

NTNU

Theoretical and empirical background of health promoting resources and work participation in individuals with musculoskeletal pain

The salutogenic perspective, ecological field theory and resilience factors behind health resources

Article 1

Department of Social Work and Health Science
Faculty of Social Sciences and Technology Management

Preface

Blessed are the men and women, who are planted in our earth,
in your garden, who grow as your trees and flowers grow,
who transform their darkness to light

—The Odes of Solomon

Acknowledgements

The present work was conducted at Department of Social Work and Health Science, Faculty of Social Sciences and technology Management, NTNU, Trondheim. I wish to express my sincere gratitude to all who have helped and supported me in my work both directly and indirectly. In particular I would like to thank:

The population of the County of Nord-Trøndelag this study is based upon and HUNT Research Centre for providing me with data.

Geir Arild Espnes, professor and my supervisor for the very generous and friendly way in which he guided me into the health promotion perspective and scientific work. Especially thanks for your personal qualities as fast thinking, always rapid response on my questions and your elegant way in building scientific confidence.

My fellow students and dearest friends, Bodil Aarmo Brenne for laughter, closeness and warmth, Rita Småvik for numerous great discussions and walking tours and Ann Mari Okkenhaug who showed us all how to transform darkness into light this last months with her great personal qualities.

My family and closest friends, goes my deepest gratitude. Especially, my warmest feelings goes to my loving son Henrik, who is cultivating everyday learning, playing and loving and giving life meaning worth living.

Sjølyst 12.01.2012

Heidi Sivertsen

Table of contents

1	Introduction	1
1.1	Changing perspective	3
1.2	Literature search	3
1.3	Objective	4
2	Theoretical basis for health resources	5
2.1	Health promotion.....	5
2.1.1	Positive health	6
2.2	Salutogenesis, an assets approach	8
2.2.1	Sense of coherence and coping.....	10
2.2.2	Meaning, comprehensible and manageability	10
2.2.3	Developing sense of coherence	11
2.3	Field theory and opportunities.....	13
2.3.1	Enhancing health	15
3	Health resources	17
3.1	Generalized resistance resources.....	17
3.2	Specific health resources	18
4	Central nervous system mechanisms of pain inhibition	21
4.1	Pain perception	21
5	Current empirical data on health resources	23
5.1	Meaning and health	23
5.2	Personal resources	24
5.3	Social resources	25
5.4	Functional resources.....	27
5.5	Gender and health.....	27
6	Discussion on the basis of theory and empirical evidence	29
7	Conclusion.....	33
8	References	I

Abstract

Musculoskeletal pain is a significant burden, both for the affected individual and for the society at large. This paper presents a theoretical and empirical overview within the health promotion perspective. The health concept is usually understood as the absence of disease, but the salutogenic perspective, ecological field theory and resilience factors could be helpful to find health promoting resources which strengthen individuals' musculoskeletal health. Further, I wish to provide a deeper understanding according to *sense of coherence* where good health constitute a fundamental attitude to life according to pain management. Health promoting resources are understood as personal, social and functional characteristics that increases coping of musculoskeletal pain and produce work participation.

Sammendrag

Muskel-skjelett smerter er en stor byrde for både individet og samfunnet. Denne artikkelen gir en teoretisk og empirisk oversikt i helse fremmende perspektivet på muskel-skjelett smerter. Vanligvis er helse begrepet forstått som fravær av sykdom, men det salutogene perspektivet, økologisk felt teori og resiliens faktorer kan være nyttige i å finne helse fremmende ressurser som styrker menneskers helse. Videre ønsker jeg å gjøre en dypere forståelse av begrepet *opplevelse av sammenheng* i forhold til endogen smertehemming tilgjengelig. Helse fremmende ressurser er personlige, sosiale eller funksjonelle karakteristikk som øker mestring av muskel-skjelett smerter og gir arbeids deltagelse.

1 Introduction

Musculoskeletal pain (MSP) can be viewed along the entire dimension from health to disease. Traditionally, the health concept is understood as the absence of disease and pathology and a lot of energy is used to focus on identifying medical risk, vulnerability and the factors that constitute a threat to our health. Therefore, we have much more knowledge about what contributes *to* MSP and sick leave, than what the consequences of MSP are for health and work participation.

Common sources of MSP is affecting the contiguous tissues such as muscle, nerves, tendons, joints, cartilage or spinal discs and cause pain, weakness, stiffness and reduced movement. MSP can be divided into two main clinical groups, namely articular and non-articular disorders. Articular disorders can be of varying degrees and also include inflammation and progressive injury. Typical examples are rheumatoid arthritis and osteoarthritis. Non-articular disorders primarily affect soft tissue such as muscles, tendons, ligaments, bursae, and nerves and include mechanical low back pain resulting from one or more dysfunctional aspects of truncal anatomy, or pain syndromes caused by trigger points or tender points (Mense, Simons, & Russell, 2001). MSP is a complex phenomenon because in addition to the sensory experience caused by the stimulation of pain receptors, the pain experiences is also affected by psychosocial factors, and are potentially disabling conditions (Melzack & Wall, 1996; Natvig, Eriksen, & Bruusgaard, 2002; Waddell, Burton, & Aylward, 2007).

Symptoms and illnesses in the musculoskeletal system is the most frequent cause of sickness and disability, representing 40 percent of the total sick leave in Norway in 2009, and is a common condition in the Western part of the world (Helde, Krokstad, Lysø, & Thune, 2010; Waddell et al., 2007). In Norway, these kinds of conditions caused 36 percent of the approved disability pensions in the years 2000-2003 (Groholt, Grotvedt, Hanes, & Stene-Larsen, 2010). If this tendency is not reversed, a huge provider burden will be placed on those who are in the workforce in the future (Groholt et al., 2010). Women generally have a higher sickness absence than men. Over the past 20 years, women's absence have increased by 36 percent while the increase for men was four percent in the same period (Nossen & Thune, 2009).

Public health and health promotion have changed dramatically from the time when individuals sought medical cures for diseases and either recovered or died within a few weeks (Heimburg, 2010; Brannon & Feist, 2007). Today, we are healthier than ever, but we are more

concerned with the fear and risk of disease (Skolbekken, 1996), and we spend more resources on the population's health than ever before (2011). Traditionally, when the health concept has been built on pathological thinking, public health and health promotion has also been subject to thinking and activities based on what works from a pathological perspective to find factors to combat disease and improve health (Antonovsky, 1987; Heimburg, 2010; Lindström & Eriksson, 2010). Therefore, most existing knowledge is about MSP and the risk factors predicting symptoms and illnesses (Burton et al., 2006; Pincus, Burton, Vogel, & Field, 2002; Indahl, Haldorsen, Holm, Reikeras, & Ursin, 1998; Natvig et al., 2002).

Health is defined by the World Health Organization, in the first international conference in health promotion in Ottawa in 1986, as "personal and social resources as much as physical capacity that realizes experiences in life as meaningful and provides creative and productive members of society". Health is a resource in everyday life that consists of psychosocial resources as well as physical capacities (WHO, 1986). Health is thus defined as something more than the absence of disease and is placing just as much emphasis on personal, social and physical resources and integrates a mutual relationship with a responsive social-ecological environment.

Health promotion is often defined as a process of development that makes it possible for individuals to have control over and improve their health by identifying and realizing aspirations, satisfying needs and managing the environment in order to reach a state of complete physical, mental and social well-being. In order to place health and disease in a broader context than the absence of disease, WHO has developed the International Classification of Functioning, Disability and Health (ICF) which is a core set of factors that classifies health conditions in order to study factors that contribute to health and participation in life and society (Norwegian Directorate of Health & KITH, 2004; WHO, 2001).

The purpose of ICF is to include all factors that influence a person's health status, which are function, activity and participation in interaction with environmental and personal factors (contextual factors). Personal factors that promote health are only the framework and are not classified in the core set. These personal factors are psychological factors such as habits, ability to cope with problems, willingness, motivation and other mental resources and personal characteristics (Norwegian Directorate of Health & KITH, 2004). Psychosocial factors are essential in processes of adaptation when pain strikes (Bandura, 2004; Espnes & Smedslund, 2009; Flensborg-Madsen, Ventegodt, & Merrick, 2006; Friberg et al., 2006;

Friedman, 1992; Heimborg, 2010; Karoly & Ruehlman, 2006; Kivimaki, Feldt, Vahtera, & Nurmi, 2000; Langelang, 2007; Lewin, 1935; Maslow, 1956; Ryff & Singer, 1998; Seeman, 1989; Seligman, 2008; Snyder & Lopez, 2005; Norwegian Directorate of Health & KITH, 2004; World Health Organization, 2001; Zautra, Johnson, & Davis, 2005; Antonovsky, 1987).

When the aim is work participation, factors predicting absenteeism is increased age, pain intensity, low self-care, psychological problems, diseases of the musculoskeletal system and a reduction in function (Andersson et al., 2003; Waddell, 2006). For chronic back pain, which is the largest group within the group of musculoskeletal conditions, there are few specific tests of significant prognostic value (European Commission Research Directorate General, 2009). There is some evidence of work-related factors that predict participation in the workforce after sick leave. These factors are being a co-owner, the length of the sick leave period, having a family at home and the economic status and attitudes of the unemployed (Andersson et al., 2003). This has led to basic knowledge about factors that improve health lacks (Heimborg, 2010).

1.1 Changing perspective

Knowledge about health promoting resources is necessary in order to reach an understanding of the entire health-related relationship between MSP and work participation. We need knowledge that builds on positive functioning, and to find factors that act as resources and contribute to health and work participation. What helps individuals with MSP manage and break the "vicious circles", and how do they increase their sense of meaning and coherence in life? Current theories and research on the relationship between disease and indicators of achievement of physiological, psychological and social health reflect the belief that coping mediates the adaptation process (Eriksson & Lindstrom, 2005; Folkman, Lazarus, Gruen, & DeLongis, 1986; Friedman, 1992; Seeman, 2001; Antonovsky, 1987; Singer & Ryff, 2001). To summarize, there are three reasons to find resources that contribute to health and work participation for individuals with MSP: the epidemiological reason, the economic one, and the general lack of knowledge about resources within the health promotion perspective.

1.2 Literature search

Literature searches were accomplished in electronic databases such as PubMed, Health Library, Norway, the Cochrane Library, OVID, and Medline PsycNET. Reference lists of articles and books were tracked and reviewed for any additional publications, as they may not have been indexed correctly and hence not found by electronic searches. Internet searches for

health organizations (World Health Organization, The Norwegian Labour and Welfare Administration) were also performed. Keywords used include *musculoskeletal pain, coping, sense of coherence, field theory, resilience, and work participation*.

1.3 Objective

The objective of this paper is twofold. First, it will provide a theoretical overview of the foundation of health promoting resources that might contribute to the adaptation of MSP. Second, it will provide an empirical overview of personal, social and functional health promoting resources that may contribute to coping with MSP according to work participation.

2 Theoretical basis for health resources

2.1 Health promotion

What does health mean for most of us? The traditional way is to see health as the absence of disease and to have a strong focus on objective data. However, this has not been useful in capturing the factors that are important and relevant to health status, such as how individuals feel and in terms of where they live their life (Ryff & Singer, 1998; Seligman, 2008; Bowling, 2005). On this question, Per Fugelli and Benedicte Ingstad (2001) conducted a study in which 80 persons from five different geographical locations in Norway gave their opinion on the health concept. Only 17 responded spontaneously that health is the absence of disease. For most of them, health was about well-being, function, nature, extra energy, coping and mood. Individuals think pragmatically about the concept of health when they think of what is reasonable to expect, based on age, disease burden and social situation (Fugelli & Ingstad, 2001; Niebroj, 2006).

Health is a subjective experience. We can say that a young person is in *good health* and that an older person is in *good health*, but we use different criteria to define good health for a younger and an older person. Perhaps most individuals consider themselves within an accepted level of health? Health is wholeness and goes through all aspects of life (Fugelli & Ingstad, 2001), where people live, love, work and play (WHO, 1986). Therefore, it is essential to look for factors that promote health where health is, in everybody's life.

Health is a basic human right, and everyone is entitled to a standard of living that is adequate for his or her health and well-being (World Health Organization, 2011). The WHO Ottawa Charter's definition of health shows that health is about more than disease conditions, and that the health concept is passing a reductionist and mechanical paradigm in the understanding of health and disease (Niebroj, 2006). The definition in the charter is not an operational definition, but more of an explanation and a recommended guideline for health promotion. The definition rests on the Declaration of Human Rights by giving all individuals the right to be active participating entities in their own lives, the right to be involved and to contribute to equitable and sustainable global society (Lindström & Eriksson, 2010). The Ottawa definition is not only sensitive to biological factors, but also physiological, psychological, social and even spiritual needs (Niebroj, 2006).

Nonetheless, conditions of disease is consistent with health, or we can say that health rests on the relationship between an individual's potential (opportunities) and specific requirements (resistance) in life (Bircher, 2005), located in the persons whole psychological field. Public health and health promotion has been criticized for lacking a theoretical basis, or for too often being based on narrow conceptual models (Stokols, 1996). When individuals are affected by conditions of disease they often emphasize strategies for biomedical and individual change of behavior, at the same time as they ignore personal resources and resources in the environment that supports health.

65 years ago, Kurt Lewin wrote that theories are inevitable because science must be able to go past descriptions of facts that do not have predictive value (Lewin, 1946). Moreover, he says that it is impossible to treat problems of conditions or reasons and not describe the dynamic behavior that lies beneath the surface of the directly observable properties (Lewin, 1946). Today, it is more important than ever to expand the scientific agenda from the idea that health is simply the absence of disease, to promote positive health through salutogenic and resilience factors and give resistance to disease processes and expand the number of healthy years by creating or regain optimal health (Singer & Ryff, 2001).

Health Promotion Programs are also criticized for trying to do two things simultaneously, namely protecting the disease *and* promoting health. Critics state that this is not possible and refers to the fact that health promotion is supposed to promote health, and not protect the disease that belongs to the biomedical tradition (Hill & Marks, 2008). But, when we traditionally have searched for what predicts disease, we have uncovered what produces disease. Subsequently, it is difficult to find answers to the question of what produces health. It is not certain that promotion of health cannot protect against diseases too. Health consists of many elements, and developing resources in the psychosocial field may have a protective role in resistance to and recovery from illness (Antonovsky, 1987; Ryff & Singer, 1998; Seligman, 2008; Singer & Ryff, 2001; Zautra, Hall, & Murray, 2010).

2.1.1 Positive health

Abraham Maslow (1966) was perhaps the first person to describe a "positive" psychology when he stated that we must be careful not to end up with a science that is only concerned with disease. Through his positive perspective, he describes that healthy growth is possible through human tendencies and motivations as long as our basic needs for food, security, belonging and self-esteem is covered. Then, the dominant factors in life are directed towards

growth needs and towards self-realization. These higher needs are basically being a good person and are life-giving processes which include the fulfilment of longing and ambitions.

According to Maslow (1956), self-actualizers have the ability to have strong feelings of empathy and love, and are capable of greater love, deeper friendships and more complete identification with others than individuals who not are self-actualizers. Work is a key component in order to achieve growth and personal development and Maslow used the term *open self* as a characteristic of healthy individuals. This openness is an awareness of the inner and outer situation, where self-knowledge and self-awareness is necessary (Maslow, 1956). To flourish, to have meaning and purpose in life, is a birthright for us all (Seligman, 2011).

Health is not just physical health, or negative health. There is a broad consensus that the concept of positive health is more than the absence of disease and that includes a *whole* and *optimal* body, mind and social *functioning* (Bowling, 2005; Ryff & Singer, 1998; Seeman, 1989; Seligman, 2008). However, there is no consensus on an accepted definition. Positive health should be described as the ability to cope with stress-filled situations, maintenance of social support, integration of community, high morale and satisfaction, psychological well-being and physical health (Bowling, 2005; Ryff & Singer, 1998) as well as being operationalized through subjective self-report, biological goals and functional status (Seligman, 2008; Singer & Ryff, 2001).

With focus on positive health, there is a need to promote behavioral, environmental and psychosocial factors as protective resources, and the origin of health is found in the salutogenic theory (Antonovsky, 1987; Espnes & Smedslund, 2009; Heimburg, 2010; Lindström & Eriksson, 2010). In order to achieve health promotion, the salutogenic theory specifies the theoretical orientation of what produces health and wellness (Heimburg, 2010; Lindström & Eriksson, 2010).

The World Health Organizations' definition of health is based on three elements: (1) *factors* that contribute to health, (2) *processes* that show how individuals reinforce these factors and how this can help not only to improve health but also (3) the *ability* to create a meaningful and active life in its entirety (Lindström & Eriksson, 2010). These three elements correspond to the salutogenic theory, and Lindström and Eriksson (2010) propose a philosophical formula for the health promotion perspective. Health Promotion (HP) is based on the Ottawa Charter definition (OC) that is understanding of salutogenic theory (SAL), that provides the resources and direction for individuals to achieve quality of life (QoL) that are based on human rights

(HR), which gives the formula: $HP(OC) = (SAL + QoL) \times HR$ (Lindström & Eriksson, 2010).

The loss of work capacity to disease is affecting individuals' quality of life. Therefore we need an understanding of the concept of ecological QoL that shows what individuals fight within their life (Lindström & Eriksson, 2010). Theoretically, quality of life is described as the distance between what the individual want, their hopes and dreams for their entire life and how the situation is experienced in reality (Calman, 1984). The salutogenic theory is inspired by ecological system theory, an approach that assumes that human nature is heterostatic rather than homeostatic (Eriksson & Lindstrom, 2006), and where health is seen as ascending and descending throughout life, influenced by both internal and external conditions (Langeland et al., 2006).

Therefore, the salutogenic theory and the field theory can be used in order to identify and explain the resources that contribute to health, to the processes that are subject to these resources that together assume to create a meaningful and active life. In addition, the concept of resilience, which has gained recognition through empirical research, sets the direction for the factors that can act as resources for individuals with MSP. In short, the salutogenic theory sets the positive direction for health, resilience leads to the resources, and the field theory indicates the *strength* and of these resources. Together, these three concepts can provide an explanation of the resources that may contribute to health for individuals with MSP.

2.2 Salutogenesis, an assets approach

The belief that life has meaning and the hope for a better future seem to be attitudes and beliefs that are important to maintain the motivation to master and adapt to difficult situations (Antonovsky, 1987; Frankl, 2004; Reich, Zautra, & Hall, 2010). Several individuals report growth after difficult periods, such as the acquisition of personal strength, an improvement in social relationships, a greater appreciation of life, an increased access to new opportunities, and the development of the ability to endure (Reich et al., 2010). These are all resources that can be operationalized and are thought to contribute to health.

The salutogenic theory is used as an umbrella concept¹ (fig. 1 below) because it is based on systems theory thinking and focuses on resources, skills and abilities that create health at different levels in individuals, groups and communities (Lindström & Eriksson, 2010).

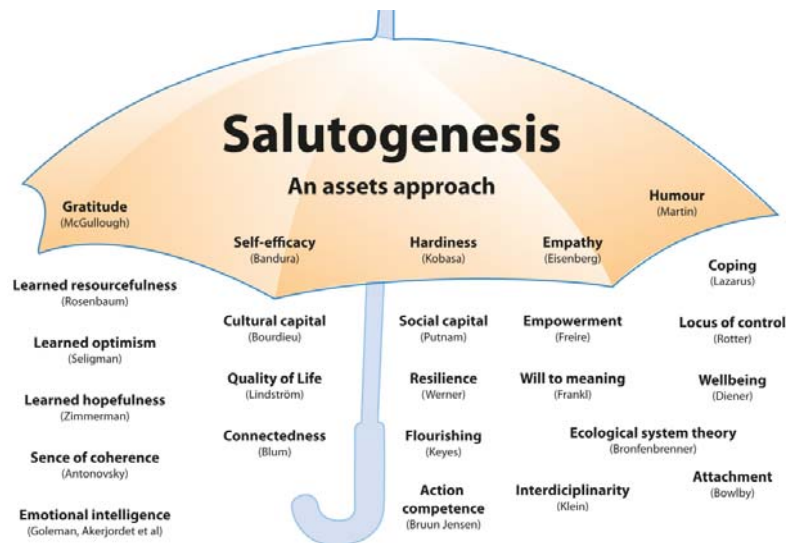


Figure 2.1 Salutogenesis as an assets approach (Lindström & Eriksson, 2010)

The way we cope with disease, and our resistance to disease, is about our attitude to life, according to Aaron Antonovsky (1987), who founded the concept of salutogenesis. The word means rise to health (Latin *salus*= health, Greek *genesis* = origin). Salutogenesis is understood as an approach to resources for health, applying salutogenic theory. Conceptually, salutogenesis is defined as the process towards health, a continuum of disease–health (ease) endpoint as a horizontal line between the total absence of health and overall health. All of us are somewhere on this line (Lindström & Eriksson, 2010).

The degree of health is stated by the person, and health is partly determined by the ability to manage stressors or disease (Niebroj, 2006). Stressors create a tension that either leads to pathogenesis and breakdown, or salutogenesis and restoration of health (Antonovsky, 1987; Flensburg-Madsen et al., 2006). The core of the salutogenic theory is based on the principal that the human organism is in a dynamic state of heterostatic unbalance (Antonovsky, 1987). Our lives are filled with stimuli of what we have no automatic and adaptive responses to, but in which we need to answer. The message to the mind is that we have a problem to solve cognitively and emotionally (Antonovsky, 1987).

¹Maslow's theory is not included in the umbrella concept. However, that does not mean that it *cannot* be included, because Antonovsky describes that needs are included in the general resistance resources and contribute to health.

2.2.1 Sense of coherence and coping

The first key feature of the salutogenic theory is "sense of coherence" (SOC) and can be called a general attitude to life. SOC is a coping resource when one is exposed to stress associated with negative life events (Lindström & Eriksson, 2010). Disease and pain is stressors that may interfere with the SOC continuum. When it comes to MSP, the aim should be to relieve pain, trouble and anxiety in order to regain the subjective experience of health and wellness. The ability to find and integrate the meaning of difficult events seems to play a significant role in our perception of health (Peterson & Seligman, 2004). Antonovsky characterized such solution processes as cognitive and emotional expectations of life as something comprehensible, manageable and meaningful (Antonovsky, 1987). This is the SOC attitude, and a person with high SOC can be said to have high coping capacity (Langelang, 2007).

Adaptive coping is, according to Folkman & Lazarus (1986), defined as a person's cognitive and behavioral efforts to manage by reducing, tolerating and accepting the internal and external demands from harmful, threatening or challenging circumstances that are perceived as demanding on the person's resources. Coping with pain and suffering is a natural part of life, and one of the most admirable human skills is the ability to adapt to almost any imaginable circumstance.

Today, researchers concentrate more on the relationship between disease and indicators of coping, which affects physiological and mental health and reflect the belief that coping mediates the adaptation process (Eriksson & Lindstrom, 2005; Folkman et al., 1986; Friedman, 1992; Ryff & Singer, 2001; Seeman, 2001). The coping process is transactional in the relationship between the individual and the environment (Lewin, 1946), and is seen as dynamic, mutually reciprocal and as being a two-way relationship with health as the goal (Folkman et al., 1986).

2.2.2 Meaning, comprehensible and manageability

A person's MSP does not develop in a vacuum, but can be defined in a developmental and social context. Cultural beliefs, previous pain experiences and opinions that are produced in painful situations can exacerbate symptoms in a new pain experience (Melzack & Wall, 1996). Coping with MSP is subject to managing, reducing, tolerating and accepting the inner and outer demands of challenging circumstances, and is a process that requires more than merely focusing on the absence of MSP, which is not always achievable. SOC expresses the degree

of a pervasive, enduring and dynamic feeling of confidence that the demands on these resources are understandable. That we trust that the available resources makes these requirements manageable and looks at the requirements challenges that are worth commitment, because it is meaningful in life (Antonovsky, 1987). When a person sees something that is worth the effort, such as increased health, it often increases a sense of meaning and a sense of comprehensibility and manageability.

The main component in SOC is meaningfulness (Antonovsky, 1987). Antonovsky states that SOC is seen as sustained harmony through life (Langelang, 2007; Antonovsky, 1987). On the question of multi-disciplinary rehabilitation with focus on increasing the SOC and facilitating work participation, it has not been found any significant correlation between the SOC and a person's return to work after a certified absence with chronic MSP (Lillefjell & Jakobsen, 2007). The relationship between physical illness and the sense of coherence is weak (Lindström & Eriksson, 2010). Could SOC alone explain the ability to work participation for individuals with MSP? It is not certain that SOC is directly associated with physical health, but it has to be studied in relation to other areas of resistance and possibilities, in which the dynamic resources that gives strength to the physical improvement processes can be found.

The pathogenic factors associated with MSP do not rule out the possibility that health promotion resources work. It is the sum of the pathogenic and salutogenic factors combined that creates the general attitude of how an individual copes with pain. According to Antonovsky (1996), there are three kinds of life experiences that develop and create strength in the SOC. These are: consistency (predictability), an underload–overload balance and participation in socially accepted decision-making. The degree of such life experiences are shaped by the individual's position in society, his or her type of work and family structure, as well as several other factors such as gender, age, ethnicity and genes (Antonovsky, 1996). It is possible to go beyond symptoms and functional losses, and focus on the internal and external potential, abilities and talents.

2.2.3 Developing sense of coherence

According to Antonovsky (1987), we have sorted out our accepted resistance in the different areas of life and established our specific location on the SOC continuum within our first 30 years of life. He claims that it is unlikely that a person's sense of coherence will change radically once it has been formed and stabilized. Individuals with a strong SOC will most likely experience a strengthening chain reaction in life. For those who, on the other hand,

have a weak sense of coherence early in life, life is not unlikely to be a vicious circle or downward spiral (Antonovsky, 1987). When the loser has started to lose, he or she will continue to weaken his or her SOC through the lack of resources or the capacity to manage available resources in order to deal with adversity. Antonovsky (1987) argues that we rarely see such psychosocial transitions that create other life experiences and provide other levels of predictability, load balance and participation in socially valued decision-making.

According to Antonovsky, most of us have established an identity, a social role and a career, and have formed the basis for predictability and load balance (Antonovsky, 1987). However, this picture may have changed since the time when Antonovsky founded his salutogenic theory. In Norway today, it is not uncommon to get more than one education thru the lifetime, which can initiate a new pattern of life experiences and an increased SOC. Growth and maturation also occurs, and when adult, one is cognitively better in dealing with the physical limitation of time and master the interpersonal world (Snyder & Lopez, 2005).

The salutogenic theory do not support those individuals who has not have achieved the *good* and *right* conditions in life, but in spite of the opposition are doing well. This has been criticized because the strength of the SOC is under continuous influence of internal and external events, and the reactions to them (Langeland et al., 2006). Erik H. Erikson's stage model confirms that any individual is under continuous development throughout life, and is dependent on other individuals, family and social relationships. Each stage in life is characterized by a psychological challenge that must be met in order to achieve normal development. Autonomy and maturity cannot be reached unless a sense of identity is established. That is the most basic psychological challenge (Seligman, Steen, Park, & Peterson, 2005).

Today, it is not uncommon to think that resources can contribute to changing a person's life, and resilience research has demonstrated that individuals can succeed, despite various pressures in life, with the help of protective and promoting factors such as a dedicated teacher (Reich et al., 2010; Werner & Smith, 1979). In fact, these resources may seem like ordinary human development qualities (Masten, 2001). An implementation of the salutogenesis principles in therapeutic interventions shows significant efficacy in coping with individuals with mental health problems. When the SOC becomes stronger, the ability to manage resources that contribute to coping will also be increased (Langeland et al., 2006). In this line of thought, we can believe that it is possible to change the SOC with salutogenesis principles

because they initiate a new pattern of resources and life experiences. Mental life processes have multiple layers of functional significance, depend on both the person and the environment (Lewin, 1935), and establish a dynamic way of view in the development of health resources towards health.

2.3 Field theory and opportunities

Ecological thinking is based on the natural ecosystem, in which natural processes are used in the understanding of human systems and environments (McLaren & Hawe, 2005). As early as in 1935, Kurt Lewin argued that the first step towards an understanding of individual behavior is to study the *resistance* and *opportunities* in their total environment. He called this the *field theory* (Lewin, 1935; McLaren & Hawe, 2005). The way in which health is experienced and developed is founded on an ecological philosophy that emphasizes the strength in the reciprocal "power" in the relationship between the person and the environment in the whole life-space (fig. 2.2), (McLaren & Hawe, 2005; Lewin, 1935). The life-space will have a tendency to change towards a better balance and more stable structure throughout life (Teigen, 2004), in line with the development of the SOC theory.

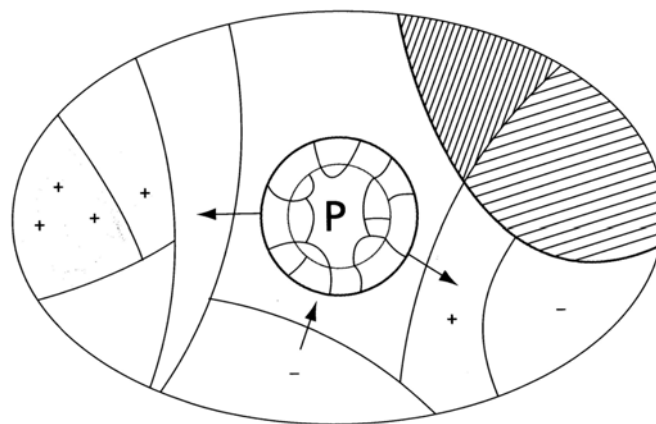


Figure 2.2 In Lewin's "life space" the person P must choose between a small nearby, and a larger but more distant good. A region with a negative value (valence) is affecting the person at the same time. The boundaries between regions are barriers that the individual must overcome (Teigen, 2004).

A fundamental idea within the field theory is that a person exists in a total psychological field, that is a dynamic mix of skills and areas of life, and that he or she acts in particular on two pairs of factors (Lewin, 1946). The first pair is the relationship between the *person* and the *environment*. To characterize the total psychological field, we must include the specific

characteristics as goals, stimuli, needs, social relationships and general characteristics in the field such as friendliness, hostility, tense atmosphere or the degree of personal freedom (Lewin, 1946). The social aspect of the psychological situation is just as important as the physical aspect (Lewin, 1946). Factors in the environment that are beyond the individual's control are also taken into account in the field theory, and that may affect a person's experience of health. Typical examples are loss of function or loss of work.

According to Lewin (1946), behavior is a result of stimuli – a goal system – and a function of the person as a social individual and the whole situation he or she exists in: $B = f(P + E)$ (Lewin, 1946). Behavior is a result of the total psychological field, this life space (figure 2.2) that surrounds a person with subjective regions that are more or less available (Teigen, 2004). Coping with MSP depends on many internal and external fields, such as vigorousness, a positive attitude, problem solving skills, social skills and access to social support (Espnes & Smedslund, 2009).

The second pair is *motivation* and *cognition*, and the dynamics are resistance and opportunity. The regions of the life space are characterized by a force that arises from the different regions with different values and indicate whether they are more or less attractive opportunities or repulsive resistance (Teigen, 2004). A personal goal or expectations of better health, and whether the particular behavior is to be accomplished, depend on two factors. The first factor is whether the person in question believes that the particular behavior leads to the desired result, for example better health. The second factor is the value this result has for the individual (Espnes & Smedslund, 2009; Lewin, 1935).

Whether or not the potential for health promoting behavior should be triggered is determined by three dynamic aspects and the composition of the regions. Health promoting behavior depends on (1) which movement of behavior is possible at a given point in time, (2) the availability and composition of the psychological forces and (3) the characteristic of the *strength* structure at a given point in time which provide the direction and strength (Lewin, 1946).

The salutogenic theory is meaningful, but the field theory is helpful because it says something about how we can explain and understand health behavior as a function of person and environment. Behavior through the movement towards enhancing health (locomotion) where the main power is pain inhibition (resultant force) and where the psychosocial fields for example socializing with friends or colleagues are resources which contribute to the

experience of wellness hormones and feeling of emotional closeness (force field). This may be an example of the endogenous pain inhibition mechanism, distraction. Then $HP(OC) = (SAL + QoL) \times HR$, where SAL is $B = f(P + E)$. Health promotion is thus founded on the Ottawa Charter definition and human rights, and enhanced health and quality of life are functions of the person and the environment.

2.3.1 Enhancing health

The potential for flourishing health processes, on the continuum from disease to ease, is in the life-space. There is ample opportunity for *conflicts*, but also many opportunities to find positive forces when the goal is a process towards health. According to Antonovsky, one way to strengthen the SOC is through social position (Antonovsky, 1987).

An employee may experience that MSP escalates due to internal conditions such as fear because he or she is threatened by discharge or an unfulfilled desire to have another job that is perceived as more meaningful. Those who are partners or shareholders in the business report less MSP and a more rapid return to work after certified work absence (Andersson et al., 2003). Perhaps the motivation to work in spite of the MSP is stronger for a committed partner in a company, than for a regular employee? As co-owner, you might be reasonably sure that the internal and external resources needed to cope with both work and pain experience are available, which is important for self-regulation.

Self-efficacy is the cognitive ability to regulate emotions, motivation and behavior in difficult situations, and is a personal resource that is important for physical and mental health (Bandura, 1986). In addition, positive thoughts about one's own qualities are associated with better adaptation to illness (Reich et al., 2010).

According to Lewin (1946), the psychological forces correspond to at least two regions. The co-owner example interacts with at least three regions, namely maximum use of own skills through engagement, social recognition as a skilled partner, and the pain experience. This is an example where the degree of *attraction* to work is higher than the burden of the pain experience. This life space has a positive (two regions)–negative (one region) conflict. Engaging in work and social recognition are positive forces, while pain is a negative force. The result can be an expression of distraction with pain relief. Health promoting behavior happens when the field which is left is of negative valence (pain) and the new field entering is of positive valence. In this example, being a co-owner is a resource for better health occurrence.

The definition of a conflict situation is a situation where the forces that operate have the opposite direction and are approximately equal in strength (Lewin, 1946). One type of conflict that may arise is a minus–minus conflict. For example, the person who is employed with negative valence in work and pain, the field the person is into before going to work in the morning most likely have negative valence (Teigen, 2004; Lewin, 1946).

The resolution and opportunity for building health can be giving a person the chance to lead in active positive valence, either in the field that the person is within or a nearby area. This can happen, for example, through more responsibility at work, which may lead to increased engagement, or through physical exercise during working hours in order to increase the sense of well-being through the secretion of hormones by the pain inhibitory qualities that have positive value for the person.

The field theory gives the opportunity to strengthen a person's capability. By enhancing his or her health through active, constructive behavior (Seligman, 2011). It is likely that this behavior leads to better health and the likelihood that the person is performing the behavior is increased, because it has positive value for the person (Espnes & Smedslund, 2009). Other possible conflict compounds are negative–positive and positive–positive. The latter conflict is the choice between two goods.

The expectation of better health is most likely to trigger positive health behavior. There are plenty of conflict situations of *potential* and *resistance* in the life space that can create health (or poor health). We can choose to relate to these challenges in an active/passive and constructive/destructive approach (Seligman, 2011). The motivation to cope with pain comes from the tendency of the person to create a balance in the system such as to reduce, minimize, manage or tolerate more or less pain (Folkman et al., 1986; Lewin, 1935). The field theory provides an opportunity to include the totality of the life space, and value the dynamics in the different fields that can be measured as resources and included in the total health profile for the potential for health.

3 Health resources

Health resources refer to a person, a group, or situational characteristics that have promoted successful mastering of the natural stressors in life (Antonovsky, 1996). Health resources increase a person's potential to deal with disease or disorder (Espnes & Smedslund, 2009) by maintaining a level of emotional equilibrium, a certain self-image – including skills – and good relationships with family and friends, and by preparing for future demands and challenges (Aldwin, 2007).

3.1 Generalized resistance resources

The other key feature of SOC is generalized resistance resources (GRRs). This is the prerequisite for the development of SOC, and is found in personal skills and in an individual's immediate or distant environments (Antonovsky, 1987). The level of coping capacity depends on the GRRs, and a resource is a personal or environmental factor that promotes health (Antonovsky, 1987; Lindström & Eriksson, 2010).

Antonovsky (1987) has proposed eight types of GRRs. These are physical, biochemical, material, cognitive, emotional, values/attitudes, interpersonal relations and macro socio-cultural resources that work together to deal with the tension of stressors. Variables such as self-esteem, social support, high social class or cultural stability are examples of GRRs (Antonovsky, 1987). How available resources are used in a health promoting manner is essential for a salutogenic result (Lindström & Eriksson, 2010).

The main point in this paper can be illustrated through an example of a GRRs or a region that changes the prevalence in several regions through active cognitive constructive adaptation with overlapping emotional consequence. It is the distinction between the thought of *being ill*, rather than *having a disease*. From a holistic perspective, it is devaluating and destructive to perceive the self as *being ill* and a pathologizing of the whole person. This will most likely worsen the experience of pain and suffering, and create a chain reaction that includes more fields in the living space than necessary.

On the other hand, *having a disease* is containing a salutogenic way of thinking, in which the person sees himself as more than the disease. At one level, we give ourselves the opportunity to actively do something constructive with the other GRRs or regions, such as increasing activities that provide relaxation, which may lead to employment participation over time. On a deeper level, we give ourselves the opportunity to make other individuals listen to and

respect us, something that in turn confirms our self-worth. In this way, we are creating an important self-worth for ourselves. This is the distinction between creating a resilient construction of the self, rather than a vulnerable construction.

In this line of thought, health promotion practice can open for opportunities and a search for resources, capabilities and skills that increase individual competence and contribute to health. Because of the degree of control the individual has over the stressor, plays a key role in determining whether the stressor will lead to subsequent vulnerability or resilience (Haglund, Nestadt, Cooper, Southwick, & Charney, 2007).

3.2 Specific health resources

The resilience construct was established to explain the unexpected positive results despite the risk of maladjustment or psychopathology, and describes the relative resistance to the psychosocial risk experiences a person is exposed to (Luthar, Cicchetti, & Becker, 2000; Masten, 2001; Rutter, 2006; Werner & Smith, 1979). The resilience research has given attention to the ordinary human capacity for adaptation that promotes healthy development and functioning (Masten, 2001; Rutter, 2006). Resilience is something more than the driving factors and disease, and can be a good measure of improvement and it can be a moderator of pain (Friborg et al., 2006).

The aim of resilience factors is to reduce the impact of pain as experienced by the person. This can be done by reducing the negative chain reaction, increasing the positive chain reaction and opening up possibilities. This can be done in a way that neutralize the risk characteristics by promoting positive cognitive processing of experiences, so that the individual can meet the challenges with a more healthy approach (Rutter, 2006). Resilience is an interactive concept that contains a combination of the degree of resistance and relatively positive adaptation (Luthar & Cicchetti, 2000; Rutter, 2006), and can explain why individuals bounce back from disease. Health promoting resources are the significant factors in this adaptation process.

Physical recovery processes may depend on the same factors that are known to promote psychological well-being (Ryff & Singer, 1996; Seligman, 2008), such as increased courage, interpersonal skills, persistence, a sense of realism, ability to feel pleasure, the ability to put problems in perspective, optimism, future perspective, perseverance and a sense of meaning. All these are important for individual growth and health (Snyder & Lopez, 2005). An increasing amount of research assumes that we can foster these capacities to promote well-

being and functional health. The individuals who are resilient have a greater capacity in terms of getting in balance physically, mentally and socially after disease, and they are to a greater extent in possession of the ability to move forward in life despite disease (Bonanno, 2004; Reich et al., 2010).

4 Central nervous system mechanisms of pain inhibition

Melzack & Wall introduced the gate theory in 1965, and the idea that signals of pain can modulate is still helpful. Modulation can be explained as inhibiting or exhibiting pain signals on different levels in the central nervous system (CNS) (Nilsen, Flaten, Hagen, Matre, & Sand, 2010). Pain experience is a central nervous interpretation of nerve signals from peripheral structures. The signal chain starts in the periphery, primarily through afferent nerve fibres. The signal moves through projection neurons that, for the most part, go through the frontal and lateral parts (tractus spinothalamicus) of the spinal cord, with synaptic connections in the thalamus. The signal continues to different areas of the CNS in the brain and cause a painful experience with both sensory discriminative, emotional and cognitive factors (Nilsen et al., 2010).

Today, the gate theory is understood as an extension of the original theory, and is including influence from the CNS, as endogenous pain inhibiting mechanisms that include emotional and cognitive factors (Nilsen et al., 2010). The level of pain is determined by how attention is deployed, how the pain experience is cognitively appraised, which coping strategies are used to decrease and modulate pain, and the response to stimulation (Bandura, O'Leary, Taylor, Gauthier, & Gossard, 1987). Endogenous pain inhibition is placebo analgesic, painful conditional stimulation, hypertension related analgesic effect, analgesic exercise effect and distraction (Nilsen et al., 2010).

4.1 Pain perception

The importance of pain is determined by the activity of pain-related nerve pathways and subjective factors such as mood level, past experiences and whether or not the pain is perceived as a threat. From this the importance, connection from different CNS regions could affect the periaqueductal gray matter, which goes through the ventrolateral medulla (in reticular substance) and dorsolateral pontine tegmentum (nearby pons) will modulate the pain experience further (Nilsen et al., 2010).

The gate theory may explain some of the pain inhibition and exhibition, where the pain is reduced and increased at different levels in the CNS. But, the gate theory does not explain the active physiological connections in distraction (Nilsen et al., 2010) or how an endogenous pain inhibitory mechanism, such as distraction, is based on psychological factors, such as expectation (Melzack & Wall, 1965; Nilsen et al., 2010). Distraction is a pain inhibitory mechanism, and includes a cognitive component. Commitment and attention shift draw

attention away from the painful experience and lead to reduced pain sensation, both in intensity and discomfort (Nilsen et al., 2010). This mechanism may have clinical relevance, according to the field theory, and gives opportunities to inhibit pain perception and promote health.

This view is supported by current theorists of emotions and explains that an episode of emotion results from a heterogeneous network of bottom-up (stimulus driven) and a top-down (goal or organism driven) processes that are organized into a coherent interpretation and action plan. In pain, when stimuli are generated bottom-up, an experience is more likely to feel like it is happening to you. When emotions are generated top-down, you may deliberate stimuli and context that trigger the bottom-up system (Ochsner & Gross, 2005).

In this, we can find possibilities for inhibition of pain perception and build positive health. Because, if the pain is first appraisal (bottom-up) will absence of adaptive emotional responses give raise to worrying, and the second appraisal can create over-strain and the stimuli response will be distorted. This can lead to insecurity and anxiety as a result of loss of employment, reduction in income and loss of social opportunities, which in turn may lead to further negative chain reactions (Maunder, 2009).

From a positive health promotion perspective is learning to notice the distinction between pain and our reaction to it and see that although the pain in our bodies may not be optional, some of the pain of our reactions *is* optional. We can for example meet pain with adjusted exercise to give oneself the *feeling of being strong and fit* which could be translated into meeting pain experiences without escalating concern.

5 Current empirical data on health resources

There is a gap in the research about specific health resources, because so far, the majority of the research has focused on evaluating the prognostic value of clinical characteristics and symptoms in order to understand the negative development of the disease for individuals with MSP. Therefore, little attention has been given to the potential prognostic value of health resources in general and health resources and their value in particular, to explain an improvement in health. Our question is which personal, social and functional resources are important to facilitate health work and participation for individuals with MSP?

5.1 Meaning and health

A strong SOC is a valuable predictor of work participation (Lindström & Eriksson, 2010). The strongest predictive factor for work participation is one's own expectations, the number of previously sick days, any somatic disease and high levels of satisfaction and sense of coherence (Hansen, Edlund, & Henningsson, 2006). In numerous accounts, resilient individuals report that meaning, faith and hope played a key role in sustaining them though adversity (Reich et al., 2010; Lindström & Eriksson, 2010). A strong SOC is associated with good health, especially mental health (Lindström & Eriksson, 2010).

SOC strengthens resilience and the development of a positive perception of health (Eriksson & Lindstrom, 2006). Manageability is supported by empirical evidence showing that the degree of *individual control* over stressors plays a role in whether or not the MSP leads to lasting vulnerability or resilience (Haglund et al., 2007). It also seems that SOC is a health promotion resource that strengthens the resilience in individuals and aids the development of positive health (Eriksson & Lindstrom, 2006).

The average SOC increases throughout life, and we find the highest average in the oldest part of the population. In addition, it seems that those who develop a strong SOC also choose more positive lifestyles with less alcohol and tobacco, more physical activity and healthier nutrition (Lindström & Eriksson, 2010). Personal skills, family relationships and a supportive social environment outside the family correlate positively with the SOC (Friborg, Barlaug, Martinussen, Rosenvinge, & Hjemdal, 2005).

Women with MSP who received cognitive behavior therapy reported a greater pain relief than the men who received the same treatment (Mense et al., 2001). Positive characteristics in the individual, a supportive family and a social environment are factors that promote adaptive

copied and brings health (Aldwin, 2007; Friberg et al., 2006; Haglund et al., 2007; Karoly & Ruehlman, 2006; Masten, 2001; Ozbay, Fitterling, Charney, & Southwick, 2008; Tugade, Fredrickson, & Barrett, 2004; Werner & Smith, 1979). Factors that affect how individuals cope with internal and external stimuli are personal skills, social skills, family and social resources, and a structured personal style (Friberg, Hjemdal, Rosenvinge, & Martinussen, 2003), and there is reason to believe that these factors also mediate adaptation processes from MSP towards health.

5.2 Personal resources

A sense of *control* over our own behavior, environment and thoughts and feelings, and that the world seems predictable and controllable, is essential for good health (Antonovsky, 1987; Maddux & Lewis, 1995). Personality and personal skills are often studied as what makes life worth living, and come from the feeling of being loved and giving love in a mutual romantic relationship, relationships between parents and children, deep personal relationships, a concern for the well-being of others and knowledge about morally correct behavior (Ryff & Singer, 1998). Individuals with positive emotions, positive relationships and involvements to other people tend to report better health than others (Seligman, 2008). Close and warm relations promote good feelings, and good feelings inhibit the perception of pain in women with osteoarthritis and fibromyalgia (Zautra et al., 2005).

Victor Frankl was the first to describe the adaptive function of positive affect in co-occurrence with negative emotions when coping with chronic stress in a concentration camp (Frankl, 2004). Although it has been widely recognized that negative affect goes hand in hand with stress, pain and disease, there is increasing empirical evidence that shows that positive emotions also occur during chronic stress situations. Folkman and Moskowitz (2000) report similar findings when studying positive meaning in daily events. Finding meaning in major life events predicts long-term psychological well-being (Affleck & Tennen, 1996). Positive emotions do not only rule out negative emotions, but contribute to more adaptive coping and thereby increase the perception of health (Fredrickson, 2000). Mood is of importance for sick leave, and optimists have a clear tendency to have fewer days of sick leave after experiencing a great loss, than pessimists (Kivimäki et al., 2005).

Most research has been reasonably consistent when it comes to which personal and social skills those seem to promote health. High education, the ability to regulate emotions, motivation and a repertoire of problem-solving abilities, a positive interaction style that

respond to other individuals feelings and needs and a flexible approach to new situations that reflects that we have the capacity to learn from experience and adapt to changing circumstances (Rutter, 2006; Snyder & Lopez, 2005; Reich et al., 2010).

Self-enhancing cognition is thoughts about one's positive qualities, something that is associated with better psychological adjustment to disease (Reich et al., 2010). Cognitive therapy, with or without physical training, is the type of treatment that works best for work participation for those with chronic back pain (European Commission Research Directorate General, 2009; Lindell, Johansson, & Strender, 2008). There is consistent evidence that expectations of work participation is of great importance to the work participation (Kuijer, Groothoff, Brouwer, Geertzen, & Dijkstra, 2006; Heijbel, Josephson, Jensen, Stark, & Vingard, 2006; Iles, Davidson, & Taylor, 2008).

A healthy personality actively masters the environment and shows a certain unity of personality, and is able to perceive the world correctly with a complete cognitive factor and unified self-image (Allport, 1961). A study on the relationship between SOC and Eysenck Personality Inventory indicated a highly negative correlation between SOC scale scores and neuroticism (Gibson & Cook, 1996). Individuals who are sociable, outgoing, talkative, responsive, easygoing, lively, carefree and possess leadership abilities and openness (low in neuroticism, high in extraversion) tend to rely to a greater extent on getting strength from adversity (Affleck & Tennen, 1996).

Resilient individuals show cognitive flexibility to reframe and re-evaluate experiences in a more positive light (Haglund et al., 2007; Lai et al., 2005; Southwick, Vythilingam, & Charney, 2005). We know that individuals who actively use re-evaluating as a strategy to cope with difficult situations, experience more positive emotions and fewer negative emotions when they have to cope with difficult situations. The ability to use re-evaluating is also associated with better interpersonal relationships, something that can easily be translated into increased access to social support (Diener, Lucas, & Scollon, 2006).

5.3 Social resources

Having quality relationships with others is probably the most universally agreed-upon feature that influence human health (Ryff, 2001; Reich et al., 2010). Family functioning has a central role in theory and research on competence, risk and resilience. The most frequent findings in resilience research is that a secure connection to an adult in childhood contributes to better self-esteem and can be viewed as a specific health resource (Hjemdal, 2009). We can find

theoretical support for this in Erikson's stage theory and Maslow's need for security. The existence of significant others in one's life can account for how individuals confront and resolve specific social challenges in life (Peterson & Seligman, 2004) and to what extent they develop personal and social competence. Over a 35-year period, a strong positive physical health link was found between college student's reports of having a warm relationship with their parents and their midlife health profiles. There were fewer diagnosed diseases such as coronary artery disease, hypertension, duodenal ulcer and alcoholism (Russek & Schwartz, 1997).

Having close and trusting relationships within the family is fundamental, and is a key regulator of many levels in relation to safety, emotions and reactions to threats in the environment. Characteristics of the family that contribute to a person's well-being are emotional support, good parenting skills, clear rules and norms (Hjemdal, 2009). A common understanding of values and attitudes, closeness, a positive outlook on the future and loyalty are resources that characterize a harmonious family (Hjemdal, 2009) and may be protective when a family member is affected by pain or disease.

When individuals experience pain and illness, they mobilize their resources. Access to social support outside the family is important for developing vulnerability or resilience (Reich et al., 2010), and access to friends, colleagues or teachers can compensate for the lack of support in the close family (Hjemdal, 2009). Such relationships can provide support, confidence and feedback that all contribute to the building of self-esteem. When evaluating the manner in which the social environment contributes to health, we can distinguish between emotional, instrumental and social support (Reich et al., 2010). Unity between friends, trust, help and appreciation of one's properties that is important for growth, self-esteem, identity and autonomy.

On a spontaneous question of well-being, both the men and women answered that quality relationships are of the highest priority (Ryff, 2001). But, when men are asked in a questionnaire about the significance of social support for their well-being, they rank positive relations lower than self-acceptance, purpose in life, environmental mastery, personal growth, autonomy, independence and positive relationships than women. In real life gender does not matter, quality relationships is most important.

5.4 Functional resources

Physical capacity and training gives a sense of well-being, and a meta-analysis showed for arthritis pain management that provided training and relaxation with reward for increasing activity levels, increased self-regulation and coping control and prolonged health effects and health benefits (Dixon, Keefe, Scipio, Perri, & Abernethy, 2007). In rehabilitation, it turns out that the emphasis on physical capacity, emotional stress and coping abilities is significant in order to improve the functioning in daily life for individuals with MSP (Lillefjell, Krokstad, & Espnes, 2006). The exercise effect has shown health benefits of up to 12 hours (Sibold & Berg, 2010) through increased secretion of endorphins, dopamine and serotonin, which lowered the pain experience (Nilsen et al., 2010).

5.5 Gender and health

It is important to collect gender-specific data because we cannot assume that knowledge revealed in research on men, can be transferred directly to women. It appears that women and men are different in how they develop diseases, and the likelihood that the recovery process also includes gender-specific patterns is present. Women generally report more pain in the musculoskeletal system (Nossen & Thune, 2009), but this does not mean that women complain more about MSP. Research indicates that women may have an increased sensitivity in pain systems (Mense et al., 2001).

Different explanatory models are used to explain why women report a higher frequency of MSP, such as the exposure theory, the biological theory, the vulnerability theory, social inequality, stronger MSP and psychiatric comorbidity among women (Gjesdal, 2009). SOC could predict disease in women, but not in men (Kivimaki et al., 2000). There is a lack of empirical studies of gender differences and resources that promote health in individuals with MSP.

Biological explanations of stress reactivity show gender differences in the neural response and the pattern of stress. Men have a tendency to activate the prefrontal cortex known as the *fight-or-flight* response, while women tend to activate the limbic system known as *tend-to-be-friend* response to stimuli. Activation in the limbic system also shows greater diffusion in women (Wang et al., 2007). It seems that women have increased sensitivity in the deep muscle layers compared to men (Mense et al., 2001).

6 Discussion on the basis of theory and empirical evidence

By moving from a reductionist and mechanical understanding of disease to holism and an ecological view of health, we change focus to the place where health is produced. Through the salutogenic theory, the field theory and empirical data from resilience research are collectively responsible in finding resources who promote health. For individuals, there is a difference in the overall field of *being sick*, which affects the whole individual, and *having a disease*, which only concerns a part of the whole individual. Salutogenesis and pathogenesis work at the same time (Lindström & Eriksson, 2010).

Antonovsky's salutogenic concept has been criticized for circular reasoning, for example when claiming that healthy individuals feel well and have a positive experience of themselves, and because they have a positive experience of themselves and the world, they feel well (Lazarus, 1995). To measure a person's *sense of coherence* alone, does not provide insight into the factors that produce health. The salutogenic concept must therefore be placed into a context such as process (e.g. treatment) or outcome (e.g. job satisfaction, social support) to measure health status.

The concept of resilience has been criticized for lacking a coherent conceptual theory that includes opportunities for integration between other disciplines and specialized venues (Luthar et al., 2000). This is the same criticism that has been made about the field of public health and health promotion (Heimburg, 2010; Lindström & Eriksson, 2010). The empirical *bottom up* concept of resilience gives strength to the *top down* driven salutogenic theory, (Reich et al., 2010) and provides new knowledge about resources that may be of value to the individual, and for the concept of positive health and health promotion. In addition, the two-factor resilience concept is founded on the interaction between the risk of disease and protective factors.

These two concepts are related concepts, because they both provide a focus within a strength perspective called fortigenese (Strümpfer, 2006). The salutogenic theory describes the GRRs as factors that create a prerequisite for the development of SOC (Antonovsky, 1987; Lindström & Eriksson, 2010), and the resilience research describe these factors that contribute to positive results (Hjemdal, 2009; Reich et al., 2010).

In a development perspective, it can be argued that salutogenesis principles and resilience factors have overlapping qualities. Antonovsky (1987) argues that SOC is a relatively stable

attitude that is developed through the use of GRRs to reach understanding, manageability and create meaning in stressors throughout their lives. The key feature of resilience is also to develop greater self-awareness, which in turn leads to the desire for personal fulfilment of hope and social needs (Reich et al., 2010). To explain health in the relationship between pathogenic and salutogenic, these two concepts give explanatory power to each other through the theory driven GRRs and empiric driven specific resilience factors that both support a positive health and salutogenic coping style and, in fact, The Human Rights.

Methodologically, it may be possible that these two constructs overlap psychometrically, which may be a theoretical weakness (Lindström & Eriksson, 2010), but the SOC instrument measure health indirectly and provides little direct response to the factors that promote health (Hjemdal, 2009). Resilient actions often start with a smile from a beloved or a moment of reflection that encourages a new direction or a broader perspective in difficult life experiences, such as pain or disease (Owen R.L., 2006; Reich et al., 2010), and is not really a sense of coherence.

The relationship is weak between physical health and SOC compared with that between mental health and SOC (Flensburg-Madsen et al., 2006). Lindström and Eriksson (2010) explain that SOC mainly deals with a person's mental, social and spiritual capacity to deal with life, which might explain this weak correlation. Moreover, they noted that Viktor Frankl argued that it was not the physically strongest individuals who survived the Holocaust, but those who could find meaning in this meaningless event (Lindström & Eriksson, 2010). However, it is almost obvious that the experience of meaning cannot be linked directly to pain experiences, when the SOC instrument measure indirect resources to health and the underlying attitude.

Self-assessed health is a good, independent indicator of mental and physical disease (Bowling, 2005), but equally important, the self-assessed health also reflects the so-called *new morbidity*, as conditions that affect a person's well-being and living conditions. The new morbidity is a term used to refer to conditions that cause problems because individuals are living together in cohabitation, married life, cooperation and communities. Studies from Norway have shown that self-assessed health assessments predict disease behavior, for example disability pensions (Sund & Krokstad, 2005).

When we use Lewin's ecological model, the expectation of good health also brings health through an active attitude and the choice of a healthier lifestyle. These are resilient actions

created by the expectation and motivation to take responsibility for one's own health. If expectations of pain relief are not met, love, warmth, closeness to and from a spouse, children and families can perhaps alleviate the overall pain experience. If the family resource is missing, a more subjective experience of pain could be added to the burden, with for example loneliness as a part of the total pain experience. Thus, two individuals with the same illness or disorder may have varying degrees of self-perceived health, which may also lead to a poor relationship between physical health and SOC. Health is not only something that comes from inside, for example personal and social competence, but consists of resources produced in a dynamic relationship in the environment with family, friends and colleagues.

Individual resources are emphasized by Frankl and he claim when the will is passive, the vital forces decline and physical health will at one point be affected (Frankl, 2004; Maslow, 1966). In fact, according to Frankl, it was not physical strength that determined who survived the Holocaust. The survivors were those who managed to maintain the vital forces such as will, courage, hope and making a kind of sense of it all. Health resources contain a meaningful component that has a high level of will and motivation, and when this is strong, it has impact on our overall health. There is reason to believe that participating in the workforce can be experienced as pain inhibitory through distraction, because it is a source of meaning and purpose in life. This shows how a psychosocial factor is a product of a the environmental system (Soklaridis, Ammendolia, & Cassidy, 2010).

Are resilience processes general recovery processes? Resilience is distinctly different from recovery because resilience reflects the ability to maintain a stable equilibrium. Recovery refers to the process after normal functioning for a period gives way to threshold psychopathology (Bonanno, 2004). There is competing evidence that resilience is a basic characteristic of normal coping ability (Reich et al., 2010). Some would argue that the majority successfully go through difficulties without developing psychopathology (Masten, 2001), while others will argue for the extraordinary characteristics of coping in difficult circumstances (Werner & Smith, 1979).

However, it is natural to think that the protective effects come into force when the individual is exposed to pain. When we measure health in a pain context, the adaptation process involves a temporary lowered function with psychopathology, which then gradually returns to normal functional levels. Resilience reflects a positive development in spite of resistance (Bonanno, 2004), and the person in question develops a more functional level than before. We can often

see an increased awareness when individuals encounter resistance and pain, and it would be foolish to rule out personal growth in recovery processes. Resilience research is consistent regarding the importance of awareness when it comes to promoting the adaptive functioning, and indicates the necessity of finding resources that contribute to health.

Every one of us knows someone with a serious diagnosis, or even a mental disease, that still shows an attitude towards life, a sense of humor and joy that even the healthiest of us can wonder about. We have far too little research and literature about this type of discontinuity between a person's level of suffering and the capacity for mental growth (Zautra et al., 2010), and this may mean that there is unused potential in individuals for health, and we could reduce the feeling of helplessness that is sometimes felt when dealing with everyday pain, disease and life problems.

Thematically, the quest for individual resources has a potential ethical dilemma when the theme is over-simplified. An oversimplification of health resources and resilience can lead to an understanding that reduces pain, illness and disease to the individual's responsibility, which may lead to an underestimation of the community responsibility for individual health. But, it can be both cost effective and knowledge effective for the social system in general to know for whom a health resource is most important. This would allow for more goals targeted, cost-intensive multidisciplinary treatment programs, to enable full capacity and quality of life for the individuals in question.

7 Conclusion

The main hypothesis is that resources strengthen an individual's health. When resources are weak or absent, it will lead to poorer health when pain occurs. This is central when trying to constitute a broader understanding of health resources as fundamental to individuals' with MSP and work participation.

The salutogenic theory for positive individual development, the ecological field theory and empiric resilience factors may contribute to making it natural to mapping a health profile of the whole pathogenic and salutogenic field. Then health could flourish through active, constructive use of the high growth factor health resources, such as completion of education, or low growth factor resources, such as having a nice dinner with the family.

For improvement and coping of MSP, it may be important to find sources that can provide a meaningful life outside the pain experiences, to increase manageability and comprehensibility, because to find meaning in pain is beyond the limit of meaning. Changes in the consciousness also could gives changes in the endogenous level of physical pain. It is important to investigate combinations of personal, social and functional health that lead to work participation in individuals with MSP.

The classification of possible health resources presented in this paper is intended to reclaim the study of health promoting resources as legitimate topics of health promotion. I believe that health can be strengthened and cultivated through identifying resources, which account for adaptation and work participation and may provide needed options for the millions of patients who suffer from MSP.

8 References

- Affleck, G. & Tennen, H. (1996). Construing Benefits from Adversity: Adaptational Significance and Dispositional Underpinnings. *Journal of Personality*, 64, 899-922.
- Aldwin, C. M. (2007). *Stress, Coping, and Development*. (2nd ed. ed.) New York: The Guilford Press.
- Allport, G. (1961). *Pattern and Growth in Personality*. New York: Holt, Rinehart and Winston.
- Andersson, A., Ekberg, K., Enthoven, P., Kjellman, G., Ockander, M., Skargren, E. et al. (2003). *What is good work-oriented rehabilitation. Orginal title: Vad er god arbetslivsinnriktad rehabilitering?* (Rep. No. 1). Linköping, Sweden.: Linköpings university.
- Antonovsky, A. (1987). *Unraveling the mystery of health*. Stockholm: Bokforlaget Natur og Kultur.
- Antonovsky, A. (1996). The salutogenic model as a theory to guide health promotion. *Health Promotion International*, 11, 11-18.
- Bandura, A. (1986). *Social foundation of thought and action: a social cognitive theory*. New York: Prentice Hall.
- Bandura, A. (2004). Health promotion by social cognitive means. *Health Educ Behav.*, 31, 143-164.
- Bandura, A., O'Leary, A., Taylor, C. B., Gauthier, J., & Gossard, D. (1987). Perceived self-efficacy and pain control: opioid and nonopioid mechanisms. *J.Pers.Soc.Psychol.*, 53, 563-571.

- Bircher, J. (2005). Towards a dynamic definition of health and disease. *Med Health Care Philos*, 8, 335-341.
- Bonanno, G. A. (2004). Loss, Trauma, and Human Resilience. *American Psychologist*, 59, 20-28.
- Bowling, A. (2005). Just one question: If one question works, why ask several? *J.Epidemiol.Community Health*, 59, 342-345.
- Bowling, A. (2005). *Measuring health*. (3 ed.) Berkshire: Open University Press.
- Brannon, L. & Feist, J. (2007). *Health Psychology*. (6 ed.) Belmont: Thomson Wadsworth.
- Burton, A. K., Balague, F., Cardon, G., Eriksen, H. R., Henrotin, Y., Lahad, A. et al. (2006). European guidelines for prevention in low back pain : November 2004. *Eur.Spine J*, 15, 136-168.
- Calman, K. C. (1984). Quality of life in cancer patients--an hypothesis. *J Med Ethics*, 10, 124-127.
- Diener, E., Lucas, R. E., & Scollon, C. N. (2006). Beyond the hedonic treadmill: revising the adaptation theory of well-being. *Am Psychol*, 61, 305-314.
- Dixon, K. E., Keefe, F. J., Scipio, C. D., Perri, L. M., & Abernethy, A. P. (2007). Psychological interventions for arthritis pain management in adults: a meta-analysis. *Health Psychol*, 26, 241-250.
- Eriksson, M. & Lindstrom, B. (2005). Validity of Antonovsky's sense of coherence scale: a systematic review. *J Epidemiol.Community Health*, 59, 460-466.

- Eriksson, M. & Lindstrom, B. (2006). Antonovsky's sense of coherence scale and the relation with health: a systematic review. *J Epidemiol.Community Health*, 60, 376-381.
- Espnes, G. A. & Smedslund, G. (2009). *Health psychology*. (2 ed.) Oslo: Gyldendal akademisk.
- European Commmission Research Directorate General (2009). Low back pain: guidelines for its manangement.
- Flensburg-Madsen, T., Ventegodt, S., & Merrick, J. (2006). Sense of coherence and physical health. Testing Antonovsky's theory. *ScientificWorldJournal.*, 6, 2212-2219.
- Folkman, S., Lazarus, R. S., Gruen, R. J., & DeLongis, A. (1986). Appraisal, coping, health status, and psychological symptoms. *J Pers.Soc Psychol*, 50, 571-579.
- Frankl, V. E. (2004). *Man's Search For Meaning*. London: Rider.
- Fredrickson, B. L. (2000). Cultivating positive emotions to optimize health and well-being. *Prevention & Treatment*, 3, No Pagination Specified-Article 1.
- Friborg, O., Barlaug, D., Martinussen, M., Rosenvinge, J. H., & Hjemdal, O. (2005). Resilience in relation to personality and intelligence. *Int J Methods Psychiatr.Res.*, 14, 29-42.
- Friborg, O., Hjemdal, O., Rosenvinge, J. H., & Martinussen, M. (2003). A new rating scale for adult resilience: what are the central protective resources behind healthy adjustment? *Int J Methods Psychiatr.Res.*, 12, 65-76.

- Friborg, O., Hjemdal, O., Rosenvinge, J. H., Martinussen, M., Aslaksen, P. M., & Flaten, M. A. (2006). Resilience as a moderator of pain and stress. *J Psychosom.Res.*, 61, 213-219.
- Friedman, H. S. (1992). *Hostility, coping, and health*. Washington, DC: American Psychological Association.
- Fugelli, P. & Ingstad, B. (2001). Health--people's perspective. *Tidsskr Nor Laegeforen.*, 121, 3600-3604.
- Gibson, L. M. & Cook, M. J. (1996). Neuroticism and sense of coherence. *Psychol Rep.*, 79, 343-349.
- Gjesdal, S. (2009). Gender differences in the transition from long-term absence from work to a disability pension in 1997-2002. Original title: Kjønnforskjeller i overgang fra langtidssykemelding til uførepensjon i 1997-2002. *Norsk Epidemiologi*, 19, 193-202.
- Groholt, E.-K., Grotvedt, L., Hanes, H., & Stene-Larsen, G. (2010). *The State of Public Health in Norway*. Original title: *Helsetilstanden i Norge* (Rep. No. 2). The Norwegian Institute of Public Health.
- Haglund, M. E., Nestadt, P. S., Cooper, N. S., Southwick, S. M., & Charney, D. S. (2007). Psychobiological mechanisms of resilience: relevance to prevention and treatment of stress-related psychopathology. *Dev.Psychopathol.*, 19, 889-920.
- Hansen, A., Edlund, C., & Henningsson, M. (2006). Factors relevant to a return to work: a multivariate approach. *Work*, 26, 179-190.

- Heijbel, B., Josephson, M., Jensen, I., Stark, S., & Vingard, E. (2006). Return to work expectation predicts work in chronic musculoskeletal and behavioral health disorders: prospective study with clinical implications. *J Occup Rehabil*, 16, 173-184.
- Heimburg, D. V. (2010). *Public Health and Health Promotion: A Salutogenic Approach*. Master NTNU Norwegian University of Science and Technology.
- Helde, I., Krokstad, S., Lysø, N., and Thune, O. (2010). Sick leave: Major regional differences in duration within the same diagnosis. *Arbeid og velferd*.
- Hill, D. & Marks, R. (2008). Health promotion programs for melanoma prevention: screw or spring? *Arch.Dermatol.*, 144, 538-540.
- Hjemdal, O. (2009). *Measuring protective factors for adults and adolescents: The development of two resilience scales*. NTNU, Norwegian University of Science and Technology.
- Iles, R. A., Davidson, M., & Taylor, N. F. (2008). Psychosocial predictors of failure to return to work in non-chronic non-specific low back pain: a systematic review. *Occup Environ Med*, 65, 507-517.
- Indahl, A., Haldorsen, E. H., Holm, S., Reikeras, O., & Ursin, H. (1998). Five-year follow-up study of a controlled clinical trial using light mobilization and an informative approach to low back pain. *Spine (Phila Pa 1976.)*, 23, 2625-2630.
- Karoly, P. & Ruehlman, L. S. (2006). Psychological "resilience" and its correlates in chronic pain: findings from a national community sample. *Pain*, 123, 90-97.
- Kivimaki, M., Feldt, T., Vahtera, J., & Nurmi, J. E. (2000). Sense of coherence and health: evidence from two cross-lagged longitudinal samples. *Soc Sci.Med*, 50, 583-597.

- Kivimaki, M., Vahtera, J., Elovainio, M., Helenius, H., Singh-Manoux, A., & Pentti, J. (2005). Optimism and pessimism as predictors of change in health after death or onset of severe illness in family. *Health Psychol*, 24, 413-421.
- Kuijer, W., Groothoff, J. W., Brouwer, S., Geertzen, J. H., & Dijkstra, P. U. (2006). Prediction of sickness absence in patients with chronic low back pain: a systematic review. *J Occup Rehabil*, 16, 439-467.
- Lai, J. C., Evans, P. D., Ng, S. H., Chong, A. M., Siu, O. T., Chan, C. L. et al. (2005). Optimism, positive affectivity, and salivary cortisol. *Br J Health Psychol*, 10, 467-484.
- Langeland, E., Riise, T., Hanestad, B. R., Nortvedt, M. W., Kristoffersen, K., & Wahl, A. K. (2006). The effect of salutogenic treatment principles on coping with mental health problems. A randomised controlled trial. *Patient Educ Couns*, 62, 212-219.
- Langelang, E. (2007). *Sense of coherence and life satisfaction in people suffering from mental health problems. Dissertation thesis for the degree of dr.polit.* University of Bergen, Norway.
- Lewin, K. (1935). *A dynamic theory of personality*. (1 ed.) New York.
- Lewin, K. (1946). Behavior and development as a function of the total situation. In L.Carmichael (Ed.), *Manual of child psychology* (pp. 791-844). New York: John Wiley & Sons, Inc.
- Lillefjell, M. & Jakobsen, K. (2007). Sense of coherence as a predictor of work reentry following multidisciplinary rehabilitation for individuals with chronic musculoskeletal pain. *J Occup Health Psychol*, 12, 222-231.

- Lillefjell, M., Krokstad, S., & Espnes, G. A. (2006). Factors predicting work ability following multidisciplinary rehabilitation for chronic musculoskeletal pain. *J Occup Rehabil*, 16, 543-555.
- Lindell, O., Johansson, S. E., & Strender, L. E. (2008). Subacute and chronic, non-specific back and neck pain: cognitive-behavioural rehabilitation versus primary care. A randomized controlled trial. *BMC Musculoskelet Disord*, 9, 172-188.
- Lindström, B. & Eriksson, M. (2010). *The hitchhiker's guide to salutogenesis. Salutogenic pathways to health promotion*. (Rep. No. 2). Helsinki: Folkhälsan Research Centre, Health Promotion Research and the IUHPE Global Working Group on Salutogenesis.
- Luthar, S. S. & Cicchetti, D. (2000). The construct of resilience: Implications for interventions and social policies. *Dev.Psychopathol.*, 12, 857-885.
- Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: a critical evaluation and guidelines for future work. *Child Dev.*, 71, 543-562.
- Maddux, J. E. & Lewis, J. (1995). Self-efficacy and adjustment. In J.E.Maddux (Ed.), *Self-efficacy, adaptation, and adjustment: theory, research, and application* (pp. 37-68). New York: Plenum Press.
- Maslow, A. H. (1956). Self-Actualizing People: A study of Psychological Health. In C.E.Moustakas (Ed.), *The Self* (1 ed., pp. 160-194). New York: Harper & Row Publishers.
- Maslow, A. H. (1966). *The Psychology of Science: A Reconnaissance*. New York: Harper & Row.

- Masten, A. S. (2001). Ordinary magic. Resilience processes in development. *Am Psychol*, 56, 227-238.
- Maunder, R. G. (2009). Psychosomatic medicine: a specialty for generalists. *J Psychosom.Res.*, 66, 99-100.
- McLaren, L. & Hawe, P. (2005). Ecological perspectives in health research. *J Epidemiol.Community Health*, 59, 6-14.
- Melzack, R. & Wall, P. D. (1996). *The Challenge of Pain*. London, United Kingdom: Penguin Books Ltd.
- Melzack, R. & Wall, P. D. (1965). Pain mechanisms: a new theory. *Science*, 150, 971-979.
- Mense, S., Simons, D. G., & Russell, J. I. (2001). Background and basic principles. In *Muscle Pain. Understanding It's Nature, Diagnosis, and Treatment* (1 ed., pp. 1-19). Lippincott Williams & Wilkins.
- Natvig, B., Eriksen, W., & Bruusgaard, D. (2002). Low back pain as a predictor of long-term work disability. *Scand J Public Health*, 30, 288-292.
- Niebroj, L. T. (2006). Defining health/illness: societal and/or clinical medicine? *J Physiol Pharmacol.*, 57 Suppl 4, 251-262.
- Nilsen, K. B., Flaten, M. A., Hagen, K., Matre, D., & Sand, T. (2010). Mechanisms for pain inhibition in the central nervous system. *Tidsskr Nor Laegeforen.*, 130, 1921-1924.
- Norwegian Directorate of Health & KITH (2004). The International Classification of Functioning, Disability and Health (ICF).
<http://www.kith.no/upload/1855/NorskBrukerveiledning-v1.pdf> [On-line].

- Nossen, J. P. & Thune, O. (2009). *Sick leave developments the last 20 years. Original title: Utviklingen i sykefraværet de siste 20 år* (Rep. No. 3). The Norwegian Labour and Welfare Administration.
- Ochsner, K. N. & Gross, J. J. (2005). The cognitive control of emotion. *Trends Cogn Sci.*, 9, 242-249.
- Owen R.L., Jr. (2006). Resilience, Meaning, and Well-Being. *The Counseling Psychologist*, 34, 96-107.
- Ozbay, F., Fitterling, H., Charney, D., & Southwick, S. (2008). Social support and resilience to stress across the life span: a neurobiologic framework. *Curr.Psychiatry Rep.*, 10, 304-310.
- Pincus, T., Burton, A. K., Vogel, S., & Field, A. P. (2002). A systematic review of psychological factors as predictors of chronicity/disability in prospective cohorts of low back pain. *Spine*, 27, 109-120.
- Reich, J. W., Zautra, A. J., & Hall, J. S. (2010). *Handbook of adult resilience*. New York: The Guilford Press.
- Russek, L. G. & Schwartz, G. E. (1997). Perceptions of parental caring predict health status in midlife: a 35-year follow-up of the Harvard Mastery of Stress Study. *Psychosom.Med*, 59, 144-149.
- Rutter, M. (2006). Implications of resilience concepts for scientific understanding. *Ann N.Y.Acad.Sci.*, 1094, 1-12.
- Rutter, M. (2006). The promotion of Resilience in the Face of Adversity. In A.Clarke-Stewart & J. Dunn (Eds.), *Families Count* (pp. 26-52). New York: Cambridge University Press.

- Ryff, C. D. (2001). *Emotion, Social Relationships, and Health*. Oxford: Oxford University Press.
- Ryff, C. D. & Singer, B. (1996). Psychological well-being: meaning, measurement, and implications for psychotherapy research. *Psychother.Psychosom.*, 65, 14-23.
- Ryff, C. D. & Singer, B. (1998). The Contours of Positive Human Health. *Psychological Inquiry*, 9, 1-28.
- Ryff, C. D. & Singer, B. (2001). Introduction: Integrating Emotion into the Study of Social Relationships and Health. In C.D.Ryff (Ed.), *Emotion, social relationships, and health* (pp. 3-22). New York: Oxford University Press.
- Seeman, J. (1989). Toward a model of positive health. *Am Psychol*, 44, 1099-1109.
- Seeman, T. (2001). How Do Others Get under Your Skin? Social relationships and Health. In C.D.Ryff (Ed.), *Relation, Social Relationships, and Health* (pp. 189-210). New York: Oxford University Press.
- Seligman, M. E., Steen, T. A., Park, N., & Peterson, C. (2005). Positive psychology progress: empirical validation of interventions. *Am Psychol*, 60, 410-421.
- Seligman, M. E. P. (2008). Positive Health. *Applied Psychology*, 57, 3-18.
- Seligman, M. E. P. (2011). Why humans want more than happiness. *Psychologies Magazine*, 72-75.
- Sibold, J. S. & Berg, K. M. (2010). Mood enhancement persists for up to 12 hours following aerobic exercise: a pilot study. *Percept Mot Skills*, 111, 333-342.

- Singer, B. H. & Ryff, C. D. (2001). *New Horizons in Health: An Integrative Approach*. Washington, D.C.: National Academy Press.
- Skolbekken, J. A. (1996). [Risk as a concept and challenge in health care]. *Tidsskr Nor Laegeforen.*, 116, 2673-2676.
- Snyder, C. R. & Lopez, S. J. (2005). *Handbook of Positive Psychology*. New York: Oxford University Press.
- Soklaridis, S., Ammendolia, C., & Cassidy, D. (2010). Looking upstream to understand low back pain and return to work: psychosocial factors as the product of system issues. *Soc Sci.Med*, 71, 1557-1566.
- Southwick, S. M., Vythilingam, M., & Charney, D. S. (2005). The psychobiology of depression and resilience to stress: implications for prevention and treatment. *Annu.Rev Clin Psychol*, 1, 255-291.
- Stokols, D. (1996). Translating social ecological theory into guidelines for community health promotion. *Am J Health Promot*, 10, 282-298.
- Strümpfer, D. J. W. (2006). The Strengths Perspective: Fortigenesis in Adult Life. *Social Indicators Research*, 11-36.
- Sund, E. R. & Krokstad, S. (2005). *Social inequalities in health in Norway. Original title: Sosiale ulikheter i helse i Norge* (Rep. No. 10). Oslo: Norwegian Directorate of Health.
- Teigen, K. H. (2004). *A history of psychology. Original title: En psykologihistorie*. (2 ed.) Bergen: Fagbokforlaget.

- Tugade, M. M., Fredrickson, B. L., & Barrett, L. F. (2004). Psychological resilience and positive emotional granularity: examining the benefits of positive emotions on coping and health. *J Pers.*, 72, 1161-1190.
- Waddell, G. (2006). Preventing incapacity in people with musculoskeletal disorders. *Br Med Bull*, 77-78, 55-69.
- Waddell, G., Burton, K., & Aylward, M. (2007). Work and common health problems. *J Insur.Med*, 39, 109-120.
- Wang, J., Kordzykowski, M., Rao, H., Fan, Y., Pluta, J., Gur, R. C. et al. (2007). Gender difference in neural response to psychological stress. *Soc.Cogn Affect.Neurosci.*, 2, 227-239.
- Werner, E. E. & Smith, R. S. (1979). An epidemiologic perspective on some antecedents and consequences of childhood mental health problems and learning disabilities: a report from the Kauai Longitudinal Study. *J Am Acad.Child Psychiatry*, 18, 292-306.
- WHO (1986). The Ottawa Charter for Health Promotion. from <http://www.who.int/healthpromotion/conferences/previous/ottawa/en/index.html>
- WHO (2001). WHO - International Classification of Functioning, Disability and Health (ICF). from <http://www.who.int/classifications/icf/en/>
- World Health Organization (2001). *International Classification of Functioning, Disability and Health* Geneva.
- World Health Organization (2011). Health and human rights. from <http://www.who.int/hhr/en/>

Zautra, A. J., Johnson, L. M., & Davis, M. C. (2005). Positive affect as a source of resilience for women in chronic pain. *J Consult Clin Psychol*, 73, 212-220.

Zautra, A. J., Hall, J. S., & Murray, K. E. (2010). A New Definition of Health. In J.W.Reich, A. J. Zautra, & J. S. Hall (Eds.), *Handbook of Adult Resilience* (pp. 3-29). New York: The Guilford Press.

The effect of health promoting resources on
work participation in population reporting
musculoskeletal pain. A sample from the Nord-
Trøndelag health study, HUNT 3, Norway

Article 2

Department of Social Work and Health Science
Faculty of Social Sciences and Technology Management

Table of Contents

1	Introduction.....	1
2	Method	3
2.1	Participants and settings	3
2.2	Survey measures	3
2.3	Statistical analysis.....	4
3	Results.....	5
3.1	Variable correlations.....	6
3.2	Work group and sick leave group comparisons.....	6
3.3	Model of work with logistic regression analysis	7
4	Discussion.....	9
4.1	Personal health promoting resources	9
4.2	Social health promoting resources.....	10
4.3	Functional health promoting resources.....	10
5	Conclusion and implications for health promotion and future research	13
6	References.....	I
	Appendix	III

Abstract

Introduction: Musculoskeletal pain (MSP) is one of the most frequent causes of sickness absence, and is a common and potentially disabling condition. This study is based on the salutogenic perspective and investigates how different combinations of personal, social and functional resources contribute to strengthen individuals' musculoskeletal health and promote work participation.

Methods: Data from the Nord-Trøndelag Health Study, HUNT 3 in Norway, were analyzed. The sample of $n = 6702$ was extracted from HUNT 3, totally including $N = 50807$ participants. Self-reported health, personal and social factors were assessed by a questionnaire and reported sick leave was collected by interview at the point of time when the data were collected from October 2006 until June 2008.

Results: Logistic regression analysis demonstrated statistical significant differences between the work group and sick leave group in self-rated health, work support, work control, work load and feeling strong and the model predicated correctly 68% of the cases. Gender differences shows that females has lower statistical significant probability ($B = -.53$) to be in the work group when suffering from MSP, with an odds 41%.

Conclusion: Participants with MSP (moderate, strong and very strong) report resources which appear to contribute to health and work are demonstrated with epidemiological strengths and may therefore aid and direct future health promotion in preventing and in the rehabilitation of chronic MSP.

Key words: *musculoskeletal pain (MSP), health promotion, resources, salutogenic, work-participation.*

Abbreviations: HUNT= The Nord-Trøndelag Health study.

1 Introduction

Suffering from musculoskeletal pain (MSP) can be seen as being on a dimension from health to disease. Full comprehension of musculoskeletal health call for understanding of both what in the person's life that contributes to a better health and what contributes to disease development. MSP and illnesses seen as related to MSP are the most frequent cause of sickness and disability from work, and is a common and potentially disabling condition in the western societies in the world (Helde, Krokstad, Lysø, & Thune, 2010; Waddell, Burton, & Aylward, 2007; Brage, Ihlebaek, Natvig, & Bruusgaard, 2010).

Traditionally, the health concept has built on pathological thinking. And in the same way public health and health promotion has built its thinking and activities on "what works from a pathological perspective"; how to identify factors that combats disease and improve health (Heimburg, 2010; Lindström & Eriksson, 2010). As a result, most knowledge one the area is on MSP and risk factors predicting pain and illnesses (Burton et al., 2006; Natvig, Eriksen, & Bruusgaard, 2002; Pincus, Burton, Vogel, & Field, 2002) than on factors predicting a bettering in health (Antonovsky, 1987; Lindström & Eriksson, 2010; Seligman, 2008), and especially for individuals with MSP (Arvidsson, Arvidsson, Fridlund, & Bergman, 2008; Lillefjell & Jakobsen, 2007). The typical approach is trial-and-error treatment which is too narrow to help most individuals suffering from MSP.

The consequence is that individuals rather expect to get help to relief from outside (e.g. medication), than taking part in an active process of making more healthy choices e.g. in light of the salutogenic perspective on how to build stronger health. In order to identify and reduce the impact of MSP, there is a need for more knowledge regarding factors associated with a good health outcome, and investigate combinations of personal, social and functional resources that contribute to work participation (Antonovsky, 1987; Lindström & Eriksson, 2010).

This study is based on a salutogenic framework as conceptualized by Aaron Antonovsky as the origin of health (salus= health, genesis = origin) and defined as the process towards the health end of a health ease/ dis-ease continuum. In salutogenic theory individuals meet life challenges with a degree of comprehensible, manageable and meaningful according to their available resources (Antonovsky, 1987). The main hypothesis in this study is that specific

health resources strengthen individuals' health which in its turn contributes to work participation.

2 Method

The data used were provided from the Health Survey of Nord-Trøndelag (HUNT) Norway (2011). The HUNT study is one of the largest health surveys in the world and is considered to be well fitted for epidemiological research because of the stable and homogenous population. The third health survey in Nord-Trøndelag (HUNT 3) was conducted from October 2006 to June 2008. Approximately 105,000 inhabitants were invited, and data were collected from 50 807 participants. Attendance rate total was approximately at 56. The HUNT study and this study are approved by the Regional Committee for Medical and Health Research Ethics (REK), Norway. HUNT 3 surveys are easily accessible at <http://www.ntnu.no/hunt/skjema>

2.1 Participants and settings

For this study participants were women and men (20-69 years) in the working age population reporting MSP over the last year. The inclusion criteria were that participants have had pain or stiffness in muscles or joints that lasted at least 3 consecutive months, had a job and answered “moderate”, “strong” and “very strong” on the question: “how strong has your physical pain been during the last 4 weeks?”. All participants who answered on the question “have you been on sick leave in the past 12 months” were included to represent outcome variable and the work group (coded= 1 for no) and the sick leave group (coded=0 for yes, with/without certified sick leave from doctor) in the study. Gender is included in the analysis.

2.2 Survey measures

The independent variables were selected based on the salutogenic theory, and supported empirically from the resilience research within the dimensions of personal, social and functional resources. *Personal resources* are measured by Eysenck Personality (EPQ) personality scale and the meaning variable. Meaning is measured by a single item “When something bad happens in my life, I think that is happen for a purpose” with response options “No”, “Yes” and “Don’t know”. *Social resources* are measured by social support, social cohesion and social activities. *Functional resources* are measured as physical exercise and self-rated health (SRH). Present health status is measured by a single question health indicator which is “How is your health now” with four response options from “poor” to “very good?” Physical exercise is measured by one question: “how often do you exercise?” Personal feeling in general is measured by “do you feel for the most part, strong and fit or tired or worn out?” The response options were on a scale from 1-7. The question was reversed so high

scores indicated a strong and a feeling of being fit. Work is measured by 12 items containing personal, social and functional resources.

2.3 Statistical analysis

The statistical analysis was tested for assumptions of normally distributed data to meet criteria for parametric tests. Factor and reliability analysis was used to determine the suitability of constructing scales, and composite scores of means were made when appropriate. Factor analysis for Eysenck Personality Questionnaire (EPQ) obtained a factor solution through (direct oblimin rotation) a structure of 6 items in extroversion (EPQ- E) scale and 6 items in neuroticism (EPQ-N) scale. The KMO and Bartlett's test was .809. Both EPQ-E and EPQ-N achieved alpha coefficients well in excess .73 and .74 respectively.

Work characteristics (12 items) were analyzed by factor analysis and obtained three component loadings (with direct oblimin rotation) which explained 62% of the variance; *work support* 26,5% , *work load* 19% and *work control* 16%. The Cronbach's alpha were .869, .817, and .747 respectively. Work load include working hard and fast, work control include what and how work should be done and work support is well-being and support. Work support and work control variable were reversed so high scores indicated greater support and greater level of work control.

Further, ordinal variables with more than four levels were treated as continuous due to the large sample size. Bivariate analysis was obtained with different types of Pearson's correlation coefficient relevant to the present level of measurement. Mann-Whitney test were used for group comparisons (work and sick leave) because of unequal group size and violation of the homogeneity of variance assumption. Crosstabs and chi-square statistics (Phi and Pearson) were used to analyze categorical variables relationships and differences between groups. We included only covariates that were significantly associated with SRH and the statistical significant variables from bivariate analysis in the multivariable logistic regression model. Final, logistic regression was used to formulate a model about resources that might determine whether a person with pain is working or being sick listed. For all analysis a significance level of $p=.01$ was selected to evaluate the significance of the results. Data was analyzed using SPSS version 19.

3 Results

The aim of the present study was to determine if combinations of personal, social and functional resources contribute to strengthen individuals' health status with MSP and promote work participation. The total data material from HUNT research center consists of N = 50 807 with a prevalence of musculoskeletal pain (MSP) or stiffness in muscles or joints that have lasted at least 3 consecutive months of 39, 5% (n=20 051). The final sample included n=6702. The work group represented 32% (n=2161) and was fairly equal distributed with 50,6% female (n=1094) and 49,4% men (n=1067), with a mean age 51,29 ($SD= 9.68$). The sick leave group represented 67% (n=4511) and consisted of 65,1% (n=2935) female and 34,9% (n=1576) men, with mean age 49,9 ($SD= 9.95$).

The distribution of MSP showed quite equal pattern between the groups with *shoulder pain* (60%) in the working group and in the sick leave group (64%), *neck pain* was reported by 56% versus 60%, pain in *lumbar regions* was reported by 50% versus 54% and pain in *hips* was reported by 35% versus 41%. The K-S test for normality was for the work group ($D(2129) = .082, p < .001$) and for the sick leave group ($D(4427) = .078, p < .001$) which indicated deviation from normality. Though an investigation of the shape of the distribution a generally quite normally sample distribution was whole. Descriptive results with grouping variable "have you been on sick leave in the past 12 months?" are presented in table 1.

Table 1. Descriptive statistics over study variables, total sample n=6702

Variables	n	M	SD	Missing n (%)
<i>Work group</i>				
Physical exercise (range 1-5)	2154	3.40	1.10	7 (0.3)
EPQ Extroversion (range 0-6)	2062	3.73	1.83	99 (4.6)
EPQ Neuroticism (range 0-6)	2087	1.76	1.72	74 (3.4)
Feeling strong (range 1-7)	2142	4.63	1.12	19 (0,9)
Social activities (range 1-5)	2148	2.05	.75	13 (0,6)
Work Support (range 1-4)	1972	3.38	.53	189 (8.7)
Load (range 1-4)	2029	2.08	.65	132 (6.1)
Control (range 1-4)	2029	3.27	.75	132 (6.1)
<i>Sick leave group</i>				
Physical exercise (range 1-5)	4498	3.45	1.06	13 (0,3)
EPQ Extroversion (range 0-6)	4300	3.83	1.78	211 (4.7)

EPQ Neuroticism (range 0-6)	4350	2.17	1.85	161 (3.6)
Feeling strong (range 1-7)	4465	4.25	1.15	46 (1.0)
Social activities (range 1-5)	4485	2.09	.76	26 (0.6)
Work Support (range 1-4)	4209	3.26	.56	302 (6.7)
Load (range 1-4)	4258	2.01	.63	253 (5.6)
Control (range 1-4)	4243	3.06	.78	268 (5.9)

3.1 Variable correlations

According to the preliminary hypothesis we first examined if the variables contribute to SRH. Exploratory analysis as Levene's test of homogeneity of variance showed significant differences in the variance of both groups on all variables ($p < .001$). There was a significant negative relationship between SRH and if one belongs to the work group or the sick leave group with ($r_{pb} = -.17$, $p < 0.01$). Belonging to work or sick leave group ($R^2 = (-.17)^2 = .34$) can explain 34% of the variability in SRH. All variables was significant in relation to SRH with $p < 0.01$.

3.2 Work group and sick leave group comparisons

According to the hypothesis and findings above are resources that correlate with SRH strengthen individuals' health status and five psychosocial resources (EPQ-N, feel strong, work support, work load and work control) were analyzed to test for if there is any differences between the work group and the sick leave group.

There was found a significant difference (Mann-Whitney test, asymptotic method) in levels of SRH between the work group ($M=3688.73$) and the sick leave group ($M=3081.22$) ($U=3839165.00$, $p < .001$, $r = -.17$). When testing *EPQ-N* levels there was found to be significantly higher in the sick leave group ($M=3350.14$) than in the work group ($M=2945.66$) ($U=3968762.50$, $p = < .001$, $r = .10$). Further, the work group ($M=3728.72$), report significantly higher levels of *feeling strong* than the sick leave group ($M=3100.25$), ($U=3872258.00$, $p = < .001$, $r = -.16$).

The work group ($M=3341.21$) reported higher levels of *work support* than the sick leave group ($M=2973.77$) ($U=3656664.00$, $p = < .001$, $r = -.10$), and the work group ($M=3266.74$) reported higher levels of *work load* than the sick leave group ($M=3085.51$) ($U=4070700.00$, $p = < .001$, $r = -.05$), and the work group ($M=3472.06$) reported higher levels of *work control* than the sick leave group ($M=2976.04$), ($U=3623673.00$, $p = < .001$, $r = -.13$). Variable relationship were assessed thorough chi-square statistics (ϕ) and showed significant gender

difference between the groups, $\chi^2(6672) = -.138, p = < .001$. Group and gender differences in means are presented in figure 1 below.

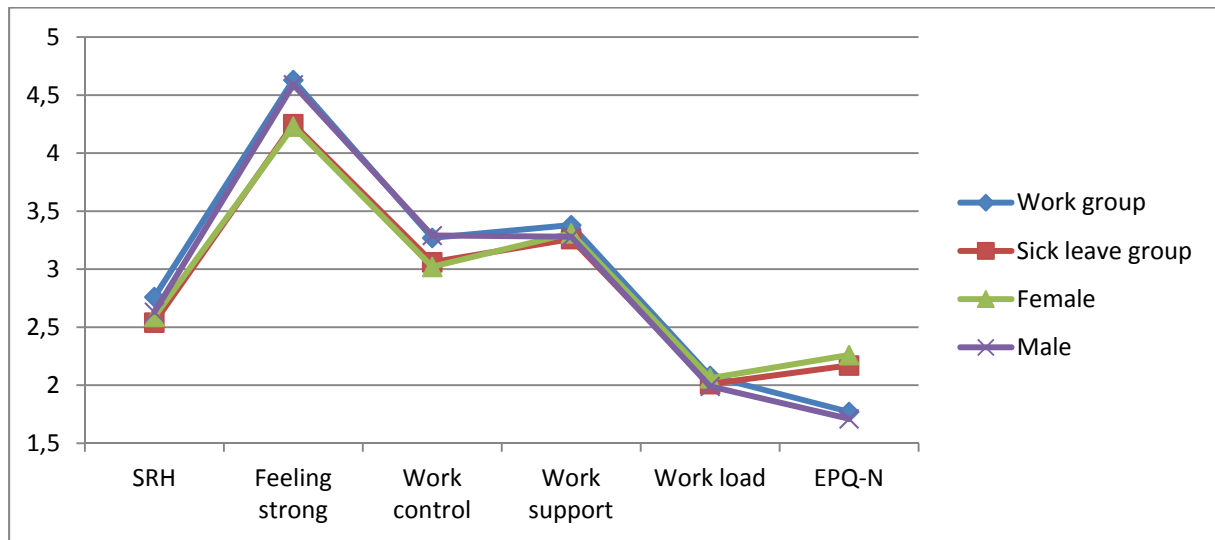


Figure 1. *Work and sick leave group, female and men composite scores of means*

3.3 Model of work with logistic regression analysis

According to the aim of the study and preliminary findings a logistic regression analysis was conducted to predict belonging to the work group using six psychosocial variables (*SRH*, *feeling strong*, *work support*, *work load*, *work control*) as predictors. Age and gender are included. A test of the full model (forward LG method) against a constant only model was statistical significant, indicating that the predictors as a set, reliably distinguished between work group and sick leave group (chi-square = 408.264, $p=000$ with ($df = 7$)). Nagelkerke's (R^2 of .092) indicated a weak relationship between prediction and grouping. Prediction success overall was 68%, which is more than by chance. Model fit is acceptable ($\chi^2(8) = 10.973, p=.203$). The Wald criterion (with acceptable *S.E*) demonstrated that only *SRH* made a significant contribution to prediction ($p=.0001$) of the work group. Collinearity statistics are satisfied, and Leverage values are satisfying low.

Due to the subtle differences between each step, main outcomes in the last step are reported. $EXP(B)$ indicates that when *SRH* raises with one unit the odds to be in work group increases with 66%. $EXP(B)$ for *work support*, *work control* and *work load* indicates that when these variables increases with one unit each, the odds to be in the work group increases with 29%, 21% and 16% respectively. $EXP(B)$ for the feeling of being strong indicates that when it

increases with one unit the odds to be in work group increases with 12%. According to gender we see that females has statistical significant lower probability ($B = -.53$) to be in work group, with an odds 41%. The total results are presented in table 2.

Table 2. *Work group prediction model with logistic regression*

Included (last step)	95 % CI for exp b			
	$B (SE)$	Lower	exp b (%)	Upper
Constant	4.60**(0,28)	NA	.01	NA
SRH	.51 ** (0,05)	1.49	1.66 (66)	1.84
Feeling strong	.12** (0,03)	1.06	1.12 (12)	1.19
Work load	.15* (0,05)	1.06	1.16 (16)	1.27
Work control	.19** (0,04)	1.12	1.21 (21)	1.31
Age	.15** (0,03)	1.09	1.16 (16)	1.24
Work support	.25** (0,06)	1.16	1.29 (29)	1.44
Gender	-.53** (0,06)	0,53	0,59 (41)	0,66

Note: n= 6702. Levels of significance: * $p < .001$, ** $p < .0001$.

4 Discussion

In our study we found an association between numerous particular resources and work participation, consistent with the theoretical assumptions and the hypothesis. We also found that resources strengthen individuals' health and promoted work participation, despite participants' moderate to very strong pain.

4.1 Personal health promoting resources

The results for personal resources is consistent with empirical findings in resilience research where resilient individuals tend to be characterized by higher *extraversion* and lower *neuroticism* levels and extroversion predicts effective functioning across a wide array of domains from aging to responses to loss (Reich, Zautra, & Hall, 2010). In this case both the work and the sick leave group report similar levels in extroversion but differ significantly in levels of neuroticism. This indicates that extroversion personality levels do not outweigh the experience of moderate to strong pain, but there is a statistical significant probability that absence of neuroticism do. In addition, social competence is associated with extroversion as a basic dimension in the personality with a potential to explain adjustment (Friborg, Barlaug, Martinussen, Rosenvinge, & Hjemdal, 2005).

The work group has higher levels of *work support* than the sick leave group, which can explain that support also could be a result of social competence and therefore an in-between variable to extroversion and MSP. The differences between groups in neuroticism, is a clear confirmation of the salutogenic theory in which Antonovsky characterized solution processes as cognitive and emotional expectations of life as something comprehensible, manageable and meaningful which is quite different than neuroticism characteristics could produce. This results also support earlier empirical results and theory behind neuroticism which block up for distraction and pain relief in individuals who starts off with a chronically higher level of arousal than extroverts (Gray, 1970) .

The results indicated that females are more likely to have worrying and catastrophic thoughts than men. This may explain the gender difference between groups and susceptibility to fatigue and lowered "work capacity"(Gray, 1970) in individuals with MSP the last year. It is possible that the health promoting effect in pain distraction lies in absence of neuroticism qualities, and not as assumed in extroversion qualities. This result is also capable to explain the difference between groups and feeling of *work control*. Men had significantly higher levels of work

control than females. Lower level of neuroticism, could promote higher level of responsibility at work which in turn increase the working capacity and distraction from pain. Little influence of one's own work and low levels of work control predict neck pain is consistent with earlier findings (Eriksen, Natvig, Knardahl, & Bruusgaard, 1999).

4.2 Social health promoting resources

Social support is probably the most empirically documented resource for adjustment, resilience and health (Reich et al., 2010). *Work support* is a health resource between the two groups. Positive emotions through social support are a basic building block obtained through colleagues. The feeling of support promotes flexibility in thinking and problem solving, and counteracts with the physical effects of negative emotions and promotes adaptive coping (Aldwin, 2007; Reich et al., 2010; Ryff, 2001). The difference between female and men was only one fourth of the difference between work group and sick leave group, which indicated that work support in work group not can be explained with gender differences as we tend to do. The difference between female and men was quite small.

4.3 Functional health promoting resources

The *SRH* is characterized in this study to include many different variables measuring different aspects, and is capable to predict 68% of the work group. The purpose of self-assessment of health is to reflect health trajectories as personal and social resources (McDowell, 2006) and it provides a formal means for the individual's judgment to influence health. A consistent finding is that a very simple summary health rating holds surprising predictive validity for health (McDowell, 2006; Bowling, 2005; Karoly & Ruehlman, 2006).

The sick leave group reported quite small amount more than work group in *work load* (hard and fast) and females reported a bit higher work load than men.

There is statistical significant difference between the work group and sick leave group in the *feeling of being strong*, and is just as equal difference we have between female and men. The work group report higher levels of feeling strong, than both females and men. This cannot be explained by gender differences. The point of matter in the salutogenic theory is tension between internal and external resources and demands. Emotions are an important component in coping with pain (Karoly & Ruehlman, 2006), and satisfying demands in the working life is a position of tension for the individual. According to Antonovsky this tension can be sorted out in a two-fold way, problem-solving and regulation of emotions (Antonovsky, 1987). It is possible that a feeling of being strong is a result of absence of neuroticism, and gives courage

to break the cycle of MSP and muscle weakness. The pain may not completely disappear, but the feeling is more optimistic and proactive in finding ways to manage pain and improve working capacity and health.

However, the study has a number of potential limitations that may restrict generalization of the findings. First and most important, causal inferences cannot be drawn from cross-sectional data. Second, because survey data is self reported they are subject for recall bias and over and/or under estimating. The strength of the current study is the size with over 50 000 participants who had completed a comprehensive range of assessments, including established instruments as EPQ. The method provides the opportunity to pull hypothesis-forming associations and is a reliable prevalence study.

5 Conclusion and implications for health promotion and future research

There was an association between numerous particular resources and work participation, consistent with the theoretical assumptions and the hypothesis. We also found that resources strengthen individuals' health and promoted work participation, despite participants' moderate to very strong pain. In general, knowledge of resources predicting good health and work participation could be used to optimize treatment strategies common for individuals with and without a MSP and should be put forward in health promotion programmer. On the individual level, is learning to notice the distinction between pain and our reaction to it and see that although the pain in our bodies may not be optional, some of the pain of our reactions *is* optional. When pain arises our conditioned reaction is to pin it down, but we can predict a more optimistic future for ourselves. We can cultivate our resources that promote health, and make the pain less rigid and use capacity to respond to it skillfully.

Acknowledgements

The Nord-Trøndelag Health Study is collaboration between the HUNT Research Centre, Faculty of Medicine, at Norwegian University of Science and Technology (NTNU), Verdal, The Norwegian Institute of Public Health, Oslo, and the Nord-Trøndelag County Council.

6 References

- Public health development. The HUNT Study, Norway. HUNT 1 (1984-86) - HUNT 2 (1995-97) - HUNT 3 (2006-08) (2011).* Levanger: HUNT.
- Aldwin, C. M. (2007). *Stress, Coping, and Development*. (2nd ed. ed.) New York: The Guilford Press.
- Antonovsky, A. (1987). *Unraveling the mystery of health*. Stockholm: Bokforlaget Natur og Kultur.
- Arvidsson, S., Arvidsson, B., Fridlund, B., & Bergman, S. (2008). Health predicting factors in a general population over an eight-year period in subjects with and without chronic musculoskeletal pain. *Health Qual.Life Outcomes.*, 6, 98.
- Bowling, A. (2005). Just one question: If one question works, why ask several? *J.Epidemiol.Community Health*, 59, 342-345.
- Brage, S., Ihlebaek, C., Natvig, B., & Bruusgaard, D. (2010). Musculoskeletal disorders as causes of sick leave and disability benefits. *Tidsskr Nor Laegeforen.*, 130, 2369-2370.
- Burton, A. K., Balague, F., Cardon, G., Eriksen, H. R., Henrotin, Y., Lahad, A. et al. (2006). European guidelines for prevention in low back pain : November 2004. *Eur.Spine J*, 15, 136-168.
- Eriksen, W., Natvig, B., Knardahl, S., & Bruusgaard, D. (1999). Job characteristics as predictors of neck pain. A 4-year prospective study. *J Occup Environ Med*, 41, 893-902.
- Friborg, O., Barlaug, D., Martinussen, M., Rosenvinge, J. H., & Hjemdal, O. (2005). Resilience in relation to personality and intelligence. *Int J Methods Psychiatr.Res.*, 14, 29-42.
- Gray, J. A. (1970). Strenght of the nervous system, Introversion-Extroversion contitionability and Arousal. In H.J.Eysenck (Ed.), *Readings in extroversion-introversion* (1 ed., pp. 49-66). London: Staples Press Ltd.

- Heimburg, D. V. (2010). *Public Health and Health Promotion: A Salutogenic Approach*. Master NTNU Norwegian University of Science and Technology.
- Helde, I., Krokstad, S., Lysø, N., and Thune, O. (2010). Sick leave: Major regional differences in duration within the same diagnosis. *Arbeid og velferd*.
- Karoly, P. & Ruehlman, L. S. (2006). Psychological "resilience" and its correlates in chronic pain: findings from a national community sample. *Pain*, 123, 90-97.
- Lillefjell, M. & Jakobsen, K. (2007). Sense of coherence as a predictor of work reentry following multidisciplinary rehabilitation for individuals with chronic musculoskeletal pain. *J Occup Health Psychol*, 12, 222-231.
- Lindström, B. & Eriksson, M. (2010). *The hitchhiker's guide to salutogenesis. Salutogenic pathways to health promotion*. (Rep. No. 2). Helsinki: Folkhälsan Research Centre, Health Promotion Research and the IUHPE Global Working Group on Salutogenesis.
- McDowell, I. (2006). General Health Status and Quality of Life. In *Measuring Health. A Guide to Rating Scales and Questionnaires*. (3. ed., pp. 520-702). Oxford: Oxford University Press.
- Natvig, B., Eriksen, W., & Bruusgaard, D. (2002). Low back pain as a predictor of long-term work disability. *Scand J Public Health*, 30, 288-292.
- Pincus, T., Burton, A. K., Vogel, S., & Field, A. P. (2002). A systematic review of psychological factors as predictors of chronicity/disability in prospective cohorts of low back pain. *Spine*, 27, 109-120.
- Reich, J. W., Zautra, A. J., & Hall, J. S. (2010). *Handbook of adult resilience*. New York: The Guilford Press.
- Ryff, C. D. (2001). *Emotion, Social Relationships, and Health*. Oxford: Oxford University Press.
- Seligman, M. E. P. (2008). Positive Health. *Applied Psychology*, 57, 3-18.
- Waddell, G., Burton, K., & Aylward, M. (2007). Work and common health problems. *J Insur.Med*, 39, 109-120.

Appendix

- Approval by the Regional Committee for Medical and Health Research Ethics (REK), Norway.
- HUNT 3 written agreement between HUNT 3, NTNU and student.

Region:	Saksbehandler:	Telefon:	Vår dato:	Vår referanse:
REK midt	Siv Tone Natland	73598916	06.10.2011	2011/1807/REK midt
			Deres dato:	Deres referanse:
			23.08.2011	

Vår referanse må oppgis ved alle henvendelser

Geir Arild Espnes
Dragvoll

2011/1807 Sammenheng mellom helseressurser og arbeidsdeltagelse hos mennesker med muskel-skjelett smerter i helseundersøkelsen i Nord-Trøndelag (HUNT 3)

Prosjektomtale (revidert av REK):

Hensikten med studien er å undersøke assosiasjonen mellom helseressurser og deltakelse i arbeidslivet blant personer med muskel- skjelettsmerter, og få mer kunnskap om hvilke faktorer som fremmer helse. Studien baseres på data fra HUNT3, og samtykke foreligger.

Prosjektleder: Professor Geir Arild Espnes

Forskningsansvarlig: NTNU, SVT, Institutt for sosialt arbeid og helsevitenskap v/ dekan Jan Morten Dyrstad

Med hjemmel i lov om behandling av etikk og redelighet i forskning § 4 og helseforskningsloven (hfl.) § 10 har Regional komité for medisinsk og helsefaglig forskningsetikk Midt-Norge vurdert prosjektet i sitt møte 23. september 2011. Komiteen viser til prosjektprotokoll, målsetting og plan for gjennomføring, og finner at prosjektet har et forsvarlig opplegg som kan gjennomføres under henvisning til evt. merknader og vilkår for godkjenning, jf. hfl. § 5.

Merknader og vilkår:

- I søknaden er prosjektleder er oppgitt som kontaktperson for forskningsansvarlig institusjon. Komiteen viser til interne retningslinjer ved NTNU og at dekan skal oppgis som kontaktperson for forskningsansvarlig institusjon for forskningsprosjekt som foregår på institutter organisert under Fakultet for samfunnsvitenskap og teknologiledelse. Komiteen forutsetter derfor at dekan Jan Morten Dyrstad er kontaktperson for forskningsansvarlig institusjon i det omsøkte prosjektet.
 - Komiteen har ellers ingen merknader til prosjektet som er beskrevet, og finner at det ligger klart innenfor de rammer som er lagt for Helseundersøkelsen i Nord-Trøndelag (HUNT) og innenfor det samtykke som deltakerne har gitt til bruk av dette materialet.
 - Komiteen vil presisere at prosjektmedarbeiderne har taushetsplikt i henhold til hfl. § 7. Personopplysninger skal behandles konfidensielt, og undersøkelsesresultater inkludert evt. navnelister, oppbevares forskriftsmessig.
 - Komiteen ber om at grunnlagsdata ikke blir anonymisert, slettet eller destruert, men blir oppbevart på en betryggende måte i minimum 5 år etter prosjektslutt av kontrollhensyn. Det må opplyses i informasjonsskrivet at slik oppbevaring blir gjennomført.
 - Prosjektleder skal sende sluttmelding til den regionale komiteen for medisinsk og helsefaglig forskningsetikk når forskningsprosjektet avsluttes. I sluttmeldingen skal resultatene presenteres på en objektiv og etterrettelig måte, som sikrer at både positive og negative funn fremgår, jf. hfl. § 12.
-

Vedtak

"Regional komité for medisinsk og helsefaglig forskningsetikk, Midt-Norge godkjenner at prosjektet gjennomføres med de vilkår som er gitt."

Godkjenningen av prosjektet gjelder til 01.01.2012. Av dokumentasjonshensyn skal opplysningene likevel bevares inntil 01.01.2017. Opplysningene skal deretter slettes eller anonymiseres, senest innen 01.07.2017.

Opplysningene skal lagres avidentifisert, det vil si adskilt i en nøkkel- og en opplysningsfil.

Forskningsprosjektets data skal oppbevares forsvarlig, se personopplysningsforskriften kapittel 2, og Helsedirektoratets veileder for «Personvern og informasjonssikkerhet i forskningsprosjekter innenfor helse- og omsorgssektoren».

Prosjektet skal sende sluttmelding til REK midt på fastsatt skjema senest 01.07.2012.

I tillegg til vilkår som fremgår av dette vedtaket, er tillatelsen gitt under forutsetning av at prosjektet gjennomføres slik det er beskrevet i søknaden og protokollen, og de bestemmelser som følger av helseforskningsloven med forskrifter.

Dersom det skal gjøres endringer i prosjektet i forhold til de opplysninger som er gitt i søknaden, må prosjektleder sende endringsmelding til REK. Vi gjør oppmerksom på at hvis endringene er "vesentlige", må prosjektleder sende ny søknad, eller REK kan pålegge at det sendes ny søknad.

Komiteens vedtak kan påklages til Den nasjonale forskningsetiske komité for medisin og helsefag, jfr. helseforskningsloven § 10, 3 ledd og forvaltningsloven § 28. En eventuell klage sendes til REK midt. Klagefristen er tre uker fra mottak av dette brevet, jfr. forvaltningsloven § 29.

Vi ber om at alle henvendelser sendes inn via vår saksportal: <http://helseforskning.etikkom.no> eller på e-post til: post@helseforskning.etikkom.no.

Vennligst oppgi vårt referansenummer i korrespondansen.

Med vennlig hilsen,

Sven Erik Gisvold
Professor dr.med.
Leder REK Midt

Siv Tone Natland
Rådgiver
REK Midt

Kopi til: jan.dyrstad@svt.ntnu.no

Avtale

mellom

HUNT forskningssenter, DMF, NTNU

og

Institutt for sosialt arbeid og helsevitenskap, SVT-fakultetet, NTNU

om bruk av forskningsdata fra Helseundersøkelsene i Nord-Trøndelag (HUNT) til masteroppgave for student Heidi Sivertsen

Prosjekttittel: "Sammenheng mellom helseressurser og arbeidsdeltagelse hos mennesker med muskel-/skjelettsmerter fra Helseundersøkelsen i Nord-Trøndelag (HUNT 3)"

Avtalen bygger på prosjektbeskrivelse med publikasjonsplan datert 26.8.11. Avtalen bygger også på godkjenning i Regional komite for medisinsk og helsefaglig forskningsetikk (2011/1807/REK midt, datert 6.10.11).

Rammene for rettigheter til å analysere på HUNT-data er beskrevet i *Retningslinjer for forvaltning og bruk av data fra Helseundersøkelsene i Nord-Trøndelag, datert 4.7.11*. Prosjektleder er ansvarlig for at analysearbeidet skjer i henhold til disse retningslinjene. Prosjektleder har ansvar for datasikkerheten og at data oppbevares forsvarlig i henhold til lover og forskrifter.

En aidentifisert datafil utleveres til prosjektleder. Prosjektleder kan la andre personer få analysere på datafilen, så fremt arbeidet holder seg innenfor rammen for prosjektbeskrivelsen og publikasjonsplanen.

Kopi av godkjent mastergradsoppgave skal sendes til HUNT forskningssenter, Levanger.

For å sikre at bruk av data skjer i samsvar med tildelte analyserettigheter skal, i henhold til gjeldende retningslinjer, alle manuskripter før innsending til publisering, forelegges publikasjonsutvalget ved HUNT forskningssenter i Levanger.

Når analysearbeidet er fullført og prosjektet avsluttes ønsker HUNT forskningssenter en dialog om hvilke data som skal tilbakeføres til HUNT databasen og hvordan slik tilbakeføring kan skje. Deretter skal datasettet slettes og bekreftelse på dette sendes skriftlig til HUNT forskningssenter,

Postadresse	Org.nr. 974 767 880	Besøksadresse	Telefon	Saksbehandler
Forskningsveien 2 7600 Levanger	E-post: hunt@medisin.ntnu.no http://www.ntnu.no	Forskningsveien 2, Levanger	+47 74 07 51 80 Telefaks +47 74 07 51 81	Maria Catherina Stuifbergen Tlf: +47 74 07 51 94

All korrespondanse som inngår i saksbehandling skal adresseres til saksbehandlerenheten ved NTNU og ikke direkte til enkeltpersoner. Ved henvendelse vennligst oppgi referanse.

Levanger, jfr. punkt 11 i gjeldende retningslinjer. Dette skal ikke skje senere enn 30.6.12, med mindre ny avtale om forlengelse er inngått med HUNT forskningssenter.

Denne avtalen er undertegnet i to eksemplarer, hvorav hver av partene beholder ett.

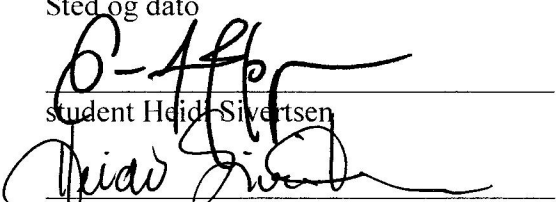
Institutt for sosialt arbeid og helsevitenskap,
SVT-fakultetet, NTNU

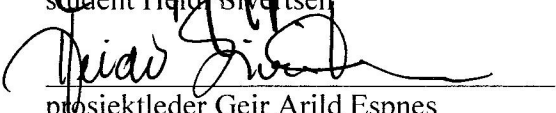
HUNT forskningssenter, DMF, NTNU

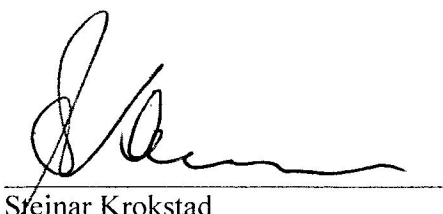
Trondheim 22/10-11

Sted og dato

Levanger, 12.10.11


student Heidi Sivertsen


prosjektleder Geir Arild Espnes


Steinar Krokstad
førsteamanuensis/daglig leder