether SOC moderates the relationship between school-related stress on subjective health complaints and whether SOC is related to health complaints. The present paper follows this work in the way that it looks at the similar correlations in a population of 18-24 year old last year high school students, and also investigates sex differences in the correlating relationships. More specifically the present paper hypothesises that;

- 1) -there is a negative relationship between SOC-13 and PSQ – i.e. youth with a high sense of coherence report less perceived stress.
- 2) -there is a positive relationship between PSQ and HBSC – i.e. the youth with a high level of perceived stress report more subjective health complaints.
- 3) -there is a negative relationship between SOC-13 and HBSC- i.e. youth with a high sense of coherence report less subjective health complaints.
- 4) -there are correlations between SOC-13 and factors from experienced childhood upbringing (the s-EMBU scale).
- 5) -there are correlations between SOC-13 and youths locus of control (the LOC scale).
- 6) -there are gender differences in the correlational analyses.

1.2. The importance of mental health research and factors such as stress in school.

A Norwegian study, based on a large cross-national WHO survey 'Health behaviour in school aged children 1997/1998', summarized the need of investigating further the subject of youth and stress prevention. They summarize that subjective health complaints like headache, backpain, and abdominal pains are common in early adolescence, and that a series of studies have implicated school-related stress in the development and maintenance of such health complaints finding that not all students develop complaints from school-related demands. This has directed the attention to factors that moderate the perception of stress, and the adverse health impact of stress (Torsheim, Aaroe and Wold, 2001).

A recent report from the Norwegian Institute of Public Health says that numbers from international studies show that between 10 and 16 percent of children and youth have such severe psychological problems that it affects negatively on their daily functioning (Costello et al, 2003, as cited in Mathiesen et al, 2007). In a Norwegian longitudinal study 50 per cent claimed their parents were too much away from home, 44 per cent said their parents were too controlling, and 10 per cent said they lived with severe burdens. However findings from the same study also suggest however, that psychological complaints decrease with increased social skills, and that the general physical health of most youth is good although girls report more complaints than boys (Mathiesen et al.,2007).

School is an institution with a large potential for helping youth to find meaningfulness in life and develop social skills and through this a solid psychological fundament. Accordingly, the school should focus more on improving itself, demanding resources, and be more concerned with focusing on mental health in all aspects of the educational practise.

The importance of taking this tendencies seriously is underlined by the fact that the Norwegian Parliament published a strategy plan for mental health of children and youth in 2003 developed in a cooperation between the following departments; the Health Department, the Children -and Family Department, the Justice Department, the Communal –and Regional Department, the Culture -and Church Department, the Social Department and the Education –and Research Department. This Parliament Report nr. 39 (2001-2002) is *the first* joint Parliament Report about *the growing up and living conditions for children and youth in Norway*. The goal is

to contribute to a child –and youth policy that create a safe and meaningful and developing daily life for more of the citizens.

This paper will in the introductory part spend quite some time introducing the frame of inspiration for, and the importance of stress research. The introduction consists of five parts: an introduction of stress in relation to school and youth, stress theory and research, an introduction of Global Workspace theory and how emotions seem to effect working memory and the learning process, an introduction of Antonovsky's Salutogenesis theory (Antonovsky, 1987, as cited in Shapiro et al., 1998) how a sense of meaningfulness, manageability and comprehensibility in life might improve general psychological health, and finally a presentation of some previous research related to each of the previously mentioned theories. This will provide a solid frame for the research conducted in the present study, and also underline the importance of and potential for more research on the sense of coherence, stress and health in youth.

1.2.2. Stress theory

Stress is a natural innate mechanism that can be viewed as a psychophysical defence system in all living organisms. Even today studies of how the mind affects the body are not too common because studies of the processes in the mind and the functions of the body still seem to exist in separate departments in most universities in the western world (Lovallo, 2005). In Asia monistic thoughts in the mind-body interaction, are more common like as in Vedic/Tantric yoga philosophy (Morseth, 2002).

Hans Seyle is recognized as the father of stress research. He described three levels of the general adaption syndrome (the concept that all challenges to homeostasis (balance/harmony) in living beings follow a universal pattern), and that stress responses have long term consequences sometime harmful sometime beneficial. The focus of long-term consequences attracted attention to the nature of changes the organism might experience and under what circumstances (Seyle, 1956, cited in Hoffman & Parsons, 1993).

Allostasis is the term meant to capture the idea that when a demand has not been removed or neutralized, maintaining homeostasis may be a source of ongoing wear and tear on the system. The concept of allostasis appears especially useful when taking into account more

gentle, persistent, and less life-threatening forms of stress. These less intense stressors may be suspected of causing long term damage to health even if the short term effect is negligible because they exert a constant bias or demand on the system. The ongoing demands competes for coping resources and reduces the ability of the person to cope psychologically or physiologically with new demands that may be imposed by other stressors encountered in daily life. This idea, is called the *allostatic load* and has gained importance since 1993 (Lovallo, 2005).

This line of thought is highly relevant in relation to youth, stress and health and their ability to concentrate and learn in school, and how ideas and environmental influences can come to have power over our bodies and how mental stress can affect our health and development.

An argument for considering the role of the brain in altering the physiological function for better or worse is summarized as follows:

“The brain is how we make contact with the external environment. The interactions are regulatory in nature. We could say that the brains primary purpose is to provide the highest level of behavioural and physiological regulation, dedicated to maintaining health, fitness, and reproductive success. Because the central nervous system is for sustaining life and coping with external threats, it must be seen as the primary focus of a behavioural medicine. Therefore, we will address the question of stress responses as potential modifiers of health within a behavioural medicine framework” (Lovallo, 2005).

1.2.3 Defining stress.

Stress is an active process that involves an action on the process that threatens the equilibrium. It is assumed that the tension may cause harm unless some process of compensation reduces the disequilibrium to a baseline-level or the cause is removed. It follows that a stressor is a stimulus event that challenges the integrity, or health, of the body and the stress response is the body's compensatory reaction to that challenge (Lovallo, 2005). One might say that the stress results from the demand that has to be covered in the reducing the threat to zero. The greater the demand and the less ability we have to reduce it, the greater will be our state of stress. Stressors might also be psychological in origin. A mental arithmetic task could be thought of as a prototype of a psychological stressor. This is a good example in relation to stress and youth. A mental arithmetic task produces a significant cardiovascular activation, along with a mild sense

of aversion and secretion of cortisol. This occurs by minimal motor demands and maximal mental effort. Its ability to alter physiological function, derives almost exclusively from the activation of brain centres capable of affecting the brainstem and hypothalamic-pituitary axes (Brod, 1963, as cited in Lovallo, 2005) There seems to be no fundamental difference between the introspective information the brain uses in its normal regulation of the body and the information it receives from outside as determined by the behaviours of the individual or by the cultural environment (Schwartz, 1979 as in Kristeller, 2003).

It is important to realize the impact of environmental influences on a young persons psyche causing different levels of stress. This is important in relation to youth's ability to produce the type of results the school demands; stress might deprive health and so the focus, energy and level of concentration needed to do so.

1.2.4 Two recent models of chronic stress.

Two recent models of chronic stress allow us to think about the products of negative emotions and persistent feelings of distress as causes of changes in the body and brain that may be health impairing. This touches the theme *how a person's worldview like the sense of coherence can influence his or her emotions and thereby cause psychological stress responses*. This is done by considering how higher brain systems interact with the regulatory functions of the hypothalamus and brainstem to form psychological stress responses. In so doing, the process of psychological stress is being characterized by using functional and neuro-physiological models in parallel to understand how psychological responses are tied to events in the brain. A model, Lazarus and Folkmanns appraisal model of psychological stress, takes a cognitive view of how we engage with the world. The authors postulate that we first evaluate events for their threat value. This *primary appraisal* is intended to ensure that we do not blindly encounter danger, but instead recognize it and begin to evolve a plan and begin to deal with it. Next, in a secondary appraisal, we evaluate our options for coping with any presumed threats. This two level appraisal process determines not only our cognitive and behavioural responses but also our emotional, neuro-physiological, autonomic and endocrine responses to external events. In short our appraisals determine the nature and magnitude of our psychological reactions and their accompanying physiological adjustments (Lazarus & Folkmann, 1984, as cited in Lovallo 2005).

The process of psychological stress includes both primary appraisals of the event and secondary appraisals of the effectiveness of available coping options. These two processes have an impact on physiological responses to the situation. Lazarus model uses beliefs and commitments as the criteria for deciding what events are threatening. An example is imagining a regular person versus an athlete training for the Olympic Games breaking an arm.

The Lazarus and Folkmann model does however not specify how psychological processes of appraisal and coping might link up with physiological outcomes by the way of the central nervous system processes and peripheral outflow, but another model illustrates how encounters with threatening events may be incorporated into neuro-physiological changes and autonomic and endocrine outflow (Lovallo p.89-90, 2005).

This paper will not go more detailed into the neuro-physiological mechanisms of the appraisal process. It will just make a point illustrating the connection between how sensory input, and also due to individual differences in experience, affect physiological processes in the body. However recent research points to the amygdala as an example of the huge effect it has on bodily functions and expressions as a result of both exteroceptive or interoceptive stimuli. Some of this research will be reviewed in this paper in relation to the Global Workspace theory.

This is how recent research describes the appraisal process, and its effects on stress responses as central to their basic question of how ideas can come to have power over our bodies. It is central to describe the specific mechanisms to illustrate how fine tuned the interaction between the mind and the body is, and the importance of acknowledging this in relation to youth, stress, health and coping in life and in school. The shift from a view of the body as a passive agent, acted upon by a pathogen or a treatment, to an active entity that takes in information, evaluates it, and reacts to those evaluations not only opens up new ways of thinking about what makes us sick, but also permits new ways of thinking about what can make us well (Foss& Rothenberg, 1988). Studies also suggest that nurturing and protection from severe and uncontrollable stress in early childhood can avert these consequences (Meaney, 2001, cited in Lovallo 2005). This is why it is important to investigate stress in youth, and to start stress prevention as early as possible. In the following we will look at a model that has casted an even closer light on the effects of ideas, emotions and environmental influences on physiological processes and paved the way for cutting edge research. The Global Workspace theory.

1.3. The Global Workspace Theory.

Global Workspace Theory (GWT) is another theory underlining the importance of emotional/psychological influence on physiological processes (Baars & Franklin, 2003), and it is a challenge to Alan Baddeley's model of Working Memory (WM) extended with the episodic buffer in 2000 (Baddeley, 2000, cited in Ibid). The WM model has been a central basic model for research on memory since it appeared in 1987. GW theory claims that Baddeley's model not specifies the role of conscious elements in the memory system. This problem is seen as crucial since it can help explaining why information from a great deal of seemingly independent sensory channels are tied together and interact. GWT suggests that consciousness is needed to recruit unconscious specialized networks that can do detailed WM functions. The model suggest that conscious awareness plays a key role in classic WM, but that conscious elements recruit unconscious functions via a broadcast of the contents, and that emotions, conscious or unconscious, play a central part in consciousness and for WM through guiding attention.

The role of emotions are researched on in relation to long term memory, but in relation to Baddley's model for WM, and within the field of short term memory, the role of emotions has not been granted too much attention until recently.

There seem to be two main aspects in how emotions affect memory in general. One is that *stress hormones, like cortisol and adrenalin*, interact with the amygdala. The other is that amygdala can change the activity in other brain regions (Phelps, 2004). One of the ways it does this is by participating in the consolidation process mainly in the hippocampus (Saccetti, et al., 2002, as cited in McPherson, 2000). Other brain areas also are mentioned in relation to emotions and WM, but in the coming presentation the focus will be limited to research on the amygdala and the amygdale-hippocampus interaction.

In the following text the contrast between Baddeley's model and the GWT models will be presented in relation to putting the role of emotions in a frame/context.

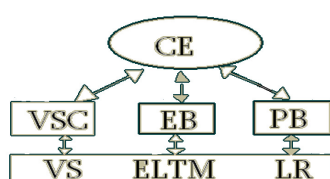
This focus on emotions and working memory seem highly relevant to stress research.

1.3.1. Two central models of WM

Two central models of WM will be presented in the following, and through these it will be illustrated how emotions can have an impact on and role in WM.

Model 1.3.1.1.

Baddleys Multi Component Working Memory Model. CE= Central executive, VSC= visuospatial schetchpad, EB= episodic buffer, PB= phonological loop, VS= visual semantics, LR= linguistic regularities. Adopted from Baddeley,2000, cited in Baars&Franklin, 2003.

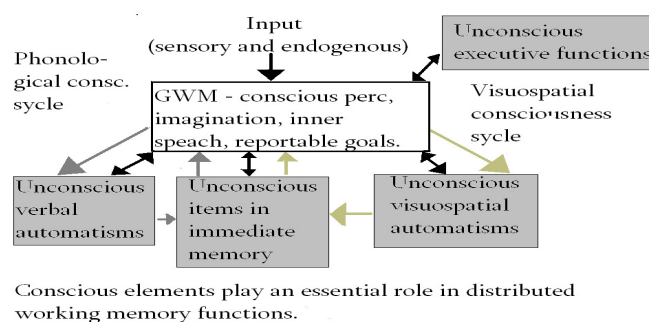


Baddeley revised his model during 1974 to 2000, see model 1.3.1.1., through the introduction of 'The Episodic Buffer'. The episodic buffer as component values the integrating of information and the relating of WM and long term memory, in contrast to earlier approaches to WM which have focused on separating the different components (Baddeley, 2000). The episodic buffer consists of a limited capacity system that provides a temporary storage of information in multi media form, that is capable of binding information from the other systems and form long term memory to a unitary episodic representation. The new, as a result of revision, is the rejection of that the slave/subordinate systems only represent activations within the processes of verbal and visual perception and production. Conscious awareness is thought to be the main method of retrieval from the buffer, and it is suggested that the episodic buffer makes up the crucial binding link between memory and consciousness (Baddley 2000, cited in Baars & Franklin, 2003).

GWT suggest that the wake consciousness function in WM is crucial, and criticizes Baddleys model for its lack in specifying this. The presentation of GW theory is to show that this newer model connects emotions and WM. This connection can help verifying the connection between the stress, health, gender differences and the sense of coherence.

Model 1.3.1.2.

Global Workspace Theory. Conscious elements play an essential part in distributed Working Memory functions. Phonological (dark grey arrows) and visuospatial (light grey arrows) consciousness cycles are elaborated. Adopted from Baars & Franklin (2003).



Model 1.3.1.2., shows how a global workroom capacity associated with consciousness can recruit typical WM functions as mental rehearsal and visual imagery. These are traditionally seen as “slave”/subordinate systems in WM theory, and are suspected to operate as partial autonomous distributed networks. They are guided by executive functions, which are seen as goal hierarchies in GW theory.

GWT specifies the role of consciousness, and describes the model in seven main points:

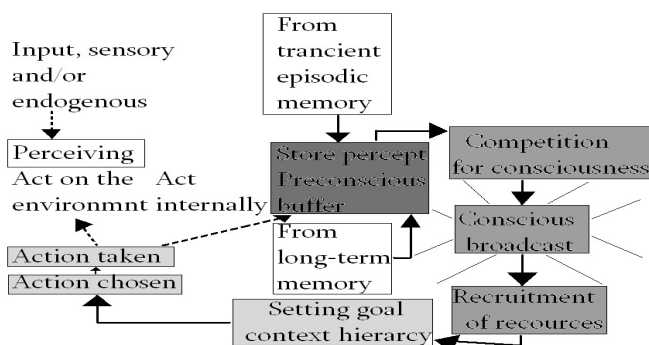
1. that the brain can be seen as a collection of distributed specialized networks (processors);
2. that consciousness is associated with a global workspace in the brain – a floating memory capacity which contents that are in focus become widely distributed (broadcasted) to many specialized unconscious networks;
3. that a global work room also can function as a integrator of many competing and cooperating input networks,
4. that some of these networks, called contexts, forms conscious contents;
5. that such contexts work together to limit conscious happenings being registered;
6. that motives and emotions can be seen as goal contexts;
7. that executive functions work as hierarchies of goal contexts (Ibid, 2003).

GWT implements also a third model, IDA – Intelligent Distribution Agent- which is an autonomous software agent, that creates a fine-branched functional explanation for the steps

involved in perception, different types of memory, consciousness, context settings and choices of action. This sequence is referred to as “The cognitive Cycle”. In addition to GWT, the IDA models a broad field of cognition.

Model 1.3.1.3.

The IDA model. The cognitive Cycle. Colour coded for its relationship to WM. Dark grey: Processes used by the central executive. Medium dark grey: Phonological loop and visuo-spatial sketch pad. Light grey: Executive processes. Adopted from Baars & Franklin (2003)



There is suggested a close relationship between traditional WM functions, GWT and its IDA model. Roughly the relationship between the three models can be described as that the WM model is build out by the two others in detail richness, where the IDA is the most detailed of the models. IDA also separates from the two others by that what is called ‘perception’ in this model not does imply the presence of conscious awareness. IDA models only the pre-conscious buffers in cognitive WM, the visuo-spatial sketchpad and the phonological loop. (This is illustrated in table 1.3.1.4.)

Table 1.3.1.4.

The relationship between WM theory, GW theory and IDA model. Adopted from Baars & Franklin, (2003).

Extended WM	GW theory	IDA model	Possible brain areas
Pre conscious visuo-spatial and auditory-phonological analysis	Unconscious input analysis	Early pre-conscious perception	Early visual and auditory cortex
Preconscious identifying of objects, words and other single chunks.		Late preconscious perception (uses slip-net)	Visual/auditory word –and object recognition areas
Perceptual input to WM storage		Percept to preconscious buffers	
The following involves many GW and IDA cycles: Instructions to practice. Repeating (retrieval, repetition/ manipulation, and storing). Instructions for retrieving and reporting. Retrieval and reporting. (Instructed tasks is under control of the central executive).		Local associations (retrieved from transient episodic memory and long term memory).	
	For every conscious happening: Competition for GW until an input processor or coalition gets access and becomes conscious.	For every cognitive cycle that involves a conscious happening: competition for consciousness (attention codes).	First stabile re-entrant organisation of perceptual and immediate association areas.
	Broadcast of conscious awareness. conscious perceptual or inner contents, like conscious images and inner speech.	Broadcast of conscious content.	Correlated firing from sensory project areas to target areas Parietal, front limbic and medial-temporal cortex, hippocampus and basal ganglia.
	Recruiting of resources (processors). Setting goals for context hierarchy.	Recruiting of resources (behavioural codes) Behavioural stream.	Re-entry between target areas and sensory cortex. Front limbic re-entrant pross. To prepair action.
	Action is chosen and prepared. Inner or outer action taken by specialized processors (networks).	Action is chosen and prepared. Inner or outer action taken by behavioural codes (possibly from preconscious buffers).	Motor-efference from motor/ pre-motor cortex.

Baars and Franklins (2003) hypothesis is that a similar cognitive cycle underlies most of human cognition, and that there are many of them, that a full cycle takes about 200ms and that they overlap each other and also function parallel. They also claim that WM tasks occur over seconds, something that indicate that many cognitive cycles are needed for every WM task, especially if it contains conscious components like mental rehearsal.

If one look at model 1.3.1.4., the last four lines will bee seen as implementing the central executive in Baddleys WM theory, and here the goals that will form actions are recruited, organized and practiced (Baars & Franklin, 2003). In GWT the key observation is that in classical WM theory all components are conscious: input, rehearsal, visuo-spatial operations, memory and reporting, but suggest that a broadcast of this conscious content recruits a lot of

functions. These functions might be unconscious, like central executive functions where goal and goal contexts are treated and organized hierarchically. Emotions and motives are suggested as goal contexts. These contexts work together to limit conscious happenings and therefore also what is happening in WM according to GWT? Can these emotions and goal-contexts affect WM? Baars and Franklin suggest further studies on aspects of consciousness and cognition modelled after this approach.

Later in this paper, in the *previous research* part, some of the latest findings when it comes to the role of emotions on WM will be presented, and the implications this may have for the view on WM will be discussed through mainly four studies. In the end three questions in the light of the meeting between emotions and WM be discussed; are there gender differences? Are there age differences? Can amygdala response be changed by means of cognitive strategies? But before this there will be a presentation of Antonovsky's (Antonovsky 1987, as cited in Shapiro, 1998) theory of salutogenesis, a theory suggesting the salubrious effect of finding life meaningful, manageable and comprehensible as a preventive factor against stress and psychosomatic disease.

1.4 The sense of coherence (SOC).

Fundamentally in the salutogenetic theory is that of looking at health as an ease/ -disease continuum and the movement toward the health-end (Eriksson & Lindström, 2007). Salutogenesis is an alternative medicine concept that focuses on factors that support human health and well-being rather than on factors that cause disease. The term salutogenesis comes from the Latin *salus* = health and *genesis* = origin. The term was first used by Aaron Antonovsky an Israeli medical sociologist, who studied the influence of a variety of sources of stress on health who was able to show that relatively unstressed people had much more resistance against illness than those who were more stressed. Antonovsky argued that the experience of well-being constitutes a Sense of Coherence (SOC) – the feeling that life is comprehensible, manageable and meaningful. According to Antonovsky's original idea it was more important to focus on peoples' resources and capacity to create health than the classic focus on risks, illhealth, and diseases (Antonovsky, 1987, cited in Eriksson & Lindström, 2007). The key elements in the

salutogenetic development are, firstly, the orientation towards problem solving and, secondly, the capacity to use the resources available. Over the years salutogenesis has become an established concept in public health and health promotion. In a lecture for the Nordic School for of Public health in Gothenbourg in 1993 Antonovsky pointed explicitly the responsibility of the society to create conditions that foster the strengths of coping (Eriksson & Lindström, 2007).

As a psychological theoretical framework backing up the theory of SOC, there is inspiration to be found in the movement of Positive Psychology, which is «a recent movement of researchers who study and empirically do research on what make individuals, workplaces, schools, and so on prosper and flourish, rather than diagnosing and resolving what is wrong with them» (Linley & Joseph, 2004). «Positive psychology wants to focus attention upon the sources of psychological health, thereby going beyond prior emphases upon disease and disorder». (Sheldon, et al., 2000).

Accordingly as a main tool of interest for this study the choice fell on SOC. In adults, one of the stress moderators having generated considerable interest is in fact SOC. The scale is well tested, and has proven to be related to how people experience their health independently from age, sex, ethnicity, nationality and study design (Eriksson and Lindstrøm, 2005).

In his original theoretical formulation Antonovsky (Antonovsky, 1987 cited in Torsheim, et al, 2001) proposed that sense of coherence (SOC) may influence stress and health in the three following ways:

- 1) SOC influences whether a stimuli is appraised as stressor or not;
- 2) SOC influences the extent to which a stressor leads to tension or not;
- 3) SOC influences the extent to which tension leads to adverse health consequences.

In 2001 Torsheim, Aaroe & Wold published a Norwegian study on “SOC and school related stress as predictors of subjective health complaints in early adolescence: interactive, indirect or direct relationships?” Few studies have addressed the potential health impact SOC may have *during* adolescence (Ibid, 2001). The study tested over 4500 comprehensive-school students on SOC, school related stress and subjective health complaints. Contrary to the idea of a ‘fluid and weak’ adolescent SOC, these studies indicate that a ‘young’ SOC may contribute to stress and coping in much the same way as does the ‘mature’ adult SOC. SOC also seem to in adults be strongly correlated with self- transcendence, self esteem, hope and variables assessing

emotional well-being, high quality of life and low stress (Coward, 1996, cited in Smith & Liehr, 2003).

Now let us turn to some research focusing on the relation between stress and SOC. Torsheim et al. (2001) have summarized most of SOC research in relation to youth, which in general is scarce, so this review will lean on their solid work also in the later more detailed review.

In the processes of linking life situations to health, stress appraisal is the first process that SOC may influence. Stress research indicates that level of ambiguity and uncertainty are important dimensions in appraisals of life situations. Unpredictable or incomprehensible life situations are potent sources of stress (Lazarus and Folkmann, 1984, cited in Lovallo, 2005). As a global orientation to life, the sense of coherence (SOC), will influence the degree to which people view life demands as chaotic and incomprehensible, or coherent and comprehensible. Through the confidence that ‘...the stimuli deriving from one's internal and external environments are structured, predictable and explicable’ (Antonovsky, 1987, cited in Torsheim et al., 2001) individuals with a strong SOC will be less likely to perceive ambiguity in encounters with life demands.

In line with the hypothesis that a high SOC may help to reduce stress, studies on adult populations have reported moderate inverse associations between measures of SOC and measures of perceived stress. A review of these studies showed that the associations are generally stronger for perceived measures of stress than for measures of stressful life events, suggesting a role in appraisal processes, and not in the actual exposure to stressful events (Antonovsky, 1993, cited in Ibid.).

The sense of coherence has also been suggested to influence coping expectancies in encounters with stress (Antonovsky, 1987, cited in Ibid). According to the transactional model of stress (Lazarus and Folkmann, 1984, cited in Lovallo, 2005) as illustrated earlier, coping expectancies develop from secondary appraisal processes, where people assess the means that are available to deal with the stressful condition. As a global orientation to life, individuals with a strong SOC will have a general confidence that resources are available to meet the demands posed by stressful situations. This confidence increases the likelihood of positive coping expectancies. In related conceptual formulations (Bandura, 1986; Kobasa, 1979; Ursin, 1988,

cited in Torsheim et al., 2001) coping expectancies are assumed to moderate reactions to stress. In line with these models Antonovsky proposes that a strong SOC may help to prevent stress from turning into potentially harmful tension. From this perspective SOC acts as a classic moderator of life stress (Antonovsky,1987, cited in Ibid).

Empirical studies on the stress-moderating role of SOC show mixed findings. In a study of Finnish adult workers Feldt (Feldt, 1997, cited in Torsheim, 2001) found that the relationship between work demands and health complaints was stronger for workers with a low SOC, but in statistical terms the interaction was weak. Also there was found that job demands from active jobs lead to sickness spells in workers with low SOC, but not in workers with a high SOC (Vahtera et al., 1996, cited in Kivimaki et al. 1997). In contrast, a number of other studies have failed to detect stress-distress moderation (Anson et al.,1993; Flannery&Flannery,1990, cited in Torsheim, 2001) leaving the issue of SOC as a moderator unresolved.

Antonovsky suggested that a high SOC may prevent stress-associated tension from developing into health problems. Stressing the point that SOC is not a particular coping style, Antonovsky proposed that individuals with a high SOC are more likely to select the coping strategy that is efficient for dealing with the stressor. High SOC individuals tend to use problem-focused strategies, they are flexible in their choices of strategies, and they are skilled in using feedback to redirect coping attempts. As a consequence, individuals with a high SOC are, in general, more likely to remove the source of stress, and to terminate the associated tension. Over time, individuals with a strong SOC will experience shorter periods of harmful tension than individuals with a weak SOC, suggesting a main effect between level of SOC and health (Antonovsky, 1987, cited in Torsheim,2001). More research findings about SOC and its impact on health will be highlighted in the following.

1.5 Previous research

In the following relevant research will be presented as a means to illustrate the importance and potential of more focus on stress in relation to youth health. This research will be presented in three chunks, filling out the previous perspectives and theories mentioned earlier in this introduction. First there will be presented research in relation to Lovallo's (2005) work on how ideas can affect physiological processes in relation to stress, then research in relation to the Global Workspace Theory and Working Memory -especially on how emotions can alter the capacity of Working Memory. Finally follows a short research review on the role of the sense of coherence in relation to stress.

1.5.1 Research on how ideas can affect physiological processes in relation to stress.

Lazarus and Folkmann's model of stress emphasizes perceived control over the environment as a critical determinant of the psychological impact of events (Lazarus & Folkmann, 1984, cited in Lovallo 2005). Evidence is also emerging that clinical events can be reduced over a period of years by training heart disease patients to cognitively regulate their emotional responses during potentially stressful episodes (Blumenthal, et.al.,2002, Ibid, 2005).

In the 1970's, studies on dogs were performed resulting in the introduction of the term *learned helplessness model of depression* to characterize the cognitive, emotional and performance deficits shown by the dogs after exposure to uncontrollable shock. This apparent helplessness (often accompanied by depression) develops when outcomes (shocks) are not contingent on performance (attempts at escape or avoidance). These studies showed that the animals had learned to be helpless and that this experience led to depression (Seligman et al., 1971 as cited in Lovallo, 2005; Miller, et al., 1975).

It is also plausible that stress-induced activation of the locus ceruleus (a critical nucleus communicating with the entire central nervous system) would have significant emotional and behavioural consequences. Particularly during uncontrollable shock exposure, the locus ceruleus receives high levels of input from the amygdala and hypothalamus, resulting in high firing rates. Extensive coverage of studies on the manipulation of the locus ceruleus NE (central nervous system norepinephrine) is provided in several reviews (Weiss et al., 1975).

When it comes to individual differences three major sources of individual differences in reactivity to psychological stressors are suggested: that persons may differ because of their cognitive and emotional characteristics, reflecting operation of frontal-limbic processes on patterns of response; they may have exaggerated autonomic and endocrine responses because of differential activation of hypothalamic and brainstem outputs; and they may have altered peripheral responses that reflect changes in the tissues themselves (Lovallo, 2005). Some research on individual –and gender differences will be mentioned later in relation to the role of amygdala in studies concerning the role of emotions on Working Memory.

Changes in terms of degree of helplessness have in animal studies revealed being paralleled by changes in the central nervous system. Most research on stress has been conducted on animals (Ibid, 2005). In the following some perspectives on human helplessness will be reviewed.

Research on human subjects point out, that alienation occurs when people have no part in deciding what to do or how to do it and are required to work in determinable, uncreative conditions,(alienation from work or life activity), have no control over what they make or what becomes of it (alienation from their products or what they create), when there is competition and hostility among all groupings in society thereby eliminating a feeling of genuine human community (alienation from other humans), when they are removed from the natural world by the inorganic conditions of human existence (alienation from natural world). Being involved and being able to participate in what's going on seems in this aspect to be an important factor for psychological wellbeing (Lange, 2004).

Involvement in academic tasks is at a juncture of cognitive and motivational variables and that being involved in a discourse requires cognitive processes such as comprehension and concentration, along with motivational aspects such as current goals and emotions. Taking motivation as a starting point, there is evidence for that positive affect occurs with and as a result of involvement, and often these positive emotions seem to motivate further discourse (Reed and Schallert, 1993). The parallel to involvement is relevant in the present study because it points to the need for cognitive models to take into the account the effects of motivational /affective variables such as the sense of coherence.

In relation to stress and its influence on health and the immune system, research show behaviour-immune interactions that concern the effect of negative emotions and life stress on the immune system. There seem to be a possible buffering effect of positive emotions. Positive human relationships and an enhanced feeling of self-efficiency, are thought to ameliorate the negative effects of life stresses on immune function (Kiecolt-Glaser et al., 2002, in Lovallo, 2005). An 8-week course of mindfulness meditation compared to being on a waiting list for meditation training, was found to improve immune system response to influenza vaccine (Davidson et al., 2003). Another study indicated that the effects of emotional expression could ameliorate the effects of trauma, leading to improved psychological status and immune function. Students were asked to write about their traumatic events in their lives or emotionally neutral events every day for 4 days. Six months later, those who expressed themselves about their traumas were happier and less depressed. They also had better lymphocyte activity, suggesting improved immune function relative to controls (Keller et al., 1994, Cited in Lovallo, 2005).

In relation to the EMBU-scale and childhood upbringing, Seymore Levine performed in the 1950's rat studies that illustrate how early nurturing or lack of nurturing can have profound effects on gene expression, emotional and stress reactivity, and possibly health (Levine, 1957, cited in Ibid). There is also evidence for that maternal behaviour regulate long term hippocampal expression in the offspring (Weaver, 2002). These studies suggest a potentially beneficial effect on immune system function by use of stress reduction, mood enhancement, and improvements in psychological health. These positive indicators suggest that research on ways to implement interventions to improve general health through better immune system functioning may have benefit in specific groups that need such interventions.

The nurturing perspective in relation to stress is implemented in the present study by the EMBU scale (emotional memories of childhood upbringing) and its possible correlates with perceived stress represented by the PSQ scale. The health perspective is implemented by the HBSC (health behaviour symptom checklist) scale, the mentality factors by the NC (non conformity) scale, LOC (locus of control) -and the SOC (sense of coherence) scale.

1.5.2 Research in relation to The Global Workspace Theory and Working Memory - how emotions can alter the capacity of Working Memory.

In the following, mainly four recent studies will be reported. As a preliminary summary the following studies seem to have found that: individual differences in amygdala activity predict response speed in Working Memory (WM) (Schaefer, et. al., 2006), emotional intensity can prevent feature binding in WM (Mather et al., 2006), that emotional intensity and valence modulates short term memory as an independent factors (Maljkovic & Martini, 2005) and that there seem to be a differential influence of negative emotions on spatial and verbal WM (Xuebing Li, et al., 2006).

Finally, three implications by the meeting between emotions and WM will be highlighted. Can there be gender differences when it comes to the role of emotions for WM. Are there age differences? Can amygdala response be changed by means of cognitive strategies? Most of what have been found concern how emotional stimuli affect processes in WM through unconscious networks, that get activated and interact, in line with the ideas that The Global Workspace Theory represent. Reviewing this research is relevant in relation to stress and youth in school, because it illustrates that emotions such as stress may affect students health through physiological processes -hence also the ability to focus, and their capacity to learn and remember both consciously and subconsciously, due to an emotional impact on physiological processes in central parts of the brain and their related processes.

The amygdala has traditionally been seen as a brain structure that mainly is related to emotions and as cut off from higher cognition, but when it comes to the encounter between emotions and memory it is traditionally the interaction between the amygdala and hippocampus that is discussed. These two structures are linked to different memory systems with different functions, but they interact by subtle and important mechanisms. It is found that the amygdala can modulate both the relation and the storage of hippocampus dependent memories. Hippocampus in its turn can by forming episodic representations of emotional significance and interpretations of happenings influence the amygdala response when emotional stimuli meet (Phelps, 2004).

Recent findings show that the human amygdala also has a role in supporting WM, a higher cognitive function. An fMRI study found that higher event related amygdala activity

predicated faster response speed, without loss of accuracy. A further study also found that the correlation between the amygdala and faster response speed was specific for the cognitive variable high memory load, not affect related variables. These results support the models for amygdala functions that can explain its involvement not only in emotions but also in higher cognition (Shaefer, et al., 2006).

Shaefer et al. also point out that the amygdala can function as having a helping role in preparing the organism to better being able to handle challenging situations selectively or specifically by allowing only goal-relevant stimuli, and it is worth noting that goal processing is a fundamental component in both emotions and executive control (Fridje, 1986; Scherer, 2001; Anderson, 1983; as cited in Schaefer et al., 2006).

Emotions and motives are central in GWT as goal contexts, that are hierarchically ranged and fighting over the space in consciousness. This perspective is also supported by findings that are concerned with the slow consolidation process, claiming this process is allowing the reaction of an event to influence the storage of this happening. The emotional reaction, like intensity and the release of stress hormones, is following the happening in it self (McGaugh, 2000). In this way the processes that release the emotional responses, that might also be the most crucial ones for survival, also will be the ones that will be remembered later. Thus stress hormones activate adrenal receptors in basolateral amygdala, that modulate the effect of these hormones in hippocampic consolidation (Ibid, 2002).

The amygdala traditionally is seen as being critically involved in calculating the emotional significance of events, and through its connections to brain regions that handles sensory experiences, it seems to also be responsible for the influence of emotions on perception – it signalizes/alarms emotional significant events even when we are not consciously aware of it. It is quickly responding to the environment, pre-consciousness, and generally independent of focused awareness (LeDoux JE,2002;Whalen PJ, 1998; Vuilliemuer P, 2001;Anderson, A.K., 2003;Vuilleumier,2004, cited in Phelps, 2004). The amygdala in particular seems to be related to negative experiences. When it comes to negative emotions it has been suggested that parts of WM get occupied with fear and worries, so that less capacity is available for other processing (McPherson, F., 2000).

Obviously attention on emotional stimuli can prevent feature bindings, like the localizing of an object associated by emotional information. In two fMRI experiments there seemed to, relative to low-arousal trials, high –and medium arousal trials, result in higher activity in areas associated with visual processing (fusiform gurus, middle temporal gyrus), and less activity in precentral- superiortemporal areas. This might indicate that arousal (emotional intensity), and maybe negative valence (degree of pleasure/ not pleasure) for depressed people, recruits attention to objects and in this way disturbs the WM processes that help binding features together (Mather, et al., 2006).

Information accumulation in WM might also seem to be a controlled process, whose result is modulated by valence and arousal as inner attention alarms. A study showing scenes with affective contents showed that the degree of valence (pleasantness) and arousal (the intensity of the created emotion) is modulating the short term memory as independent factors. Emotional intensity influence dramatically the average response time for data accumulation in memory: Higher intensity result in faster accumulation. The degree of pleasantness has a more interesting effect: As an image is being observed the information from images with a positive or neutral content is accumulated in a constant speed, while information from negative scenes is code slowly and then increasingly faster. The authors conclude with a possible explanation to the phenomenon; that it might be possible that images with negative content attract most of the early processing resources, to the cost of the wider context, and in this way prevent the recognizing memory. Another explanation might be a kind of filtrating system that limits or increases the stream of information to the visual short term memory. They also point out that neutral or positive images from a teleological standpoint not represent a challenge for the organism, while negative content on the other hand represent a threat that might demand a more accurate and controlled flow of information (Maljkovic & Martini, 2005). The consciousness this way might seem to be pre-programmed to be alert and set to register any threat to the organism in coherence with the appraisal model and stress theory of Lazarus and Folkmann (Lazarus and Folkmann 1984, cited in Lovallo, 2005).

These findings seem to support with the previously mentioned findings of Mather et.al. (2006). The age group being tested in Maljkovic study were from 18 to 25 years old (like in the present study), and thus in a period where the amygdala might be particularly sensitive to

negative influences (Charles, et. al.,2003, cited in McPherson, F.,2000).

Further studies of negative emotions influence on WM also can seem to point out that there is a differential effect of negative emotions on spatial and verbal WM. The authors, Xuebing Li, et al.(2006), point to Baddleys WM model where spatial WM is separated from verbal WM, and continues the study of the notion that the modulating of cognition not is a global effect, but might be involving specific neuro-cognitive mechanisms. The study found that frontal-parietal cortex might be the area where emotion and working memory interact. In both spatial and verbal tasks, the anterior late positive component and posterior P300 (brain areas) are affected by negative emotion. The effect were however larger in spatial then in verbal tasks. The research subjects were equally distributed of females and males. Especially the activity in parietal P300 were reduced by negative emotion in spatial tasks, but not in verbal. Current density analyses revealed high current density in frontal parietal cortex, but only in spatial tasks. (Xuebing Li,et al., 2006). The authors suggest this might be so due to that a negative emotion seem to pull the attention resources away from the task itself, and that the attention resources particularly demanded in spatial WM not necessarily are needed in verbal WM, but they do not give any more explaining then this. The study maps out yet another example of the amygdala influence in WM processes, and that different neural network -mechanisms seem to be activated differently according to type of task. This seems to support the notions of the GWT model. There seem to be gender differences when it comes to processing of emotional information. Females seem to be better at remembering emotional memories. Females also seem to be more likely to forget information that is presented just before emotionally charged information. This might mean that females are more sensitive to emotionally contents –a notion compatible with the findings that females and males seem to code emotional experiences in different parts of the brain then do males. In females it seems that the evaluation of emotional experience and coding of memories is more closely connected (Caneli, et al., 2002, as cited in McPherson, F., 2000).

A theme that has evolved in this regard, in the attempts of understanding the mechanisms underlying the amygdale influence on emotional memory, is the unique role of the left and right amygdale. There has been suggested by recent brain scanning that they might be differently involved in memories of emotional stimuli dependent of the sex of the subject. The left amygdala might be correlated with the memory of emotional stimuli in females and the opposite in males,

but it is not yet clear whether this is due to gender (Canhill, 2001; Canli, 2002, as cited in Phelps, 2004). Studies of subjects with damage on amygdala reveal no gender differences so far, but there has been found verbal involvement in the left amygdala and visual in the right amygdala that also has been found in previous studies (LaBar, 1998; Funayama, 2001; Adolphs, 2000, as cited in Phelps, 2004).

There might also be so that age is influencing degree of amygdala activity in relation to memory. The tendency of letting unpleasant memories fade faster than pleasant ones, seems to be getting stronger by increased age. Preliminary brain research suggests that in older adults amygdala is activated equally on negative and positive images, while in younger adults it is activated more when negative images. It might be so that older adults is coding less information about negative images (Charles, et al., 2003 as cited in McPherson, 2000).

Other individual differences seem to be crucial. A study has investigated neural substrates that underlies the human ability to regulate their emotional responses, and shows that amygdala response can be changed by cognitive strategies (Oschner, 2002). Have in mind also Lazarus model of appraisal and coping (1984, cited in Lovallo, 2005), where it is in regard to this model is pointed out that different life experience leads to different interpretation of events and different shaping of emotions to these interpretations. Lovallo also points out that the interpretations of these happenings and their evaluation based on experience takes place in WM (Lazarus & Folkmann, 1984, as cited in Ibid). Individual differences and gender seem to be important factors to take into account in further studies of emotions and their effect on WM and other physiological processes.

These findings put forward a lot of possibilities for future research. The role of emotions in relation to learning and memory can have a number of important implications for pedagogy and learning theory, in meeting with psychology. A personal thought on why these studies might be important, is that there is in relation to emotions and memory often is referred to the roots in instinctive survival mechanisms. Positive or neutral stimuli is not making out any threat for the organism, while negative stimuli as previously mentioned create reactions in a larger degree, both in amygdala activity and by pulling away attention from WM tasks etc. A thought here is that most research subjects that are used in most such studies, also in the present study, are young middle class western students. Might not this type of genetically imprinted fear-response

threatening the survival of the organism by large be outdated for this group? And the fight -or flight mechanisms amongst the young in the modern western world today might instead be moving more and more over to factors of emotional and psychological stress? It is because of this it might be particularly important to increasingly taking into account such factors in relation to young people to day, and in particular in the educational institutions. The challenge for most people in this group is no longer physical survival, but psychological survival. Emotions have not until recently been taken into concern in studies of cognitive behaviour like memory, even if they are always there in human everyday functioning. Possible coping-tools might also be developed due to findings, verifying that one by the help of cognitive strategies can affect and alter the structure of neural networks, thought patterns behaviour and so health.

1.5.3 Research review on the sense of coherence (SOC) in relation to stress.

The founder of the term ‘sense of coherence’ (SOC), Aaron Antonovsky sees persons SOC as shaped by culture and experiences, and that it is fully developed around 30 years of age. He claimed that people with an initially high SOC has a stabile SOC around the age of 30 while in individuals with low SOC it is much more changing (Antonovsky, 2005, cited in Isaksson & Neijbert, 2006). Research seems to confirm this (Nilsson, et al., 2003 cited in Ibid). This is further underlining the importance of providing a fertile soil anywhere possible for the young, so that they will develop a high and stabile SOC as early as possible.

When it comes to the following review of research on SOC and stress in youth, this text will lean heavily on research by Torsheim et al. (2001). The reason for this is that there are not too much research on stress, SOC and youth in general (Lundberg, 1997; Cederblad, et al., 1994), and also Torsheim et al.’s (2001) research summarizes nicely and to the point the role of SOC in relation to youth and stress in particular. Their study of SOC is also highly relevant for the present study since it was performed on a large group of Norwegian youth seven years ago.

Antonovsky’s original contribution suggests that the adolescent SOC may affect level of health complaints indirectly, by preventing school-related stress appraisals, interactively by moderating the impact of stress, and directly by reducing the likelihood of sustained activation Antonovsky, 1987, cited in Ibid). A potential shortcoming in previous research is the failure to

compare the relative importance of these mechanisms at given developmental stages in life. This is why these authors, to gain more knowledge on the role of SOC in early adolescents adaptation to school-related stress, investigated each of the following assumed relationships: that SOC is inversely related to appraisals of school-related stress; that SOC moderates the relationship between school-related stress on subjective health complaints; that SOC is inversely related to health complaints. To do this Torsheim et al. (2001) investigated causal models for the relationship between stress, SOC and subjective health complaints, but claim the cross-sectional design does not allow for any firm conclusions regarding causality

It was found that both stress-mediated effects, stress-interactive effects, and direct effect of SOC on health complaints were consistent with the data. More specifically they found that when controlling for the effects of SOC, the relationship between school-related stress and health complaints was very weak (standardised path coefficients: 11 year olds 0.08; 13 year olds 0.07; 15 year olds 0.07; $p < 0.05$ for all age groups). An effect decomposition was done to assess the relative contribution for the different relationships regressed on subjective health complaints. Across age, the main effect of SOC accounted for an increasing share of variance in health complaints, from 39% in the group of 11 year olds up to 54% in the group of 15 year olds. The interactive effects of SOC and school-related stress accounted for between 0.5 and 1% of the variance in health complaints. The results provide some support for the general stress-health mechanisms that Antonovsky formulated. While the study did not address stability of SOC, the strong cross-sectional consistency across samples, indirectly point to a degree of stability in SOC also in adolescence (Torsheim et.al., 2001). For SOC and the mechanisms of health complaints; findings seem to confirm the previously mentioned theories about physiological consequences of stress in the terms of helplessness and low perceived control.

The original theoretical formulation, emphasises that SOC is a developmental construct that becomes crystallised at the age of 30, suggesting a more fluctuating and less essential role for SOC in earlier age-groups: 'The adolescent, at the very best can only have gained a tentative strong SOC, which may be useful for short-range prediction about coping with stressors and health status (Antonovsky, p.107, 1987, as cited in Torsheim,2001).

School related demands are potent sources of stress in adolescent normal populations (Maisak, & Goodale, 1979; Greene, 1988; Henker, Whalen, & O'Neil, 1995, as cited in, Ibid, 2001). Elevated levels of such stress is associated with psychological distress (Wagner & Compas, 1990; Ystgaard, 1997; Aro et al., 1987; Gerralda, 1996; Hurrelmann et al, 1994, as cited in Ibid, 2001).

In a study from the Norwegian health institute in 2004 where about 3800 18 to 19 years old students in Oslo were answering a questionnaire revealing not too much health complaints physically (91% of the boys and 85% of the girls reported their health as good), but when it came to psychological problems 35% of the girls report such symptoms and 14% of the boys. Only 13% of the girls and 4% of the boys has asked for help. More locally, in Tromsø, representing over 600 of the participating students, health complaints were almost 30% higher in girls then boys with headache as the most common complaint. Also here extremely few had used health service systems for their problems (Sagatun et al, 2005). Another Norwegian youth study, the Hubro investigation, also reveal that of over eleven-thousand 15 -to 16 year old 10th graders filling out questionnaires in school hour only 6,8% has been seeking help for their psychological problems, and if severe problems only 34% (Zachrisson et al., 2006). Youth simply do not seem good at seeking help for their mental problems. As schooling is mandatory in most countries, exposure to school demands is beyond the control of adolescents. Identification of resources that may help to prevent stressful appraisals, or moderate the adverse health impact of stress, may serve as an important first step in developing preventive strategies.

Based on one of the assumptions made by Antonovsky that individuals with a high SOC will tend to appraise demands as predictable and comprehensible, Torsheim (2001) predicted that students with a high SOC would be more inclined to view school demands as comprehensible and predictable, and less threatening to well-being. In line with these expectations moderate-to-strong inverse relationships were found in all three age groups. The subcomponent of comprehensibility has been suggested to be an important factor in stress appraisal of recurring demands (Antonovsky, 1987, cited in Eriksson & Lindström, 2005). The role of comprehensibility may be particularly relevant in relation to school related demands, as the ambiguities posed by schoolwork is closely related to a lack of comprehension. The expectations of comprehensible demands may provide a cognitive set that organises the appraisal of such

demands as they occur (Torsheim, et al. 2001).

The relationship between SOC and school-related stress grew weaker with age. With the notion of an emerging, and more and more crystallised SOC, this pattern was somewhat surprising. One possible explanation is that academic demands increase over age, and become less susceptible to benign appraisals. In the context of qualification to higher education, the potential threatening aspects of school-demands may become more salient. Such contextual factors may influence stress appraisals more strongly than the level of SOC. As such, the relative contribution of SOC in appraisals of school-related stress may become lower when contextual factors dominate (Torsheim et al., 2001)

A study argues that school may be regarded as a work setting for adolescents (Samdal et al., 1988). The size of the path coefficients between SOC and school-related stress, was strikingly similar to what has been found in adult studies for work-related demands (Larsson & Setterlind, 1990; Ryland & Greenfield, 1991 as cited in Torsheim et al., 2001) and the parallel findings in their study do not support a strong distinction between the function of the adolescent and the adult SOC in appraisals of work demands (Torsheim, et al., 2001). This makes it possible to compare to some degree studies of adult SOC in relation to work demands with SOC in youth in school.

This introductory research has been presented to illustrate the importance and potential of more focus on stress in relation to youth health, and as an attempt to provide a conceptual framework for how salutogenetic factors may intervene on youth, health and stress. This research has been presented in three chunks; in relation to how ideas can affect physiological processes in relation to stress, in research related to the Global Workspace Theory and Working Memory - especially on how emotions can alter the capacity of Working Memory, and finally through a research review on the role of the sense of coherence in relation to stress and youth. This research has inspired the use of the following method to grasp the phenomena of stress, health and the sense of coherence among youth in the present study.

2. Method

2.1. Pilot Study

A small pilot study consisting of three youth, eighteen years of age, filling out and commenting the layout and language of the paper questionnaire was performed prior to approaching the whole sample. The time to fill out was estimated to half an hour. Some corrections of typos and language were made. The author also talked to young people prior this pilot test while making the questionnaire about what would inspire them to finish everything in such a questionnaire and take it seriously. A reward was suggested as a motivational factor, and this was supported by supervisor prof. Martin R. Eisseman, Phd. The Master Fund by the University of Tromsø accepted a formal application for funding the reward which was seven lottery tickets called “Flax” shared within each of the classes participating. All together 49 “Flax” lottery tickets were distributed two months after the survey, November 2007, to the seven participating classes.

2.2. Sample and sampling procedure

In late September 2007 questionnaires were administered to seven classes in three public high schools in Tromsø, Norway. The high schools are in this paper labelled school A, B and C to guarantee their anonymity. About 150 questionnaires were distributed. The students were all 18 years old during the school year 2007/08 (mean age 18.2). The sample was obtained using a clustered sampling procedure with school-class as the sampling unit.

The middle of and late September month was chosen because it is in the middle of the autumn semester, in time before the stressful period of the final exams before Christmas. This was assumed to be a time when a fairly normal level of stress best could be observed in last year of high school for the 18 year old students. The principals of the schools were contacted via telephone, mail and personal meetings from May till September 2007 for arranging dates for the survey to take place. The principals all signed a written consent to their school participating in the study.

A cover letter introduced the author and the purpose of the survey. It was clarified that the participation in the survey is voluntary and anonymous. The author asked the students to

answer honestly and thoroughly to all of the questions, that they were guaranteed anonymity, that this was voluntary and told them about a reward of seven lottery tickets called “Flax” the class would get in November for participating in the study. The students filled out the forms in class in a regular school-hour, and the author picked them up the next day. The author sent all participating classes their promised reward in early November 2007.

125 completed and valid questionnaires were returned with an almost perfect equal distribution of females (64) and males (61). Students completed out the questionnaires, which took half an hour, in class the same day as they were handed out by the author who picked them up personally the following day.

Table 2.2.1.

Participants gender distribution, age and schools.

Schools	Sex	N	Min. age	Max. age	Mean age	SD
High school A (public)	Female	20	18	22	18,55	1,050
	Male	25	18	23	18,28	1,021
	Total	45	18	23	18,40	1,031
High school B (public, vocational)	Female	21	17	18	17,95	0,218
	Male	15	17	20	18,07	0,594
	Total	36	17	20	18,00	0,414
High school C (public)	Female	20	17	21	18,15	0,745
	Male	24	18	21	18,17	0,637
	Total	44	17	21	18,16	0,680
Total of high schools A, B and C	Female	61	17	22	18,21	0,777
	Male	64	17	23	18,19	0,794
	Total	125	17	23	18,20	0,783

2.3. Instruments

A paper format of the survey questionnaire was chosen to minimize the risk of losing participants and data due to technical error or other factors that easily might intervene when surveys are being administered via internet to in this case a small and specific group of subjects.

The test battery was comprised basic demographic measures, and six different scales:

The SOC-13 scale: Antonovsky's (2005) Orientation to Life Questionnaire, short form (SOC-13), was adapted to fit early adolescence and measures the three components of comprehensibility, manageability and meaningfulness in its three subscales in a seven part Likert -scale (always/ very often-never). Antonovsky suggested to take into concern the total of SOC and not the parts of the components. High score indicates a high position on the SOC continuum (min =13, max=91).

In the following are the questions are presented (used in the present study) that compose the SOC-13 questionnaire (Antonovsky, 1987;2005 cited in Eriksson & Lindström, 2005), a short form of the original. This is done to show what kind of topics a sense of coherence imply according to Antonovsky's theorizing. The 'SOC-13' consists of 13 items divided in three subscales, each presented in the following;

Table 2.3.1.

The SOC-13 scale consisting of three sub scales:

1. Sub scale: Meaning (4 items):

How often do you have the feeling that you don't care about what's going on around you?

How do you think you are going to feel about the things you will do in the future?

How do you feel about the things you do every day?

How often do you have the feeling that there is little meaning in the things you do in your daily life?

2. Sub scale: Comprehension (5 items):

How often has it happened in the past that you were surprised by the behaviour of people you thought you knew well?

How often do you have the feeling that you are in an unfamiliar situation and don't know what to do?

How often does it happen that you do not quite understand your own feelings and ideas?

How often does it happen that you have feelings inside that you would rather not feel?

How often does it happen that you have the feeling that you don't know exactly what's about to happen?

3. Sub scale: Manageability (4 items):

How often has it happened that people whom you counted on disappointed you?

How often do you have the feeling that you are being treated unfairly?

Many people – even those who with a strong character- sometimes feel like losers in certain situations. How often have you felt like this in the past?

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

The SOC-13 formula is thoroughly tested and high in reliability in terms of a Cronbach's alpha which for the total scale is in this study is 0.78. It is also validated across cultures, social class, ethnical background, age and sex (Antonovsky, 1987;2005 cited in Eriksson & Lindström, 2005).

The Locus of Control (LOC): The construct of LOC refers to the extent to which an individual perceives events and actions in his or her life as a consequence of their own behaviour, ability or characteristics (internal control) or of fate, luck, chance or powerful others (external control). This scale has 50 items, and consists of two subscales; one measuring external locus of control and the other measuring social desirability. (Eisemann, et al.1988) Cronbach's alpha is in this study for LOC social desirability scale 0.59, and for LOC external control 0.69.

The HBSC symptom checklist: A scale on reported symptoms in the last 6 months (headache, abdominal pain, backache, depressed mood, irritability, nervousness, sleeping difficulties, dizziness) (Torsheim et al., 2001). This scale has eight items. High score represents low degree of complaints, where 1= about every to 5= seldom or never. (Wold, B. et al. ,1994). Cronbach's alpha in this study is 0.79.

The PSQ: The Perceived Stress Questionnaire emphasizes cognitive perceptions more than emotional states or specific life events and has appeared to be superior to alternative measures for predicting healthy outcomes. This scale has 30 items (Levinstein, et al., 1993; Begdahl, et al, 2005). (Cronbach's alpha is in this study 0.91).

The NC-scale: A scale designed to distinguish among persons who may be differentially labelled conformists, nonconformists or independents. The 33 (including filler items) items in the scale describe attitudes pertaining to a variety of personal, social, and ethical issues, and were taken from existing attitude scales measuring conformity. High score reflect a conformistic attitude.(Smith, R. J., 1967).(Cronbach's alpha is in this study 0.51).

The s-EMBU: Emotional memories of childhood upbringing (short version) measuring perceived parental rearing styles and personality. In the present study a short form has been used, that consists of three subscales measuring rejection, emotional warmth and protection in rearing style with respectively 7, 6, and 9 items respectively. The scale measures experience of maternal and paternal rearing style separately. Accordingly the scale has a total of $((7+6+9) \times 2)$ 46 items (Arrindell, et. al., 1999). Cronbach's alpha was in excess of 0.68 for all the scales in this study.

Table 2.3.2.
Descriptive statistics and reliability measures of the scales.

Scale	N of items	Mean Score	SD	Cronbach's Alpha Coeffic.
SOC	13	52,11	9,22	0,694
SOC Meaningfulness	4	16,89	4,11	0,539
SOC Comprehensibility	5	18,64	4,30	0,518
SOC Manageability	4	16,45	3,82	0,420
LOC Ex	40	84,74	10,05	0,586
LOC Social desirability.	10	24,76	3,89	0,685
HBSC	8	31,40	5,97	0,788
PSQ index	30	0,37	0,15	0,914
NC	33	-128,68	420,04	0,508
EMBU Rejection father	6	7,45	2,15	0,704
EMBU Rejection mother	6	7,67	2,53	0,798
EMBU Over protection father	9	17,15	3,66	0,682
EMBU Overprotection mother	9	19,94	4,32	0,763
EMBU Emotional warmth father	7	15,91	4,25	0,870
EMBU Emotional warmth mother	7	18,11	3,48	0,833

Five of the scales used a Likert-type scoring system, ranging from 1 to 4, 5, 6 or 7. More specifically; HBSC scale from 1 to 5, the EMBU, PSQ and LOC from 1 to 4 and the SOC from 1 to 6. The NC scale is also a Likert scale, but more complex in structure ranging from 100 to -100. This scale also was restructured to make it more suited to Norwegian conditions and the group being tested. This will be described closer in the method critics in the discussion part of this paper. All of the scales were in the same order in all the questionnaires. This subject will be treated more thoroughly in the discussion part of this paper. The Norwegian translation was proof read by Professor Martin R. Eisemann, Phd. by the University of Tromsø.

2.4. Statistical analysis

The collected questionnaires were punched into SPSS in October 2007. All the items got an ID number corresponding with their number and place in the surveys SPSS main data file. Then the scales and their subscales were coded, and the items in each scale were reversed correctly. The total score for each scale and subscale were further calculated. The measurement models consisted of a total of 182 items.

Methods used for statistical analyses of the material were descriptives, correlation analyses (Pearson's r), reliability (Cronbach's Alpha), t -tests (independent samples –and one sample), multiple regression analyses and measurement of parallelism between males and females. The Bonferroni test was performed to establish a reliable significance level, adjusting the significance level to number of items correlated. In this case mostly 17 items were correlated making the necessary alpha level $p > 0.0029$.

Missing values analyses revealed that of totally 125 returned questionnaires, 54 of the forms had partial data missing. 31 had only one missing value, 14 had two to six missing values and 8 had ten to thirty nine missing values of all together 182 items. None of the cases were excluded from the analysis.

2.5. Method discussion: strengths and limitations.

A weakness in the present study is the use of clustered samples procedure. Clustered samples may potentially underestimate measurement error due to non-independent observations. However, previous documentation suggests there to be essentially no such design effect for self-reported health measures (King et al., 1996, p. 215 as cited in Torsheim, Aaroe og Wold, 2001). The scales in this study are thoroughly tested and high in reliability and validity (see methods section). Also the mean scores in all of the scales proved compatible with previous measures.

The Non-Conformity scale (Smith, 1967) was changed slightly to avoid mistakes due to the youth being too quickly filling in the answers. The quite complex likert-scale were also in the original formula randomly shifting sides in positive and negative ends on the answering sheet. The author decided that this easily could lead to misunderstandings and even mistakes, and made the positive/negative direction of the answering consequent. The scale also had to be changed slightly to suit Norwegian conditions.

A variable that might have affected the internal validity and the results in the present study is the order of the scales in the questionnaire. They were not randomized and might be affected by the states of mind of the subject growing increasingly tired, indifferent or the opposite.

A methodological strength of the present study is that all subjects were tested in the same period of time in late September 2007 trying to catch these last year high school students in a period where the level of stress were fairly normal and not too affected by final exams at the end of the semester in or the spring time in the last semester before graduation. Another methodological strength was that there were a high response rate, even though the participation was voluntary, so that no particular group of students avoided answering while some well behaved or specially interested did.

3. Results

Descriptive data for the observed variables are given in table 3.1, 3.2 and 3.3 (descriptives for each high school, separate for males and females). Preliminary correlating relationships (Pearson's r) is given in table 3.4, 3.5, 3.6 and 3.7. Multiple regression is presented in table 3.8, and a measuring of parallelism between males and females in table 3.9. Correlations for all variables for the total group ($n=125$) and separate for males ($n=64$) and females ($n=61$) is to be found in appendix. Due to the Bonferroni test for the correlating of 15-18 items an alpha level of $p > .0029$ is recommended, and therefore used for all statistical tests in the present study (Bonferroni, 1935).

Table 3.1.
Means and standard deviations for the observed indicators (n=125, 61 females, 64 male).

SCALES	Females (n=61)				Males (n=64)				Total (n=125)			
	M	SD	MIN	MAX	M	SD	MIN	MAX	M	SD	MIN	MAX
SOC	50,34	11,85	0,00	72,00	53,77	9,15	36,00	78,00	52,11	9,22	0,00	78,00
SOC me	17,29	4,63	0,00	26,00	16,52	4,06	8,00	25,00	16,89	4,11	0,00	26,00
SOC co	17,26	4,88	0,00	29,00	19,95	4,14	10,00	29,00	18,64	4,30	0,00	29,00
SOC ma	15,70	4,45	0,00	24,00	17,16	3,61	9,00	26,00	16,45	3,82	0,00	26,00
PSQ	0,41	0,15	0,11	0,86	0,33	0,14	0,07	0,69	0,37	0,15	0,07	0,86
LOC ex	83,93	11,05	46,0	105,0	86,04	8,92	68,00	109,00	84,74	10,05	46,00	109,00
LOC sos des	25,07	4,07	8,00	32,00	24,47	3,73	16,00	34,00	24,76	3,89	8,00	34,00
HBSC	29,11	6,26	13,00	40,00	33,58	4,76	18,00	40,00	31,40	5,97	4,00	40,00
EMBU rej mor	8,28	3,13	5,00	21,00	7,09	1,55	4,00	14,00	7,67	2,53	6,00	21,00
EMBU rej far	7,88	2,55	5,00	15,00	7,03	2,24	0,00	13,00	7,45	2,15	0,00	15,00
EMBU overpr mor	20,98	4,60	12,00	33,00	18,95	3,92	9,00	28,00	19,94	4,32	9,00	33,00
EMBU overpr far	18,13	3,82	6,00	28,00	16,08	5,63	0,00	25,00	17,15	3,66	7,00	28,00
EMBU emow mor	18,31	3,59	7,00	24,00	17,92	3,89	7,00	24,00	18,11	3,48	0,00	24,00
EMBU emow far	15,73	4,11	6,00	24,00	16,07	5,63	0,00	24,00	15,91	4,25	6,00	24,00
NC	-173,8	409,5	-950,0	725,0	-85,7	428,7	-1237,5	1000	-128,68	420,04	-1237,5	1000,0

SOC: The present studies mean value (52.11) on SOC-13, was compared to a large study of a Swedish student population by Isaksson & Neijbert (2006) where the total SOC mean value were 59.58. A t -test proved that the present studies group as total had a significantly lower mean score $F(1,124)=-7.839$, $p < .000$. A statistical significant difference was not found between males

($M=53.77$) and females ($M=50.34$) in the total SOC score by a t -test $F(1,63)=2.995$, $p=.004$. However the SOC-sub scale factor comprehensibility proved a statistical significant gender difference $F(1,63)=5.206$, $p<.000$.

PSQ: The groups mean value in perceived stress was compared to calculated PSQ-index mean cut-off scores where moderate levels of perceived stress have been estimated to be $M>0.34-0.46$, high levels to $M>0.46$ and low level $M<0.34$ (Bergdahl & Bergdahl, 2002, cited in Bergdahl, et al., 2005). In the present study the mean score for the total group is 0.37 which falls within the normal level of stress. A t -test revealed however a significant difference in mean score between males ($M=.33$) and females ($M=.41$), $F(1,61)=1730.001$, $p<.000$. Later in table 3.3 we will see that there are significant differences in levels of perceived stress between the populations in the different high schools tested, the females in high school B ($M=.47$) might be the reason why the mean difference totally between males and females gets so large.

LOC: In the original LOC article of Eisemann et al. (1988) the average LOC external mean score in a healthy Swedish control group is 76.7 ($n=105$) and among depressed patients 88.0 ($n=40$). In the present study the mean LOC score among the youth is 84.74 ($n=125$), a significantly higher mean score compared to the Swedish healthy control group $F(1,124)=8.937$, $p<.000$. Here, according to table 3.3 there was no significant difference between the three high schools, or between males ($M=86.04$) and females ($M=83.93$).

s-EMBU: High scores on the three different s-EMBU sub-scales have to be interpreted as for 'rejection': a reported memory of severe rejection by mother and father in childhood, for 'emotional warmth'; having received a lot of emotional warmth from mother and father and 'overprotection'; being overly overprotected by mother and father. Comparing the results of the sub-scales of the s-EMBU of the present study to the scores of a healthy sample of subjects in a Swedish study (Nordin, Eisemann and Richter, 2004) the overall values are lower than in the Swedish healthy control group and significantly lower for the sub scales of rejection from both mother and father (value rej. father $M=9.24$ and rej. mother $M=9.21$ ($n=461$) (Arridell et al., 2001 cited in Nordin et al., 2004)), where the total group mean values of the present study are significantly lower; rej. father ($M=7.45$, $F(1,124)=-8.252$, $p<.000$) and rej. mother ($M=7.67$, $F(1,124)=-6.841$, $p<.000$). Mean score for rejection from father also were lower than what the

group of chronic pain patients reported, $M=8.01$, in Nordin et al. (2004) but not significantly $F(1,124)=-2.558$, $p<.011$. The lowest rejection mean score among females was found in high school B ($M=\text{rej. mother } 7.57$ ($n=18$), $\text{rej. father } M=7.67$ ($n=18$), and for males in school B the rejection by mother mean score was 6.73 ($n=14$). The highest degree of reported rejection is from females in high school A (rejection by mother $M= 9.10$ ($n=20$)) and in males in school B (rejection from father $M = 7.67$ ($n=14$)). Running a correlation analyses of the total group of subjects between the s-EMBU factors and the eight possible HBSC health complaints revealed as the only significant relationships for females a weak correlation between nervousness and overprotection by mother ($r= -.26$, $p<.05$, $n=61$) and father ($r=-.31$, $p<.05$). The male students showed a weak relation between nervousness and overprotection from mother ($r=-.26$, $p<.05$, $n=64$) and between sleep difficulties and emotional warmth from mother ($r=-.28$ $p<.05$, $n=64$) see appendix C and D for total correlation matrix.

NC: A high positive score (max score 1000) implies that the subjects report being conform. A negative score (minimum score; -1237.5) means that the subject is non-conform. The scale varies around zero, which means neutral (Smith, R. J., 1967). The mean score of both males and females (females $M=-173,8$ and males $M= -85.7$) is close to zero but slightly over towards a non-conform tendency. A t-test shows that there are no significant gender differences here. Running descriptives however the levels of conformity varied not significantly between the present studies three high schools, except for the males in high school C - the group with the highest mean SOC score ($M=58.92$) and the lowest level of PSQ (perceived stress) ($M=.30$) and health complaints where all had $M>4.07$, was the only group having a positive NC-scale mean score ($M=69.79$) showing a slight tendency toward conformity. This scale was slightly changed in order to better suit the subject group which will be addressed further in the methods discussion.

HBSC: The mean score of reported subjective health state showed by means of t-test a statistically significant difference between females ($M=29.11$) and male students ($M=33.58$); $F(1,60)=-5.568$, $p<.000$. The former reported more health complaints in general, although the general health is good (minimum score is for the total group is 13.0 , and max 40.0 where lowest score possible, 8.0 , means that the subject report having health problems in the scale every day the last month and highest score possible, 40.0 , means almost no health problems at all the last

month). The general health of youth in Tromsø measured on 10th graders in 2004 reported that 92% of males and the same for females thought of their health as good, although females reported more complaints when more specific. The same was true for a population in Oslo although 3 years older, 18-19 years, (Bjertness et al., 2004). More details in the present study will be described in the following under table 3.2.

Table 3.2.

Means and standard deviations for the observed indicators in specific health complaints within the 8-item HBSC scale. (n=125, (61females/64 males)) LOW score in HBSC equals HIGH complaint(1=almost daily, 2=more than once a week, 3=About every week, 4=about every month, 5= seldom or never).

SCALE	FEMALES(N=61)		MALES(N=64)		TOTAL(N=125)	
	MEAN	SD	MEAN	SD	MEAN	SD
Headache	3,52	1,260	3,95	1,217	3,95	1,217
Abdominal pain	3,70	1,280	4,06	1,167	4,06	1,167
Backpain	3,59	1,465	3,89	1,387	3,89	1,387
Feeling low	3,67	1,203	3,97	1,161	3,97	1,161
Irritability	3,05	1,244	3,52	1,008	3,29	1,149
Nervous	3,97	1,095	4,13	1,016	4,05	1,054
Sleep diff	3,46	1,373	4,19	1,052	3,83	1,268
Dizziness	4,28	1,002	4,56	0,732	4,42	0,882

As table 3.2 shows, general health is quite good. For females the most frequent health complains are irritability, sleep difficulties and head aches. For males in most frequent are irritability, back pain and headache. In general females report most health complaints, and a t-test reveals a significant difference (females M=29.11 and males M=33.58, F(1,60)=-5.568, p<.000).

Tabell 3.3.

Means and standard deviations for the observed indicators for PSQ SOC,NC, LOC external, Embu rejection, emotional warmth, overprotection of father/mother and in specific health complaints within the 8-item HBSC scale, separate for the three high schools. LOW score in the HBSC-scale equals HIGH complaint (1=almost daily, 2=more than once a week, 3>About every week, 4=about every month, 5=seldom or never).

HIGH SCHOOL A.						
SCALE	FEMALES			MALES		
	N	MEAN	SD	N	MEAN	SD
PSQ index	20	0,36	0,117	25	0,33	0,122
Total SOC	20	51,75	8,867	25	51,40	8,119
Total HBSC	20	29,90	5,486	25	33,84	4,972
HEADACHE	20	3,60	1,046	25	4,32	0,988
ABDOMINAL	20	3,90	1,294	25	4,48	0,770
BACK PAIN	20	3,05	1,538	25	4,24	1,200
FEELING LOW	20	3,85	1,040	25	4,28	1,137
IRRITABILITY	20	3,35	1,226	25	3,64	0,860
NERVOUSNESS	20	4,15	1,040	25	4,12	0,927
SLEEP DIFF	20	3,75	1,20	25	4,28	0,936
DIZZYNESS	20	4,25	0,967	25	4,48	0,872
LOC EXT.	20	86,45	7,817	25	88,00	9,28
EMBU REJ.M	20	9,10	4,08	25	7,36	2,05
EMBU REJ.F	20	8,15	2,62	25	6,96	2,07
EMBU EMW.M	20	17,25	4,06	25	17,52	3,87
EMBU EMW.F	20	14,90	4,91	25	15,04	5,51
EMBU OP.M	20	19,95	3,49	25	19,40	4,33
EMBU OP.F	20	18,00	3,74	25	15,64	5,60
NC	20	-254,38	394,50	25	-125,32	429,12

HIGH SCHOOL B.						
SCALE	FEMALES			MALES		
	N	MEAN	SD	N	MEAN	SD
PSQ index	19	0,47	0,155	14	0,34	0,124
Total SOC	20	48,19	9,801	15	48,87	7,327
Total HBSC	21	26,29	7,377	15	33,87	4,190
HEADACHE	21	2,81	1,289	15	4,60	1,056
ABDOMINAL	21	3,35	1,496	15	4,47	0,915
BACKPAIN	21	3,67	1,390	15	4,07	1,280
FEELING LOW	21	3,14	1,424	15	4,13	0,990
IRRITABILITY	21	2,81	1,436	15	3,60	1,056
NERVOUSNESS	21	3,57	1,248	15	4,33	0,900
SLEEP DIFF	21	3,10	1,700	15	4,00	1,363
DIZZYNESS	21	4,00	1,140	15	4,67	0,724
LOC EXT	19	84,10	9,279	13	84,20	8,752
EMBU REJ.M	18	7,57	1,832	14	6,73	0,96
EMBU REJ.F	18	7,67	2,266	14	7,67	1,99
EMBU EMW.M	21	18,67	3,246	15	17,33	4,353
EMBU EMW.F	21	16,10	3,740	15	15,80	4,507
EMBU OP.M	21	21,142	4,788	15	18,73	3,654
EMBU OP.F	21	19,000	3,406	15	16,667	3,288
NC	21	-131,90	409,31	15	-66,00	444,45

HIGH SCHOOL C.						
SCALE	FEMALES			MALES		
	N	MEAN	SD	N	MEAN	SD
PSQ index	20	0,35	0,121	24	0,30	0,156
Total SOC	20	51,15	16,034	24	58,92	7,940
Total HBSC	20	31,30	4,692	24	33,13	5,024
HEADACHE	20	4,20	1,056	24	4,25	1,073
ABDOMINAL	20	3,85	0,899	24	4,29	1,122
BACKPAIN	20	4,05	1,356	24	4,17	1,341
FEELING LOW	19	4,05	0,911	24	4,29	1,042
IRRITABILITY	20	3,00	1,026	24	3,33	1,129
NERVOUSNESS	20	4,20	0,894	24	4,00	1,180
SLEEP DIFF	20	3,55	1,900	24	4,21	0,977
DIZZYNESS	20	4,60	0,821	24	4,58	0,584
LOC EXT	20	83,75	14,534	24	83,46	8,842
EMBU REJ M	20	8,20	3,088	24	7,04	1,197
EMBU REJ F	20	7,85	2,852	24	6,96	2,136
EMBU EMW.M	20	19,00	3,372	24	18,95	3,520
EMBU EMW.F	20	16,20	3,651	24	18,33	5,087
EMBU OP M	20	21,85	5,343	24	18,38	4,302
EMBU OP F	20	17,35	4,283	24	16,83	5,036
NC	19	-87,50	386,001	24	69,79	402,49

Table 3.3 shows the differences between the groups tested in the different high schools. Females in high school B is lowest in score in most cases –especially they have the lowest level of SOC (M=48.19), they also have the highest level of stress (M=.47). M>.46 is rated as a level of severe, and potential harmful stress in a comparison study (Bergdahl & Bergdahl, 2002, cited in Bergdahl, et al., 2005). There is a statistically significant gender difference in PSQ level in school B, $F(1,20)=16.118$, $p<.000$. Males in high school C has the lowest level of stress (PSQ M=.30) and also has the highest level of SOC (M=58.92). It is interesting comparing these findings in table 3.3 with the following table 3.4. The strongest correlations seem to be in high school B among females, and males in school C. There also seem to be rather large differences between the correlating relationships among the different groups tested.

Table.3.4

Pearsons r correlations among SOC, PSQ and HBSC for the total group and each of the three high schools, also separate for males and females.

Scale	Gender/school	Total SOC-13		Total HBSC		
		N	r	N	r	
Total perceived stress (PSQ)	<i>Females TOTAL</i>	<i>61</i>	<i>-.48***</i>	<i>61</i>	<i>-.74***</i>	
	Females/ high school A	20	-.55*	20	-.61**	
	Females/ high school B	21	-.67***	21	-.80***	
	Females/ high school C	20	-.29	20	-.63**	
	<i>Males TOTAL</i>	<i>64</i>	<i>-.51***</i>	<i>64</i>	<i>-.48***</i>	
	Males /high school A	25	-.45*	25	-.64***	
	Males/ high school B	15	-.58*	15	-.33	
	Males/ high school C	24	-.60***	24	-.48*	
	Total perceived health (HBSC)	<i>Females TOTAL</i>	<i>61</i>	<i>.41***</i>		
		Females/ high school A	20	.48*		
Females/ high school B		21	.72***			
Females/ high school C		20	.10			
<i>Males /TOTAL</i>		<i>64</i>	<i>.41***</i>			
Males /high school A		25	.54**			
Males /high school B		15	.20			
Males /high school C		24	.63***			

***: $p < .0029$ **: $p < 0.01$ level (2-tailed). *: $p < 0.05$ level (2-tailed).

Table 3.4 shows:

- a statistically significant and almost equally strong negative correlation between PSQ and SOC for the total of both males ($r = -.51$, $p < .002$) and females ($r = -.48$, $p < .002$). This means that youth with increasingly high levels of sense of coherence, report increasingly lower levels of perceived stress. However there are differences between the groups tested.
- a strong statistically significant negative correlation between PSQ and HBSC for the total of both males ($r = -.64$, $p < .002$) and especially for females ($r = -.74$, $p < .002$) (Remember that high values in the HBSC scale equals low health complaints.) This means that youth with increasingly high levels of perceived stress, report increasingly high levels of health complaints. This is true for in particular females ($r = -.74$, $p < .0029$), where the correlation is strong for all the groups of females tested, particularly for the females in school B ($r = -.80$, $p > .002$) which the highest mean score of stress (PSQ $M = .47$), and t-test reveals a

significant difference between the total of males ($r=-.48$, $p<.01$) and females.

- c) a significant moderately equally strong positive correlation between SOC and HBSC for the total of both males and females. This mean that youth with increasingly high levels of sense of coherence, report increasingly better health. However, there are significant differences between the groups tested. The significant correlations are to be found in females in school B ($r=.72$, $p<.0029$) and males in school C ($r=.63$, $p<.0029$) which are also (see table 3.3) the two groups reporting respectively the lowest and highest mean level of SOC.

Table 3.5.

Person's r correlations between SOC and PSQ on all variables, for the total group separate for males and females.

Scale	Females (n=61)		Males (n=64)	
	1.PSQ	2.SOC	1.PSQ	2.SOC
1.PSQ	1		1	
2.SOC	-,48***	1	-,51***	1
3.Headache	-,41**	,21	-,30*	,23
4.Abdominal	-,60***	,38**	,09	-,11
5.Backache	-,30*	,22	-,26*	,16
6.Feeling low	-,61***	,38**	-,41***	,49***
7.Nervous	-,49***	,15	-,47***	,32**
8.Irritable	-,58***	,37**	-,38***	,32**
9.Sleep diffic.	-,47***	,29*	-,28*	,34**
10.Dizziness	-,36**	,14	-,22	,14
11.Embu.rej. m	,21	-,28*	,12	-,01
12.Embu.rj. f	,19	-,20	,03	-,09
13.Embu.wh. m	-,11	,08	,01	,02
14.Embu.wha. f	-,32**	,26*	-,08	,11
15.Embu.op. m	,21	-,19	,11	-,12
16.Embu.op. f	,11	-,10	-,11	,08
17.Conf.(NC)	-,12	,28*	,08	,19
18.Ext. LOC	,20	-,08	,27*	-,27*

*** = $p<0.0029$ (after Bonferroni test: suggested sign. level for 18 items), ** = $p<0.01$, * = $p<0.05$

Table 3.5 shows that there are;

- a) a significant correlation between SOC and PSQ for both females ($r=-.48$, $p<.0029$) and males ($r=-.51$, $p<.0029$).
- b) a statistically significant correlation for males and females between PSQ and feeling

low, nervousness and irritability. For females also abdominal pain and sleep difficulties.

c) A statistically significant correlation for males between SOC and feeling low.

Table 3.6

Pearsons r correlations between SOC and PSQ on all variables, for the subjects reporting the highest level of stress ($M > .46$), separate for males and females. (Remember that for all HBSC factors a high score means no health complaint, and lowest score means health complaint everyday.)

Scale	Females (n=18)		Males (n=12)	
	1.PSQ	2.SOC	1.PSQ	2.SOC
1.PSQ	1		1	
2.SOC	-,29	1	-,81***	1
3.Headache	-,13	,45	,01	,20
4.Abdominal	-,39	,17	-,22	,17
5.Backache	,17	,09	-,06	,32
6.Feeling low	-,49*	,43	-,58*	,51
7.Nervous	-,02	-,02	-,11	,15
8.Irritable	-,60**	,15	-,02	-,08
9.Sleep diffic.	-,49*	,35	-,15	,30
10.Dizziness	-,54*	,47	-,26	-,01
11.Embu.rej. m	-,22	-,43	-,35	,42
12.Embu.rj. f	-,11	-,31	,01	-,10
13.Embu.wh. m	-,03	,23	-,01	-,07
14.Embu.wha. f	-,22	,10	-,13	,05
15.Embu.op. m	-,57*	-,06	,01	-,28
16.Embu.op. f	-,25	-,004	-,09	-,16
17.Conf.(NC)	,26	,33	-,51	,46
18.Ext. LOC	,15	-,10	,25	-,18

*** = $p < 0.0029$ (after Bonferroni test: suggested sign. level for 18 items), ** = $p < 0.01$, * = $p < 0.05$

Due to a low number of subjects these results in table 3.6 are hard to generalize, but they are taken into concern to illustrate what tendencies are surfacing.

Most stressed females: PSQ (stress) reveals weak correlations with the other factors, and when its level increases it correlates with these females increasingly reporting health complaints like feeling irritable ($r = -.60$, $p < .01$) dizzy ($r = -.54$, $p < .05$), low ($r = -.49$, $p < .05$) and sleep difficulties ($r = -.49$, $p < .05$). PSQ for these females also has a weak negative correlation with the EMBU factor 'overprotection by mother' ($r = -.57$, $p < .05$).

The Most stressed males: there is a statistically significant negative correlation between

perceived stress and the sense of coherence ($r = -.81, p < 0.0029$), and weaker between stress and feeling low ($r = -.58, p < 0.05$). No significant correlations with EMBU factors or other health complaints.

What the two genders with a high level of stress seem to have in common is the strong negative relationship between stress and the health complaint 'feeling low (sadness)'. If this is the case, the high school with the highest level of stress also might have the lowest mean score on the HBSC factor 'feeling low'. Looking at table 3.3 this is the case. Females in high school B reporting the highest mean value of PSQ ($M = .47$) also have the lowest mean value of 'feeling low' ($M = 3.14$) and females in high school A with the 2nd highest mean level of stress ($M = .36$) have the 2nd lowest mean level of 'feeling low' ($M = 3.85$). In high school B where the males report the highest mean level of stress ($M = .34$) they also report the lowest mean score on 'feeling low' ($M = 4.13$) of all the groups of males in the three different high schools.

What separates the two high stress groups is first of all the correlation between PSQ and SOC which is strongly significant and negative for males ($r = -.81, p < 0.0029$) and not significant for this group of females. Even though not statistically significant females have more stronger correlations between PSQ and health complaints than males, and also have a negative correlation between perceived stress (PSQ) and EMBU overprotection from mother. The more stressed the women are correlate with less maternal overprotection overprotection.

Table 3.6

Pearsons r correlations between SOC and PSQ on all variables, for the subjects reporting the lowest level of stress ($M < .34$), separate for males and females. (For all HBSC factors a high score means no health complaint, and lowest score means health complaint every day.)

Scale	Females(n=21)		Males (n=36)	
	1.PSQ	2.SOC	1.PSQ	2.SOC
1.PSQ	1		1	
2.SOC	-.42	1	-.47**	1
3.Headache	-.44*	.20	-.07	-.07
4.Abdominal	.20	.17	-.08	-.20
5.Backache	-.45*	.14	.04	-.001
6.Feeling low	-.18	.15	-.18	.41*
7.Nervous	-.11	-.08	-.30	.31
8.Irritable	-.12	.37	.10	.22
9. Sleep diffic.	-.36	.22	.16	.23
10.Dizziness	-.46*	.39	-.06	.02
11.Embu.rej. m	-.14	-.20	-.21	-.04
12.Embu.rj. f	.11	-.38	-.09	-.06
13.Embu.wh. m	-.23	.20	-.16	-.06
14.Embu.wha. f	-.26	.32	-.25	.09
15.Embu.op. m	.31	-.14	-.05	-.13
16.Embu.op. f	.37	-.38	-.08	-.04
17.Conf.(NC)	.08	.07	.07	.06
18.Ext. LOC	.14	-.03	.13	-.20

*** = $p < .0029$ (after Bonferroni test: suggested sign. level for 18 items), ** = $p < 0.01$, * = $p < 0.05$

So what might separate the low stress group from the high stress group?

Less stressed females report a different set of health complaints, more physical in nature correlated to PSQ than the high stress group, namely headache ($r = -.44$, $p < .05$) and backache ($r = -.45$, $p < .05$) and also dizziness ($r = -.46$, $p < .05$). There are no statistically significant correlates in this table.

Less stressed males still have a stronger correlation between PSQ and SOC ($r = -.47$, $p < .01$) like the high stress males but not as strong. Running a correlation analysis with an equal number of participants in the males low stress ($n = 12$) as in the high stress group the correlation $r = .47$ does not change. So there might be a significant difference in males on SOC due to stress and not as a result of few subjects. Instead of having as the high stress males a negative correlation between feeling low and PSQ ($r = -.58$, $p < .05$), the low stressed males have a *positive*

correlation between feeling low and SOC ($r=.41$, $p<.05$) -the higher SOC the less they are feeling low.

Table 3.7.

Correlations for the total subject group separately for males and females between variables in the three SOC-13 sub scales and other variables.

	Head ache	Abdo minal	Back ache	Feeling low	Irrita Bility	Nervo usness	Sleep difficul ties	Dizy	SOC (Ma)	M	SD
Females (n=61)											
SOC (Ma)	,11	,27*	,16	,26*	,30*	,19	,21	,06	1	15,70	4,45
SOC (Co)	,28*	,31*	,23	,38**	,32*	,13	,34**	,21	,65***	17,26	4,88
SOC (Me)	,10	,36**	,18	,29*	,29*	,04	,20	,07	,50***	17,30	4,63
Males (n=64)											
SOC (Ma)	,07	,02	,22	,44***	,31*	,39***	,27*	,10	1	17,16	3,61
SOC (Co)	,21	-,09	,22	,38**	,26*	,25*	,43***	,08	,62***	19,95	4,14
SOC (Me)	,23	-,20	-,07	,30*	,14	,14	,06	,18	,28*	16,52	4,06
	SOC (Co)	SOC (Me)	PSQ	EMBU Rrej M	EMBU emow F	EMBU emow M	NC	LOC EX	M	SD	
Females (n=61)											
SOC (Ma)	,65***	,50***	-,41***	-,34**	,28*	,20	,22	-,07	15,70	4,45	
SOC (Co)	1	,59***	-,51***	-,24	-,18	-,03	,23	-,02	17,26	4,88	
SOC (Me)	,59***	1	-,29*	-,15	,21	,06	,25	-,10	17,30	4,63	
Males (n=64)											
SOC (Ma)	,62***	,28*	-,45***	-,01	,07	-,08	,17	-,13	17,16	3,61	
SOC (Co)	1	,14	-,48***	,11	,11	-,13	-,06	-,10	19,95	4,14	
SOC (Me)	,14	1	-,27*	-,10	,12	,28*	,24	-,37**	16,52	4,06	

*** = $p<.0029$ (after Bonferroni test: suggested sign. level for 18 items), ** = $p<0.01$, * = $p<0.05$

From this table 3.7 one can see that;

a) SOC manageability

for females; is significantly correlated to stress.

For males; manageability is significantly correlated to stress (PSQ) and to feeling low.

b) SOC Comprehension

for females ; comprehension is significantly correlated to stress. For males; comprehension is significantly correlated to stress and to sleep difficulties.

c) SOC Meaning

for females; is only weakly correlated to stress and moderately to abdominal pain and weakly to feeling low and irritability. For males; is only weakly correlated to stress, and

to EMBU emotional warmth from mother and feeling low, but moderately negatively correlated to their external locus of control.

Manageability and comprehension have the strongest correlations of the sub scales and seem to significantly influence stress (PSQ) equally much, and equally for both males and females. Feeling low is more strongly and significantly connected to manageability for the males, where as for the females it is more correlated to comprehension. For complete correlation tables see appendix C and D.

Table 3.8.

Result from a standard multiple regression analysis with spilt file on gender. Dependent variable is PSQ (perceived stress).

<i>Model</i>	<i>Females(n=61)</i>				<i>Males(n=64)</i>			
	<u>Adj</u> <u>R²</u>	<u>β</u>	<u>t</u>	<u>Sig</u>	<u>Adj</u> <u>R²</u>	<u>β</u>	<u>t</u>	<u>Sig</u>
Total SOC		-.167	-1.658	.104		-.376	-3.129	.001
Total HBSC		-.641	-6.687	.000		-.418	-3.377	.001
Embu rejection father		.044	.306	.761		-.105	-.725	.472
Embu rejection mother		.017	.110	.913		.193	1.532	.131
Embu emotional warmth father	.563	-.221	-1.735	.089	.342	-.063	-.257	.798
Embu emotional warmth mother		.128	1.001	.322		-.025	-.121	.904
Embu overtprotection father		.047	.414	.681		-.117	-.728	.470
Embu overprotection mother		.067	.560	.578		.094	.434	.666
Total NC		.107	1.092	.280		.255	2.287	.026
Total LOC external		.040	.429	.670		.119	.994	.325

In the model with all the studies variables, health complaints (HBSC) have the largest predictive power in females on stress, for males also but not as much as for the females. For males their sense of coherence has an almost equal predictive power as perceived health.

Table 3.9.

Table for evaluating parallelism, the different effect of variables on perceived stress in males and females the following formula was used:

$$T = \frac{\beta_1 - \beta_2}{\sqrt{\text{std.err.1 squared} + \text{std.err.2 squared}}}$$

<u>Variable</u>	<u>Females</u>		<u>Males</u>		<u>T</u>
	β_1	<i>Std.err.1</i>	β_2	<i>Std.err.2</i>	
SOC	-.002	.001	-.006	.002	-1.940
HBSC	-.015	.002	-.012	.004	-.671
EMBUemo.w. father	-.008	.005	-.002	.006	-.98.361

Table 3.9 shows in the right column the value of T. The T-value shows that SOC and HBSC do not affect the perceived stress in males and females significantly differently. Emotional warmth from father however is clearly significant meaning that emotional warmth from father has a larger effect on stress in females than in males, but looking at table 3.8 this variable does not have a strong significant predictive power on perceived stress.

4. Discussion

The intention of this study was to investigate whether there was a connection between PSQ and SOC-13, HBSC, s-EMBU factors, LOC and NC, revealing what factors might influence and be influenced by perceived stress. In the following, after a short summary of the main results, the findings will be discussed chronologically according to the present studies hypotheses which are;

- 1)-there is a negative relationship between SOC-13 and PSQ – the youth with a high sense of coherence report less perceived stress.
- 2)-there is a positive relationship between PSQ and HBSC – the youth with a high level of perceived stress report more subjective health complaints.
- 3)-there is a negative relationship between SOC-13 and HBSC- the youth with a high sense of coherence report less subjective health complaints.
- 4)-there are correlations between SOC-13 and factors from experienced childhood upbringing (the EMBU scale).
- 5)-there are correlations between SOC-13 and youths locus of control (the LOC scale).
- 6)-there are gender differences in the correlating relationships in hypotheses 1 to 5.

To first sum up the main results before discussion, increasingly high score in sense of coherence (SOC) predict a decreasing level of perceived stress. Youth with an increasingly high level of perceived stress report increasingly more frequent health complaints (HBSC). There is a statistically significant negative relationship between health complaints and the sense of coherence. The group of males with the highest sense of coherence and group of females with lowest sense of coherence report the strongest correlations between the sense of coherence and health complaints. There were only found very weak and no statistically significant correlations between SOC and factors from experienced childhood upbringing (the s-EMBU scale). There were no statistically significant correlations between SOC and youths locus of control. Significant gender differences were found in that level of perceived stress and level of health complaints were significantly higher in females. According to multiple regression analyses, health complaints and sense of coherence yielded the largest predictive power for females and males concerning perceived stress. For males their sense of coherence has an almost equally strong predictive power as HBSC on perceived stress. For females, health complaints have a stronger predictive power than their sense of coherence on stress. Evaluation of parallelism however, shows that SOC and HBSC do not have a significantly different effect on perceived

stress in males and females. For both genders perceived stress is equally related to their health complaints and to their sense of coherence. However, the present study supports the overall trend in previously mentioned youth and health studies, of females reporting a higher level of stress and health complaints than males.

Hypothesis 1: The results indicate that the youth's sense of coherence (SOC-13) appears quite relevant for understanding their experience of stress (PSQ) in accordance with Antonovsky's (2005, cited in Eriksson & Lindström, 2006) salutogenetic theory, in particular for males. As appears from table 3.4 there is a statistically significant, almost equally strong negative correlation for both males and females of the total group. However, looking at the same table 3.4, there are significant differences between the high schools in this study. Among two of the schools, B and C, there are significant gender differences. Looking at table 3.3, the groups with the highest correlations between SOC-13 and PSQ were the groups with the most extreme mean scores of PSQ; the females in school B with the *highest* mean score and the males in school C with the lowest. Interestingly, on the other hand, females in school B have the *lowest* mean level of sense of coherence among the females, and males in school C have the highest among the males. It is important to have in mind however, that the number of subjects in the smaller groups range from fifteen to twenty three only.

Torsheim et al.(2001) found that for students with a high SOC, school-related stress was less strongly associated with health complaints. This is contrary to what was found in the present study where the group reporting the highest level of sense of coherence, the males in school C, yielded the strongest and statistically significant correlation between HBSC and PSQ among males. Also looking at table 3.6 the males in the group reporting the highest level on stress, SOC is strongly and statistically significantly correlated with PSQ. However the opposite is the case for the high stress group of females, and the females in school B reporting a very high mean level of stress. The strongest PSQ-HBSC association is in the group of females with lowest mean score in SOC. Also in the low stress group (see table 3.6) of males the moderately strong PSQ-SOC association is there, but not for females in either cases. Torsheim et al. (2001) claimed that several methodological factors speak against a stress-moderating role for SOC. The interactive effects in their study were only accounting for between 0.5 and 1% of the true variance in health

complaints. Notably, the main effect of SOC on health complaints was strong. Torsheim et al. (2001) claim it seems reasonable not to overstate the substantive significance of the present interaction effects. The weak interaction effects found in Torsheim et al.'s (2001) study are in line with the bulk of studies reporting weak or non-significant interaction effects between SOC, stress and health outcomes (Feldt, 1997, in Torsheim et al., 2001 ; Vahtera et al., 1996). For studies of stress-moderation in general, weak or absent interaction effects, have been explained with reference to lack of statistical power, and amplification of measurement error (Busemeyer & Jones, 1983, cited in Torsheim, 2001). The present study might indicate the importance of controlling for gender differences in future studies of the relation between sense of coherence, health complaints and perceived stress in youth. So far, there is only little research in support of this assumption.

Hypothesis 2: The results indicate that the youths perceived stress (PSQ) appear quite relevant for understanding their experience of health complaints (HBSC) especially for females. From table 3.4 there is a strong statistically significant correlation for both males and females in particular of the total subject group. The more stress the more health complaints. A t-test reveals that the gender difference is statistically significant, and looking at the same table 3.4, there are significant differences between the groups in the different schools tested. Within all of the schools there are significant gender differences. The correlations are statistically significant for females in two of the schools, except for males in school A having a higher correlation than the females in the same school. These males however still have a lower health complaint and level of stress than the females, as is the over all trend. The effect of stress, school related stress, on health complaints and its associations with SOC was tested by Torsheim et al (2001) which found that the model of best fit in was a model where SOC and school related stress *interacted* in predicting health complaints. These authors also found that the relationship became stronger with increasing age, testing 11 to 15 year olds. In controlling for the effects of SOC the relation between school related stress and health complaints was weak indicating a significant role of SOC. In the present study also, the correlations between PSQ and HBSC are strong especially for females. For the total group of females reporting the highest mean level of PSQ ($M > .46$) the total health complaint mean score was 22,56 (meaning having the listed health complaints more than once a week) and the health complaint irritation seem to be the strongest association, for males in

the same high stress group the total mean of health complaints was 29,08 (meaning having the listed health complaints about every week) and the strongest correlated complaint was 'feeling low'. For the low stress group (table 3.5) of females headache, backache and dizziness were the most frequently reported and no health complaints proved significantly correlated to PSQ. For the high stress group, table 3.6, of females feeling low, irritability, sleep difficulties and dizziness, and for males feeling low. Also in this condition no health complaints proved significantly correlated to PSQ. It is important to mention that in these groups the number of subjects are low, and the assumption should be investigated further.

Hypothesis 3: The results indicate that the youths sense of coherence (SOC-13) appear quite relevant for understanding their experience of health complaints (HBSC) particularly for the groups where the level of SOC is either peaking or low. Females in school B with the lowest level of SOC has a statistically significant strong correlation with also the lowest HBSC mean reported. Males in school C with the highest mean level of SOC also has a statistically significant strong correlation with HBSC. Torsheim et al. (2001) found that most of the variance accounted for by SOC could be attributed to the direct relationship between SOC and health complaints. Direct effects of SOC accounted for almost half of the variance in health complaints. The indirect and interactive relationships only accounted for a marginal proportion of variance. Torsheim et al. (2001) discusses how the strong main effect of SOC is open to several interpretations. According to Antonovsky, people with a high SOC use more effective coping strategies, and will always be moving from a state of tension to non-tension. In a more speculative vein, (Antonovsky,1987, cited in Ibid) proposes that SOC affects the tendency for the physiological system to enter disequilibrium. This hypothesis converges with recent contributions that view subjective health complaints as a physiological sensitisation phenomenon (Ursin,1997).The strong association between SOC and health complaints, controlling for level of stress, could reflect that individuals with a high SOC show a resistance to such a sensitisation.

Hypothesis 4: The results in the present study indicate that the youths understanding of their childhood upbringing (s-EMBU) appear vaguely but not statistically significantly correlated to their sense of coherence (SOC-13) in the case of females. According to Antonovsky (2005,cited in Eriksson & Lindström, 2006) the social relation to the family is crucial since the foundation for SOC is being settled during childhood. Table 3.5 shows that for the females sense

of coherence and parental emotional warmth has a weak positive correlation, and also the maternal rejection has a negative correlation with SOC. Supporting the previous finding by Nordin et al. (2004), suggesting a higher degree of parental caring attitudes among pain patients compared with healthy subjects, females in the present study reporting the highest level of stress and highest level of health complains, the females in school B, report the lowest mean level of the EMBU sub scale 'rejection from mother' of the females. They also interestingly report the lowest level of emotional warmth from father. For males there were no significant correlations between SOC and the s-EMBU subscales.

Hypotheses 5: The results of the present study indicate a significantly higher level of external control compared to the healthy control group in a previous study by Eisemann et al. (1988). The difference between the groups might be due to age-difference. Adults have more control than youth and do not to such a large extent attribute the things that happen in their life as a consequence of external forces. Both the total group of males and females, with no significant gender difference, had mean levels at the same level of that of the group of depressed patients in the Eisemann et al. (1988) study. Table 3.5 however reveals no statistically significant correlations, only a weak negative correlation between locus of control and SOC-13 among the total group of males in the present study. The correlation was not significant in the high -or low stress groups or for females. Table 3.7 indicates that the male correlation between LOC external and SOC might be related negatively to the SOC subscale of 'meaningfulness'. The tendency is that an increasing sense of meaningfulness predicts a decreasing degree of external control, for males only in the present study. The stable and high level of external locus of control across all the groups despite gender might be a result of that they all are in the same life situation, and to a large degree are attributing the things that happen in their life as a consequence of external forces like fate, luck, chance or powerful others, in opposite to being a result of their own behaviour, abilities or characteristics (Eisemann et al., 1988).

Hypothesis 6: The results indicate some statistically significant differences between males and females. First of all the present study support previous findings (Torsheim et al., 2001; Bjertness et al., 2004; Zachrisson et al., 2006; Mathiesen et al. 2007), that the total of females report statistical significantly more health complaints (HBSC) than males. Independent samples t-tests proved statistically significant difference in HBSC score between males and females, and

the eta squared value was large (.141).

Females also report a significantly higher level of stress than males in all the groups tested. Independent samples t-tests proved significant difference in PSQ score between the genders, and the eta squared value were moderate (.067).

The females with the highest level of stress, have significantly stronger correlations between PSQ and health complaints, and have more health complaints of a more physical nature, like stomach ache, than males. The genders share the strong correlations between stress and the more psychological health complaints like feeling. The correlation however is stronger for males, irritation is stronger for females and all groups of females who also have significantly more sleep difficulties than males.

The mean score of SOC-13 (see table 3.1) is for the total of males and females not significantly different. Independent samples t-tests proved no significant difference in SOC score between males and females. The value for both genders is low compared to previous studies (Isaksson & Neijbert, 2006). But looking at the subscales, the females mean score in comprehension and manageability is significantly lower than for the total group of males, and statistically significantly correlated to perceived stress (see table 3.7) for both groups in particular males. The SOC sub scales are also more connected to s-Embu factors for the female respondents, all though not statistically significantly, in particular rejection from mother might seem to influence their manageability.

The mean score of PSQ (see table 3.1 and 3.2) is significantly higher for females than for males in all groups tested. The general level of stress falls for females within what is considered normal and for all the groups of males all means are on the level of what is considered low stress, but there are differences between the groups tested, and in particular the group of females in school B has a level of PSQ considered harmfully high. These females also report the lowest level of SOC and the highest degree of health complaints. Perceived stress (PSQ) has significantly stronger correlation with health complaints (HBSC) for females than for males except in one of the schools, A, where the correlation were strongest and statistically significant for the males only. The correlation between perceived stress and sense of coherence is significantly stronger for males than for females. For males with a high level of stress it is particularly strong but the number of subjects is only twelve in this group. Females with highest

degree of stress had a higher mean value. A correlation analyses showed that their stress were strongest but not statistically significantly correlated to the HBSC factor feeling low, irritability, sleep difficulties, dizziness and negatively to the EMBU factor overprotection from mother. For males their stress were correlated highly to their sense of coherence and vaguely and not statistically significantly to the HBSC factor feeling low. Here there seem to be some differences between males and females with high stress.

As concerns level of external locus of control (LOC external) there seem to be no gender difference in mean levels in any of the groups or in the total of males and females. However for the total group of males, which is not the case for females, external locus of control is vaguely correlated negatively to the SOC sub-scale meaningfulness but not statistically significant. Because it was hard to find studies on gender differences in youth (or young adults) and external locus of control and sense of coherence, the author did not succeed in finding any supporting research for this possible difference between males and females.

Gender differences in the s-Embu subscales were found for the total group of females reporting weak correlations between perceived stress and soc (se table 3.5) with some of the s-Embu sub-scales. The strongest correlation was the negative correlation between perceived stress and emotional warmth from father. Weaker negative correlations were found between sense of coherence and maternal rejection. In the group of high stress subjects, a weak negative correlation was found between females's perceived stress and maternal overprotection. There were no such correlations for males in any of the groups. Over all females seem more affected by the Embu factors then the males but due to differences between groups and low significance it is not possible to draw any conclusions. Previous research (Nordin et al., 2004) has found in general higher mean scores for all the sub scales in a healthy group of subjects compared to the present study.

Degree of conformity proved no significant gender differences, and correlations with the other factors were non significant and mean scores was for all groups more or less close to zero (se description of scoring system see under table 2.2.2 in the methods section). But there seem to be a slightly more conform trend among the males in all groups particularly. The scale was applied in the present study expecting to find a relation between the degree of conformity, sense of coherence and perceived stress. The only correlation found was a weak positive correlation in

the total group of females between degree of conformity and SOC. Increasing level of SOC might predict increasing degree of conformity. There was no correlation with the SOC sub scales, but interestingly the males in high school C, with the highest mean score of SOC, were the group with the highest positive mean value in conformity (NC) (see table 3.3), supporting the possibility of a positive NC-SOC correlation also among the males like the one found in the total group of females.

Final summary and reflection over the present study;

The present study shows a group of subjects in high school reporting a generally lower degree of sense of coherence in life than comparison groups from previous studies. The level is not significantly different between females and males. The level of stress and health complaints however is significantly higher in females, even though the mean score reveals a normal moderate level of stress. A group of females however, reported a surprisingly high level of stress. The same group also has the most health complaints and the lowest level of sense of coherence. In general the overall health is good, and stress levels are moderate. The health complaints and sense of coherence are the factors having the largest predictive power on perceived stress for both females and males, and does not seem to affect the perceived stress in males and females significantly differently. A methodological limitation of the study makes it unable to draw any conclusions about causality in the various correlating relations. This will be a challenge for future studies.

In introducing the present study the importance of implementing psychological research in pedagogy models was addressed, and youth mental health research also is on the political agenda represented by the Parliament Report nr. 39 (2001-2002) about *Adolescence and quality of life for children and youth in Norway*. The present study shows among other things that the general level of sense of coherence among youth is in fact very low compared to previous studies, and the sense of coherence seems to be connected to youth stress and health. The heightening of youth sense of coherence in life might this way be a salubrious factor. This inspires to more research on how to increase the feeling of that life is manageable, meaningful and comprehensible in youth, and how to practically implement these findings in models of psychology and pedagogy and praxis in school, to reduce stress and increase general health. An

aspect of this is also addressed by the movement of Positive Psychology stated in the Akumal manifesto from 2000: «improving child education by making greater use of intrinsic motivation, positive affect and creativity within schools.» (Sheldon, et al., 2000). Inspiration can be found in David Kolb's model of Transformative learning that allow students to go through four stages of learning. It is a cycle involving four learning modes: concrete experiences, reflective observation, abstract conceptualisation and active experimentation. Using this model a study was able to make a balance in the different aspects of learning in a comprehensive structure. In its conclusion it is pointed out that «Kolb's model allows building students participative attitude -a situation that might not be often present in actual education» (Juares-Najera, et al., 2006).

Transformation might not just be an epistemological process involving a change in world-view and habits of thinking; it is also a process where participants experienced a change of their being in the world. This was shown in a study as participants after a longer program shifted into a new feeling of relatedness with their material, social and environmental realities, and sought arenas for socially responsible involvement as active citizens (Lange, 2004). This might be a compatible description to that of experiencing a high degree of sense of coherence in life.

Studying youths, males and females, and their stress and health in relation to sense of coherence, might not only foster pedagogic tools that in turn could initiate a better learning environment. It might also help finding out how to provide youth a deeper sense of relatedness to their being in the world, which according to eco-philosophers (Drengson, 1999) is crucial now in the process of re-establishing a fundamentally important healthy global environment.

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Appendix A List of codes and scores

Total 182 items: LOC:50, s-EMBU:23, HBSC:8, SOC-13:13, PSQ30, NC:33, KJØNN:1, ALDER:1.

ID NR Matching on answer sheets and in SPSS

Sex 1=Women (61),
2=Men(64)

Age In years
Total M= 18.2, SD= 0.783
Women M=18.21, SD=0.777
Men M=18.19, SD= 0.794

1. HBSC (1 factor)

1=about every day 2=more then once a weak 3=about every weak
4=about every month 5=seldom or never

2. s-EMBU (6 factors)

1=No never 2=Yes sometimes 3=Yes often 4=Yes all the time
*REJECTION FATHER(6 items) *REJECTION MOTHER (6 items)
*EMOTIONAL WARMTH FATHER (6 items) *EMOTIONAL WARMTH MOTHER(6 items)
*OVERPROTECTION FATHER(9 items) *OVERPROTECTION MOTHER(9 items)
Reversed items: nr 17

3. PSQ (1 factor)

High PSQ indicates high degree of stress.
1=Allmost never 2=Sometimes 3= Often 4= Mostly
The PSQ mean index score is calculated by: (total score-30)/90
Reversed items: nr 1, 7, 13, 17, 21, 25, and 29

4. Smiths Non Conformity scale (1 factor)

High score=high degree of conformity.

100,0...	87,5...	62,5..	50,0...	37,5...	25,0..	12,5..	0,0...	12,5...	25,0...	37,5..	50,0...	62,5...	87,5...	100,0
↓		↓		↓		↓		↓		↓		↓		↓
totally agree		quite agree		neutral		quite disagree		totally disagree						

Reversed items: 3, 5, 8, 11, 16, 23, 24, 25, 26, 27, 28, 29, 30, 31
Fillers to be deleted: 6, 7, 17, 32, 33

5. LOC (2 factors)

1=Is not so at all 2= Is not quite so 3= Is quite so 4= Is completely so.
*LOC Social desirability (10 items)
*LOC external control (40 items)
(High score indicates high degree of external control)
Reversed items: 1, 5, 9, 11, 15, 16, 19, 20, 23, 24, 27, 29, 31, 34, 37, 41, 42, 45, 46, 49, 43and 47.

6. SOC-13 (3 factors)

High score =high sense of coherence in a 1-7 likert scale.
* SOC MANAGEABILITY (4 items)
* SOC COMPREHENSIBILITY (5 items)
* SOC MEANING (4 items)
Reversed items: 1, 2, 3 and 7.

APPENDIX
-B-
Correlations
between all
variables.
Total group
of women.

(N=61)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	M	SD
1.PSQ	1																	0,41	0,15
2.SOC	-,48***	1																50,38	11,85
3.Headache	-,41**	,21	1															3,52	1,26
4.Abdominal	-,60**	,38**	,22	1														3,70	1,28
5.Backache	-,30*	,22	,29*	,25	1													3,59	1,47
6.Feeling low	-,61***	,38**	,54**	,50**	,32*	1												3,67	1,20
7.Nervous	-,49***	,15	,32*	,30**	,19	,43**	1											3,97	1,10
8.Irritable	-,58***	,37**	,16	,57**	,05	,56**	,34**	1										3,05	1,24
9.Sleep diffic.	-,47***	,29*	,24	,37**	,18	,37**	,10	,41**	1									3,46	1,37
10.Dizziness	-,36*	,14	,49**	,16	,15	,50**	,16	,24	,41**	1								4,28	1,00
11.Embu.rej. m	,21	-,28*	,00	-,17	-,15	-,05	-,21	-,14	-,04	,02	1							8,28	3,13
12.Embu.rj. f	,19	-,20	,01	-,01	-,18	,14	-,20	-,12	,11	,01	,66***	1						7,89	2,56
13.Embu.wh. m	-,11	,08	-,02	,16	,14	,03	-,03	,04	-,03	-,001	-,54***	-,34**	1					18,50	3,59
14.Embu.wha. f	-,32**	,26*	,03	,17	,28*	,11	-,06	,08	,07	,10	-,34**	-,42***	-,52***	1				15,74	4,11
15.Embu.op. m	,21	-,19	,03	-,14	,08	-,11	-,26*	-,09	-,10	-,14	,30*	,14	-,07	-,08	1			20,98	4,60
16.Embu.op. f	,11	-,10	-,02	,07	,03	,01	-,31*	-,05	,10	-,12	,11	,31*	-,02	,15	,49***	1		18,13	3,82
17.Conf.(NC)	-,12	,28*	,14	,20	-,01	,15	,07	,21	,08	-,07	-,23	-,20	-,13	,14	-,25	-,11	1	-173,77	409,5
18.Ext. LOC	,20	-,08	-,23	-,22	-,14	-,09	-,07	-,18	,06	-,05	,21	,13	-,26*	-,28*	-,07	-,06	,07	83,93	11,05

***:p<.0029

** :p<.01,

* :p<.05

APPENDIX

-C-

Correlations
between all
variables.

Total group
of men.

(N=64)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	M	SD
1.PSQ	1																	0,33	0,14
2.SOC	-,51***	1																53,77	9,15
3.Headache	-,30*	,23	1															4,36	1,03
4.Abdominal	,09	-,11	,29*	1														4,41	0,94
5.Backache	-,26*	,16	,28*	-,25*	1													4,17	1,25
6.Feeling low	-,41***	,49***	,33**	-10	,42**	1												4,25	1,05
7.Nervous	-,47***	,32**	,20	,03	,16	,50***	1											4,13	1,02
8.Irritation	-,38***	,32**	,22	,13	,21	,36**	,29*	1										3,52	1,01
9.Sleep diffic.	-,28*	,34**	,17	-,09	,30*	,43***	,51***	,21	1									4,19	1,05
10.Dizziness	-,22	,14	,38***	,24	,17	,19	,22	,35**	,07	1								4,56	0,73
11.Embu.rej. m	,12	-,01	-,08	,12	,08	,13	-,15	,01	,15	-,05	1							7,09	1,55
12.Embu.rj. f	,03	-,09	-,14	-,15	-,11	-,16	-,18	-,18	-,13	-,23	,18	1						7,03	2,25
13.Embu.wh. m	,01	,02	,02	-,08	-,11	-,13	-,20	-,18	-,28*	,16	-,04	,12	1					17,92	3,90
14.Embu.wha. f	-,08	,11	-,01	-,14	-,03	-,09	-,10	-,22	-,13	,09	-,12	36**	,75***	1				16,08	5,64
15.Embu.op. m	,11	-,12	-,02	,02	-,03	-,12	-,26*	-,18	-,14	-,03	,28*	,18	,43***	,25	1			18,95	3,92
16.Embu.op. f	-,11	,08	,08	,06	-,02	,07	-,12	-,22	-,01	,11	-,12	,54**	,44***	,72***	,44***	1		16,22	4,95
17.Conf.(NC)	,08	,19	,19	,15	,02	,22	-,03	,15	-,02	,07	-,08	-,07	,25*	,11	,16	,04	1	-85,71	428,7
18.Ext. LOC	,27*	-,27*	-,17	-,03	-,03	-,09	-,12	,07	,08	-,19	,20	-,21	-,18	,20	,15	-,20	-,12	85,50	9,02

***:p<.0029,

** :p<.01,

* :p<.05

APPENDIX

-D-

**Correlations
between all
variables.**

**Total group.
(N=125)**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	M	SD
1.PSQ	1																	0,37	0,15
2.SOC	-,59***	1																52,54	9,22
3.Headache	-,40**	,28**	1															3,95	1,22
4.Abdominal	-,37**	,30**	,33**	1														4,06	1,17
5.Backache	-,32**	,22*	,34**	,30**	1													3,89	1,38
6.Feeling low	-,55**	,47**	,49**	,39**	,40**	1												3,97	1,16
7.Nervous	-,52**	,28**	,27**	,20*	,19*	,47**	1											4,05	1,05
8.Irritation	-,51**	,42**	,24**	,43*	,15	,50**	,33**	1										3,29	1,15
9.Sleep diffic.	-,41**	,32**	,29**	,27**	,27**	,44**	,28**	,37**	1									3,83	1,27
10.Dizziness	-,31**	,21*	,47**	,23*	,18*	,39**	,20*	,31**	,32**	1								4,42	0,88
11.Embu.rej. m	,19*	-,28**	-,08	-,17	-,10	-,03	-,21*	-,15	-,06	-,03	1							7,79	2,53
12.Embu.rj. f	,20*	-,24*	-,07	-,06	-,14	,05	-,26**	-,17	,02	-,11	,63**	1						7,72	2,15
13.Embu.wh. m	-,02	,09	-,05	,01	,00	-,11	-,11	-,10	-,17	,08	-,30**	-,23*	1					18,36	3,48
14.Embu.wha. f	-,23*	,28**	,10	,13	,20*	,10	-,09	-,02	,06	,16	-,24*	-,35**	,65**	1				16,43	4,25
15.Embu.op. m	,20*	-,18	-,06	-,13	-,01	,16	-,26**	-,16	-,16	-,11	-,35**	,20	,15	,01	1			20,05	4,32
16.Embu.op. f	-,08	,01	,01	,02	,01	,01	-,26**	-,13	,06	-,01	,18	,25**	,24*	,32**	,57**	1		17,58	3,66
17.Conf.(NC)	-,00	,19*	,14	,21*	,02	,21*	,03	,20*	,02	-,01	-,13	-,08	,02	,16	-,05	,05	1	-117,44	422,9
18.Ext. LOC	,18	-,21*	-,14	-,20*	-,14	-,10*	-,06	-,12	,02	-,05	,17	,05	-,12	-,08	,04	-,05	-,05	86,59	8,10

***:p<.0029, **:p<.01, *:p<.05



.En undersøkelse om stress og helse.

Hei og takk!

Du er nå i ferd med å hjelpe til i utviklingen av en stadig bedre skolehverdag.

For at det skal bli endring kreves det at noen setter i gang, og at andre hjelper til.

I dette tilfellet vil du være til STOR hjelp, og det vil kun ta deg en halvtime!

Pass på å svare på **ALLE** spørsmålene, og svar seriøst og ærlig.

I det følgende skal du svare på 6 ulike korte skjemaer. Til sammen vil disse skalaene gi innsikt i hvordan undervisning kan forbedres og tilrettelegges ut ifra hvordan blant annet du og dine medelever har det. Dette studiet er inspirert av positiv psykologi som tar sikte på å studere hva som er bra i mennesker for å kunne forbedre det og utvikle det videre, og av økofilosofi som handler om å se HELE mennesket og dets samspill med og ivaretagelse av naturen. Deltakelse er frivillig, og du er garantert anonymitet.

Først kryss av for om du er mann



eller kvinne



Testene begynner på neste side. Takk og lykke til!

Lise Sand Mellem

Masterstudent ved Institutt for psykolog, Universitetet i Tromsø.

Veileder: Professor Martin Eisemann ved Psykologisk institutt, UITø.

Helse



I løpet av de siste månedene hvor ofte har du hatt følgende plager?
(Sett kryss for hver linje.)

		Omtrent hver dag	Mer enn en gang i uka	Omtrent hver uke	Omtrent hver måned	Sjelden eller aldri
A	Hodepine					
B	Vondt i magen					
C	Vondt i ryggen					
D	Kjent deg nedfor/trist					
E	Vært irritabel/i dårlig humør					
F	Nervøs					
G	Vanskelig for å sovne					
H	Svimmel					

Takk. Test nr 2 fortsetter på neste side:

Minner fra barndommen



Nedenfor finner du en del påstander angående barndommen din. Les nøye gjennom følgende instruksjoner før du fyller ut skjemaet.

1. Når du fyller ut dette skjemaet gjelder det å prøve å huske hvordan du opplevde at foreldrene dine var mot deg i barndommen. Selv om det er vanskelig å huske eksakt hvordan våre foreldre var mot oss da vi var små, har vi likevel visse minner angående de prinsipper og brukte i oppdragelsen.
2. Du skal for hvert spørsmål sette ring rundt det alternativet som gjelder for akkurat DIN fars og mors oppførsel mot deg. Les nøye, og avgjør hvilket svaralternativ som passer best for deg. Gi separate svar for far og mor.

1 Det hendte at foreldrene mine ble sur og sint på meg uten at jeg fikk vite årsaken.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

2 Foreldrene mine ga meg ros.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

3 Jeg ønsket at foreldrene mine skulle bekymre seg mindre om hva jeg gjorde.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

4 Jeg fikk mer ris av foreldrene mine enn jeg fortjente.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

5 Når jeg kom hjem måtte jeg gjøre rede for hva jeg har gjort.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

6 Jeg synes at foreldrene mine forsøkte å gjøre ungdomstiden min stimulerende, interessant og lærerik.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

7 Foreldrene mine kritiserte meg i andres nærvær.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

8 Det hendte jeg ikke fik lov til å gjøre ting som andre barn fik lov til, fordi foreldrene mine var redd det skulle skje meg noe.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

9 Foreldrene mine ville jeg skulle være best.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

10 Gjennom sin atferd, for eksempel ved å se trist ut, gav foreldrene meg skyldfølelse når jeg hadde oppført meg dårlig mot dem.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

11 Jeg syntes at mine foreldres uro for at noe skulle hende meg var overdrevet.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

12 Når det gikk dårlig med meg, følte jeg at foreldrene mine prøvde å trøste og oppmuntre meg.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

13 Jeg ble behandlet som familiens sorte får, eller som familiens sydebukk.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

14 Familien viste gjennom ord og handling at de likte meg.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

15 Jeg følte at foreldrene mine likte mine søsken bedre enn meg. (Svar dersom du har søsken.)

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

16 Foreldrene mine behandlet meg på en måte som gjorde meg skamfull.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

17 Jeg fikk lov å gå hvor jeg ville, uten at foreldrene mine brydde seg for mye.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

18 Jeg følte at foreldrene mine la seg opp i alt jeg gjorde.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

19 Jeg følte at det var varme og ømhet mellom meg og mine foreldre.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

20 Foreldrene mine satte bestemte grenser for hva jeg fikk lov til og ikke, og isse forholdt de seg strengt til.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

21 Foreldrene mine straffet meg hardt, til og med for bagateller.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

22 Foreldrene mine ville bestemme hvordan jeg skulle kle meg og se ut.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

23 Jeg følte at foreldrene mine ble stolte når jeg lyktes med noe.

	Nei aldri	Ja, iblant	Ja, ofte	Ja, hele tiden
Far	1	2	3	4
Mor	1	2	3	4

Takk. Test nr 3 begynner på neste side:

. STRESS (den siste måneden)(PSQ) .



For hver påstand, kryss av for det svaret som beskriver hvor ofte dette har stemt for deg den siste måneden. Arbeid raskt uten å tenke for lenge. Husk på at dette kun gjelder den siste måneden.

		Nesten aldri	I blant	Ofte	For det meste
1.	Du føler deg uthvilt				
2.	Du føler at for mange krav stilles deg				
3.	Du blir lett irritert eller sur				
4.	Du har for mye å gjøre				
5.	Du føler deg ensom og isolert				
6.	Du er involvert i konfliktsituasjoner				
7.	Du gjør ting du virkelig liker				
8.	Du føler deg trøtt				
9.	Du er redd for å ikke nå dine mål				
10.	Du føler deg rolig				
11.	Du må ta for mange beslutninger				
12.	Du føler deg frustrert				
13.	Du er full av energi				
14.	Du føler deg anspent				
15.	Problemene dine hoper seg opp				
16.	Du føler du har dårlig tid				
17.	Du føler deg sikker og trygg				
18.	Du har mange problemer				
19.	Du føler du er under press av andre				
20.	Du føler deg motarbeidet				
21.	Du trives med tilværelsen				
22.	Du er redd for framtiden				
23.	Du føler du gjør ting som du egentlig ikke vil gjøre				
24.	Du føler deg kritisert og observert				
25.	Du er lett til sinns				
26.	Du føler deg mentalt utmattet				
27.	Du har vanskelig for å slappe av				
28.	Du føler deg nedtyngt av ansvar				
29.	Du har nok tid til deg selv				
30.	Du føler tidspress				

Takk. Test nr 4 begynner på neste side:

Konformitet

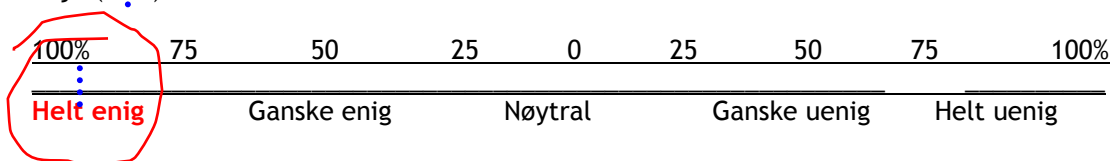
I det følgende er en liste utsagn som noen vil være enige i og andre uenige. Vennligst marker i hvilken grad du er enig eller uenig ved å sette en loddrett strek på linja.

Legg merke til at graden av enighet og uenighet bytter plass på linja usystematisk ved noen av spørsmålene underveis i undersøkelsen.

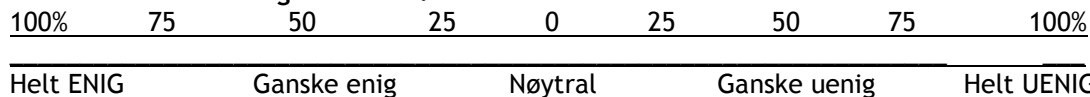
Les nøye **eksempellet** som illustrerer metoden:

1. Jeg liker rock.

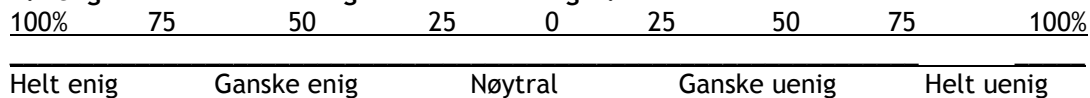
Liker du rock svært godt setter du en strek helt til venstre på linja, som vist med stiple linje (···) inne i sirkelen.



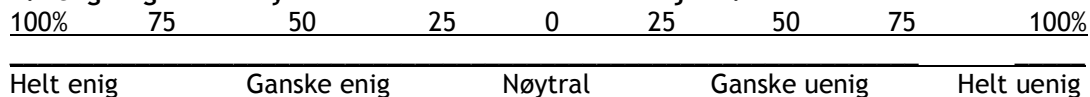
1. Det ungdommen trenger mest er streng disiplin, klar bestemthet og viljen til å jobbe og sloss for familie og fedreland.



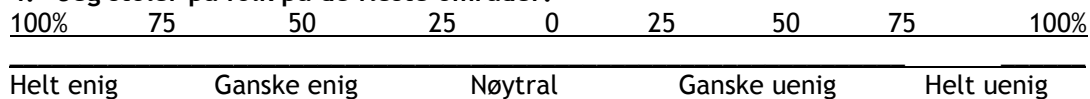
2. Jeg finner det vanskelig å bli kvitt en selger.



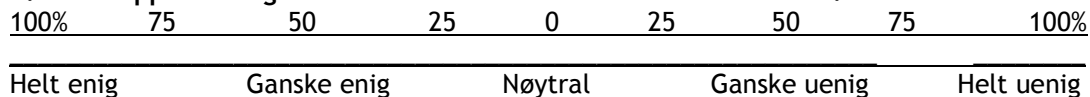
3. Jeg er generelt kynisk i forhold til det motsatte kjønn.



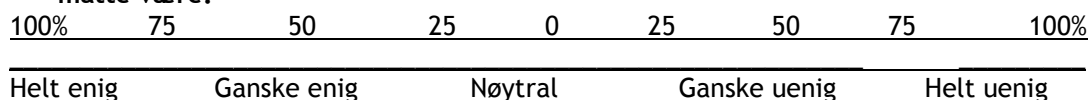
4. Jeg stoler på folk på de fleste områder.



5. Folk oppfører seg likt fordi de er redde for å være annerledes.



6. Jeg må innrømme at jeg ville finne det vanskelig å ha en nær vennsom i oppførsel og utseende gjorde han eller henne frastøtende, uansett hvor smart eller snill han/henne måtte være.



7. For å komme godt overens i en gruppe, må gå overens med de andre personene.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

8. Den eneste måten å vise at du er individualist i dag er gjennom å utføre en uvanlig eller uaksepterbar handling.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

9. Det er mindre nødvendig å ta sjanser etter man har gjennomlevd de tidlige litt vanskelige årene.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

10. Jeg tror jeg er omtrent gjennomsnittelig i min religiøse, politiske og sosiale tro.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

11. Vitenskapen må ha like mye å si om moralske verdier som religion har.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske uenig Nøytral Ganske uenig Helt uenig

12. De fleste mennesker ville vært lykkeligere hvis de levde mer med sine medmennesker og gjorde de samme tingene.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

13. Jeg foretrekker lagspill framfor spill hvor et individ konkurrerer mot et annet.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

14. Pinlige opplevelser plager meg.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

15. Det plager meg om folk tror jeg er for uvanlig eller rar.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

16. Jeg tiltrekkes oftere av det uferdige og det uperfekte enn det fullførte og polerte.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

17. Det er på tide å erstatte det gamle med det nye på alle områder.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

18. Jeg oppfører meg ikke frekt, selv om dette ville satt irriterende personer på plass.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

19. En gruppe hvor folk er uenige vil være en ueffektiv gruppe.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

20. En klok person gir opp eventyrlige påfunn når hun/han har nådd en moden alder.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

21. Man burde være ganske forsiktig så man ikke virker dum og rar.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

22. Jeg tror man burde ignorere andre menneskers feil og prøve å komme overens med nesten alle.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

23. Jeg mistenker alle mennesker som virker veldig vennlige med en gang man møter dem.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

24. De fleste lover i dag er så fornærmende mot mennesker at de fortjener å bli brutt.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

25. Personer som klamrer seg til gamle måter er nesten utelukkende redd for nye retningslinjer og ideer.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

26. Det kunne vært bedre å legalisere bruken av rusmidler og narkotika.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

27. Det er praktisk talt aldri en unnskyldning for å offisielt bannlyse en bok.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

28. Jeg liker å leke meg med nye ideer, selv om de ofte viser seg å ha vært bortkastet tid.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

29. En full kvinne er ikke noe mer uverdigg enn en full mann.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

30. Noen av mine venner mener at mine ideer er upraktiske og til og med litt ville.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

31. Jeg bryr meg ikke om hvis folk synes jeg er eksentrisk (spesiell).

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

32. Nordmenn er som sauer - redde for å skille seg ut fra flokken.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

33. Når jeg tydelig blir fortalt om ikke å gjøre noe, så gjør jeg det generelt heller ikke.

100% 75 50 25 0 25 50 75 100%

Helt enig Ganske enig Nøytral Ganske uenig Helt uenig

Takk. Test nr 5 begynner nå :

Kontroll (LOC[©])



I denne undersøkelsen vil du finne en rekke ulike spørsmål. Det er fire svaralternativer for hvert spørsmål: "stemmer overhodet ikke", "stemmer ikke så bra", "stemmer ganske bra", "stemmer helt". Din oppgave er å ta stilling til hvilket svar som passer for deg. Spørsmålene er formulerte som påstander. Vi begynner med et eksempel:

Eks.	Stemmer ikke i det hele tatt	Stemmer ikke særlig bra	Stemmer ganske bra	Stemmer helt
------	---------------------------------	----------------------------	-----------------------	-----------------

Folk er for det meste interessert
i å prøve nye ting.

Om du satt krysset som markert betyr det at du ikke er enig i påstanden
Jobb raskt og tenk ikke for lenge på spørsmålene.

	Stemmer ikke i det hele tatt	Stemmer ikke særlig bra	Stemmer ganske bra	stemmer helt
--	---------------------------------	----------------------------	-----------------------	-----------------

1. Man velger som regel selv hvilke
venner man vil omgås med.

2. Problemer løser seg som regel om
man ikke grubler så mye på dem.

3. Enkelte mennesker er født med
flaks.

4. Man blir ofte klandret for ting
som ikke er ens skyld.

5. Hvis man virkelig jobber for å
oppnå noe, kan man klare det

6. Andre menneskers innsats er
avgjørende, om man skal bli kvitt
psykiske problemer

Stemmer ikke i
det hele tatt

Stemmer ikke
særlig bra

Stemmer
ganske bra

stemmer
helt

7. Jeg har aldri med vilje sagt noe for
å såre noen.

8. Nysgjerrighet er mest til besvær

9. Det er med egne anstrengelser at
man kan påvirke sin egen fremtid

10. Om dagen begynner bra, blir det en
bra dag uansett hva man gjør.

11. Man kan påvirke folks oppfattelse av
seg selv, gjennom sin måte å være på.

12. Jeg stiller alltid opp når noen trenger
min hjelp.

13. Hvis man virkelig ønsker noe, går det i
oppfyllelse.

14. Det er ofte ingen vits å forsøke å få sin
vilje igjennom.

15. Med egne anstrengelser kan man
forminske sine psykiske problem.

16. Gjennom å planlegge kan man påvirke
fremtiden sin.

17. Det er best å følge samfunnets normer

18. Jeg har aldri hatt noe imot å gjøre ting
for andre, selv om det medfører et visst
besvær for meg.

19. For det meste kan man selv påvirke sin
egen situasjon

20. Det er lett for meg å påvirke mine
venner til å gjøre som jeg vil.

21. Den beste måten å håndtere et problem
er å la være å tenke på det, så løser det
seg av seg selv.

22. Jeg er alltid like høflig og behersket
uavhengig av hvem jeg snakker med.

	Stemmer ikke i det hele tatt	Stemmer ikke særlig bra	Stemmer ganske bra	Stemmer helt
23. Jeg kan ha det bedre med meg selv hvis jeg forandrer mitt syn på meg selv.				
24. Å tro at det er lykke å finne en firkløver er overtro.				
25. Når man selv har gjort en feil, er det vanskelig å gjøre noe for å rette på det.				
26. Folk blir ofte sinte på meg uten grunn.				
27. Gjennom målrettet arbeid kan nesten hvem som helst oppnå fremgang.				
28. Det spiller ingen rolle hvem jeg prater med, jeg lytter alltid like interessert.				
29. Man kan påvirke hvordan man føler det i ulike situasjoner, slik at man har det bedre.				
30. Livet kontrolleres i stor grad av tilfeldige forhold.				
31. Man kan påvirke det som hender i morgen, med det man gjør i dag.				
32. Hvis jeg har gjort en feil, vil jeg alltid stå inne for det.				
33. Det er best å ta dagen som den Kommer.				
34. Det fins måter å takle en del av sine psykiske problemer selv				
35. Det er bare flaks hvis man får noe som er bra i livet.				
36. Jeg er alltid høflig, selv mot utrivelige personer.				
37. Det er bare med egen innsats man kan komme seg frem i livet.				
38. Om arbeidet er utrivelig får man heller bare håpe på å få det bedre.				

	Stemmer ikke i det hele tatt	Stemmer ikke særlig bra	Stemmer ganske bra	Stemmer helt
39. Jeg har ingen problemer med å erkjenne at jeg er ukyndig i noe.				
40. Det er egentlig bare tilfeldigheter som gjør at man har det bra.				
41. Det lønner seg å prøve å påvirke andres meninger.				
42. Det kommer mest an på en selv hvor bra man håndterer sine problem				
43. Det hender at jeg har vært misunnelig på personer som har vært heldige i livet.				
44. Er noe viktig for meg vil jeg finne ut av det før eller siden				
45. Man kan påvirke sin egen skjebne				
46. Når noen ikke liker en, kan man nesten alltid endre på det.				
47. Det har skjedd at jeg har tydd til en løgn for å slippe å gjøre noe jeg ikke har villet gjøre.				
48. Hvis man har tanker som plager en, er det vanskelig å gjøre noe med det.				
49. Gjennom å revurdere en del av det man har trodd på, kan man få det bedre.				
50. Mye av det negative som har hendt meg, kommer av uflaks.				

Takk. Test nr 6, den siste KORTE testen (!!) begynner på neste side:

Følelse av mening (SOC)



Her presenteres noen utsagn om hvordan du opplever ulike forhold og hendelser. Sett ring rundt det tallet som er nærmest det endepunktet som best beskriver deg.

Har du følelsen av at du egentlig ikke bryr deg om hva som foregår rundt deg?	<i>sjelden/aldri</i>	1 2 3 4 5 6 7	<i>meget ofte</i>
Har det tidligere hendt at du ble overrasket over oppførselen til folk du trodde du kjente godt?	<i>aldri hendt</i>	1 2 3 4 5 6 7	<i>har alltid skjedd</i>
Har det hendt at mennesker du stolte på skuffet deg?	<i>aldri hendt</i>	1 2 3 4 5 6 7	<i>har alltid hendt</i>
Hittil har ditt liv:	<i>overhodet ikke hatt klare mål eller mening</i>	1 2 3 4 5 6 7	<i>hatt meget klare mål og mening</i>
Har du følelsen av at du blir urettferdig behandlet?	<i>meget ofte</i>	1 2 3 4 5 6 7	<i>sjelden/aldri</i>
Har du følelsen av at du er i en uvant situasjon og ikke vet hva du skal gjøre?	<i>meget ofte</i>	1 2 3 4 5 6 7	<i>sjelden/aldri</i>
Å gjøre de hverdagslige gjøremål er en	<i>kilde til dyp glede og tilfredsstillelse</i>	1 2 3 4 5 6 7	<i>kilde til plage og kjedsomhet</i>
Har du svært blandede følelser og tanker?	<i>meget ofte</i>	1 2 3 4 5 6 7	<i>sjelden/aldri</i>
Hender det at du har følelser inni deg som du helst ikke vil føle?	<i>meget ofte</i>	1 2 3 4 5 6 7	<i>sjelden/aldri</i>
Mange mennesker - også sterke personligheter - føler seg av og til som tapere i visse situasjoner. Hvor ofte har du i fortiden følt deg slik?	<i>meget ofte</i>	1 2 3 4 5 6 7	<i>sjelden/aldri</i>
Når noe hendte, har du ofte funnet ut at:	<i>du over- eller undervurderte dets viktighet</i>	1 2 3 4 5 6 7	<i>du hadde en riktig vurdering av situasjonens viktighet</i>
Hvor ofte har du følelsen av det er liten mening i de ting du foretar deg i hverdagen?	<i>veldig ofte</i>	1 2 3 4 5 6 7	<i>veldig sjelden eller aldri</i>
Hvor ofte har du følelsen av at du ikke er sikker på at du kan beholde kontrollen?	<i>veldig ofte</i>	1 2 3 4 5 6 7	<i>veldig sjelden eller aldri</i>

Tusen takk for at du fylte ut hele skjemaet!

