ULLA-SISKO LEHTO-JÄRNSTEDT

Social Support and Psychological Stress Processes in the Early Phase of Cancer

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ACADEMIC DISSERTATION
To be presented, with the permission of
the Faculty of Medicine of the University of Tampere,
for public discussion in the main auditorium of Building K,
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Teiskontie 35, Tampere, on November 24th, 2000, at 12 o'clock.

University of Tampere
Tampere 2000

This work is dedicated

To the patients of this study
– each and every one.

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ABSTRACT

Physical health is affected by different kinds of environmental factors. One of these factors is psychological stress. The effects of stress are mediated by coping, stress management, which is modified by social support and personality and initiated or interfered by stressors. These together contribute to the health status or illness of a patient. Coping is the major determinant in the process from stressful events to adaptational outcomes, such as psychological symptoms and somatic illness. There is strong evidence for a causal impact of social relationships on health. The social support of a person consists of the network of the social relationships (sources of support), and the functions of social support derived from these sources. The person's own subjective experiences of the supportiveness of the relationships are positively related to health outcomes. Social support protects the individual from the potentially harmful effects of stress and thus enhances coping. Besides cancer related stressors, cancer patients may simultaneously experience various additional stress causing factors. The health consequences of the psychological stress processes may surface as various physical and/or psychosocial health outcomes.

Factors in the psychological stress processes, namely experienced social support, coping with illness, Type C personality related anger expression, experienced cancer and non-cancer stressors, psychological and physical symptoms, well-being, breast cancer specific symptoms, and depression were measured in a consecutive sample of 72 melanoma (36 women, 36 men) and 103 breast cancer patients 3–4 months after diagnosis. The methods were the Structural-Functional Social Support Scale (SFSS), the MOS Social Support Survey, the Ways of Coping Questionnaire, the Coping With Illness Scale (CILL-26), the Anger Expression Scale, the Life Experience Survey, the Chronic Strains Survey, the Rotterdam Symptom Checklist, EORTC QLQ-Breast 23 module, and the Depression Scale (DEPS). Social support experienced by the patients was measured by a new method constructed within this study, the Structural-Functional Social Support Scale (SFSS), which evaluates both the number of people with whom the patients had discussed their disease (sources of support) and the amount of functional social support experienced from these sources.

The experience of cancer was shared with others. The mere existence of a source of support, when the patient had it, was felt to be supportive. An increase in the number of members in a support source did not increase the support experienced. Experience of the amount of support was quite similar irrespective of its source. Breast cancer patients experienced more support than melanoma patients, which may be due to the amount of cancer treatment received. There were hardly any gender differences. Functional support was distinguished according to sources of support, whereas division by function (emotional and practical) was weaker and not present in every source. When SFSS was compared with MOS Survey and the Ways of Coping Questionnaire's Seeking Social Support items, MOS measured almost solely support from spouse and family and Seeking Social Support items support from friends, acquaintances, and other patients; these two scales measured social support from a different viewpoint than SFSS.

SFSS is applicable for research purposes and capable of producing interesting additional information about social support.

Five patterns of coping (Focusing on the Positive, Distancing, Seeking Social Support, Cognitive Escape-Avoidance, and Behavioral Escape-Avoidance) and three traits of anger expression, (anger-in, anger-out, and anger control) were identified. The effect of experienced social support, anger expression, stressors, and age on coping was investigated by stepwise regression analysis (RA). Each of these factors had an influence on coping with cancer. In melanoma, social support predicted in RA coping with the disease. Among men the influence was stronger than among women, whereas in breast cancer, the predicting power of social support was weaker. All the coping patterns were affected by social support. More support led in RA to more use of other coping patterns in general, but decreased the two escape-avoidance patterns. The influential sources of social support differed between genders. In men, the most influential sources of social support were other patients and acquaintances, whereas in women, the most influential source of support was friends. Support from spouse and family had only a minor effect on coping with cancer, and support from nurses had none. Anger expression factors did not explain away the influence of experienced social support on coping, but had an additional effect. Anger expression traits showed only weak connections to experienced social support. Non-cancer stressor load increased coping with cancer. Patients with adjuvant treatment experienced more support from several sources than patients who had only had surgery.

Furthermore, the effect of the factors in the psychosocial stress processes on reported symptoms and well-being of the patients was also investigated by stepwise regression analysis (RA). Differences in the symptoms reported were explained by psychological factors in the stress processes, not by differences in the cancer type or treatment. The effect was stronger in melanoma and differed between genders. In the RA model, the effect of psychological stress processes on overall symptoms was strong, but minor on breast cancer specific, i.e., breast area symptoms. Psychological symptoms were increased by more Behavioral Escape-Avoidance in melanoma, more Cognitive Escape-Avoidance in breast cancer, more anger-out trait in men, more anger control trait in breast cancer, and greater number of negative non-cancer life events in both female groups. Patients with more non-cancer stress reported more physical symptoms. Quality of life was differently predicted by psychological factors between genders, e.g., greater age predicted worse quality of life among men, but not among women. In melanoma, more use of coping pattern Behavioral Escape-Avoidance strongly predicted greater reported depression. In breast cancer, more depression was predicted by several variables. The presence of adjuvant cancer treatment was associated with more depressive symptoms.

The results obtained concur with the hypotheses about factors involved in or influencing the psychological stress processes in chronic diseases. The only distinguishing psychosocial factor between the investigated cancer groups was the amount of experienced social support, which was higher when there had been more medical cancer treatment (operation only *versus* operation plus adjuvant treatments). This might have led to the observed differences between the two cancers and, further, to the changes in the psychological stress processes and in the amounts of symptoms reported. Adjuvant medical cancer treatments may have had an additional effect by producing more experienced social support, and, as a result, the patients with operation only gained something less in the psychosocial field of cancer care. The results permit the conclusion that adjuvant psychosocial cancer treatment (psychosocial intervention) – if it increases experienced social support – may benefit patients by helping them to cope with cancer. This may be especially beneficial for patients who do not receive adjuvant medical cancer treatment, and consequently, do not receive social support through this extra attention.

INTRODUCTION

For decades the psychological, social, and spiritual dimensions of cancer were neglected in most countries; the focus of the care was almost totally on the biomedical aspects. As a result, patients' psychosocial situation and/or problems were usually not addressed in their care (Engel 1977, Dolbeaut et al. 1999). Recently, interest in the 'human side' of the patients, i.e., more comprehensive care, has increased. Over the past 20 years, psychosocial oncology has developed as one of the subspecialities of oncology. Converging trends within psychology, sociology, psychiatry, and oncology have led to the study of psychological issues in relation to prevention, early detection and compliance, psychological responses in cancer patients and delayed effects of cancer treatment (Holland & Rowland 1989). Psychosocial oncology deals with two main psychological dimensions of cancer: the patients', families', and staff's emotional reactions to cancer and its treatment, and the psychological and behavioral factors that influence cancer risk and survival (Dolbeaut et al. 1999).

Health psychology is the systematic application of psychology to the relevant areas of health, disease, and the health care system. It was formally recognized in 1979 by the American Psychological Association (APA) and defined *"the aggregate of the specific educational, scientific, and professional contributions of the discipline of psychology to the promotion and maintenance of health, the prevention and treatment of illness, the identification of etiological and diagnostic correlates of health, illness, and related dysfunction, and to the analysis and improvement of the health care system and health policy formation."*

The scope of the discipline is broad. Most of the theories and methods of psychology can be applied to health-related topics. Specifically, health psychology has borrowed from public health, epidemiology, physiology, medical anthropology, and sociology. Health psychology is open to basic and applied research as well as practical application in the clinical work. The scope varies from experimental animal research to various treatment programs addressed to people suffering from a somatic disease or dysfunction. Health psychology can be applied at any stage at the wellness continuum, as well as at prevention of illnesses (Sheridan & Radmacher 1992).

Health psychology and medicine have many interests in common, but they differ in their approaches. The primary focus of medicine is still often on the causes, diagnosis, and treatment of illness. The interest of health psychology is in the prevention and in the enhancement of health, and thus it has been claimed to have a broader focus than traditional medicine. Health psychology does not in any way tend to question the value of medicine. However, it is capable of offering something to benefit both disciplines: the health and well-being of the patient.

This study belongs to a larger ongoing follow-up research project 'Psychological Stress Processes and Biopsychosocial Outcome of Cancer' conducted at the Department of Oncology of the Medical School, University of Tampere, and at Clinic of Oncology, Tampere University Hospital, Finland. This research project takes a multidisciplinary approach combining health psychology, psychosocial oncology, and cancer epidemiology. The data was gathered in clinical settings. The present study has three main goals: 1) To investigate the structure, definition, conceptualization, and methodology of social support in somatic health research, to present some implications of the former on the basis of data on newly diagnosed cancer patients, and to devise and validate a new measure of social support experienced by patients with a chronic disease, the *Structural-Functional Social Support Scale (SFSS).* 2) To investigate factors in the psychological stress processes – stressors, coping, social support, and personality – and the effect of the other factors on coping with cancer in newly diagnosed cancer patients. 3) To evaluate the psychological and physical symptoms and well-being of newly diagnosed cancer patients and to assess their connections with psychological stress processes.

REVIEW OF THE LITERATURE

Models in health research

The dominant paradigm of medical science in the 20th century has been the **biomedical model**, heavily influenced by Cartesian dualism, which defines the mind and the body as separate substances (Engel 1977, Sheridan & Radmacher 1992). Before Cartesian dualism became generally accepted, the role of psychological factors in determining health and illness was considered very important. The discovery of external causes of disease such as bacteria, viruses, chemicals, radiation, and vitamin deficiencies increased the strength of the biomedical model. Biomedical research came to be mainly interested in eliminating the effects of these factors, which led to many important discoveries in medicine during the 1900s (e.g., O'Leary 1990, Sheridan & Radmacher 1992). It has been argued that social, psychological, and behavioral dimensions fall outside the framework of the biomedical model, and therefore they were largely ignored (Engel 1977, Sheridan & Radmacher 1992) or considered less interesting.

The challenge to expand the biomedical model came originally from psychosomatic medicine (Engel 1977), which, in spite of the dominance of the biomedical model, has been an organized approach of science and treatment for over 50 years. Psychosomatic medicine investigates the interactions between psychosocial and biological factors in health and disease, 'psychosomatic' meaning that the mind (*psyche*) and the body (*soma*) are both involved. Psychosomatic medicine was developed when it became obvious that not everyone became ill after being exposed to a pathogen and that known biological risk factors of diseases account for only a fraction of the cases of illness. It was even suggested that all disorders might be called psychosomatic, because psychological or psychosocial factors are involved in all disease processes (Engel 1977).

It was not until the 1980s that both theoretical and empirical research on psychological and social dimensions in somatic diseases started to grow and develop rapidly. The **biopsychosocial model of illness** by Engel (1977) had a great influence on this research. He evinced the following six basic statements:

1) "In the biomedical model, demonstration of a specific biochemical deviation is generally regarded as a specific diagnostic criterion for the disease. Yet in terms of the human experience of illness, e.g., laboratory documentation may only indicate disease potential, not the actuality of the disease at the time. The abnormality may be present, yet the patient may not be ill.
2) Establishing a relationship between particular biochemical processes and clinical signs of illness requires a scientifically rational approach to behavioral and psychosocial data, for these are the terms in which most clinical phenomena are reported by patients. Otherwise, the reliability of observations and the validity of correlations will be flawed.
3) Conditions of life and living constitute significant variables influencing the time of reported onset of the manifest disease as well as of the variations of its course.

Psychophysiological responses to life changes may interact with existing somatic factors to alter susceptibility and thereby influence the time of onset, the severity, and the course of a disease.

4) Psychological and social factors are also crucial in determining whether and when patients with the biochemical abnormality come to view themselves or be viewed by others as sick. Still other factors of a similar nature influence whether or not and when any individual enters a health care system and becomes a patient.
5) "Rational treatment" directed only at the biochemical abnormality does not necessarily restore the patient to health even in the face of documented correction or major alleviation of the abnormality.
6) Even with the application of rational therapies, the behavior of the physician and the relationship between the patient and the physician powerfully influence the therapeutic outcome for better or for worse. These constitute psychological effects which may directly modify the illness experience or indirectly affect underlying biochemical processes, the latter by virtue of interactions between psychophysiological reactions and biochemical processes implicated in the disease."

Engel's biopsychosocial model directed attention to social, psychological, behavioral as well as biological dimensions of illness. The model asserted that a given disease should be usefully analyzed at several different levels, each level requiring its own methods. Investigation on one level would complement the work done on the others (Gross 1989).

Psychological stress in health research

Physical health is affected by different kinds of environmental factors. One of these factors is psychological stress. The effects of stress are mediated by coping which is modified by social support and personality (Holahan & Moos 1986). There is wide agreement that the effects of stress are due to how a person can cope with stress in a particular situation. Coping can be defined by different theoretical formulations. In this study it is seen from the process-oriented view by Lazarus & Folkman (Folkman et al. 1986a and 1986b, Lazarus 1993). Social support is an interesting moderator of coping, because there is evidence for a causal impact of social relationships on health (e.g., House et al. 1988). Furthermore, social support can be affected by means of psychosocial interventions, which thus are means to change the psychological stress processes and/or the outcome of these processes.

Coping is a major determinant in the process from stressful events to adaptational outcomes such as psychological symptoms and somatic illness (Folkman et al. 1986a and 1986b, Lazarus 1993). According to the buffering model (Cobb 1976, Cohen & Wills 1985), social support protects the individual from the potentially harmful effects of stress, being thus coping related. The other modifier, personality, influences the coping behavior of a person. The so-called Type C behavior can be seen either as a personality pattern or as coping behavior (Temoshok 1987). Stressors may be either physical stimuli, such as pain, or psychosocial stimuli (Burgess 1987, Folkman et al. 1991); they are essential for coping processes to occur. The health consequences of the stress processes can be various physical and/or psychosocial health outcomes.

The effect of stress on health and well-being can be investigated from different scientific backgrounds and viewpoints. Some investigators emphasize personality aspects while others are more concerned with coping related processes, including social support. In 1991, Friedman wrote that "roughly speaking, stress researchers have divided into two camps. The first focuses on the *emotional* and *motivational* aspects of stress, including hostility, type A personality, physiological reactivity, and anxiety and depression. The second camp tends to be more concerned with *coping*, including appraisal processes, cognitive style, social support, social environment, hassles, and self-disclosure. Although the two perspectives overlap and have obvious implications for each other, there is often insufficient communication between them". The present study emphasizes the latter viewpoint, coping and related stress processes, because the ultimate aim of the project is to produce information on how the stress processes of patients suffering from a chronic disease can be altered and health consequences of stress diminished.

Factors in psychological stress processes

Social support

An association between interpersonal relationships and psychological and physical health has long been noted, both in case reports and by research (House et al. 1982 and 1988). The issue of social relationships and health was revitalized in the mid-1970s by Cassel (1976) and Cobb (1976), when the concept of social support was introduced. In a relatively short time it was shown to be an important construct in health research (e.g., Cohen & Wills 1985, House et al. 1988). The concept of social support has interested researchers for two different reasons: 1) social support appears to be one of the mediating factors in the relationship between stress and health outcomes, and 2) social support including interventions for stressed individuals seem to help in diminishing the consequences of stress or to improve adjustment (Dunkel-Schetter et al. 1987). In practice the research of social support has been divided into two approaches: 1) a theory-oriented tradition that emphasizes theoretical development of the area and theory-based tests of hypotheses, and 2) an applied tradition based on the fact that social support can be deliberately changed by psychosocial interventions (Rook & Dooley 1985, Dunkel-Schetter et al. 1987, O'Reilly 1988).

Social support containing psychosocial interventions has been suggested to be capable of improving both psychosocial well-being of the patients and the biological course of their diseases (even prolonging survival time) (e.g., Spiegel et al. 1989). That is why psychosocial interventions have been developed and used with the aim of benefiting the patients and families of the patients. Intervention research has been criticized because of deficiencies in study design and reporting (Fawzy et al. 1995, Bottomley 1997, Fobair 1997a and 1997b, Iacovino & Reesor 1997). This approach is practical by nature and directly applicable to clinical work.

The theoretical approach is of special importance because the study designs in the practical research approach – and especially the theoretical formulations behind them – have been reported to be insufficient. Although a lot of work has been done during the past 20 years within social support research, theoretical clarifications are still needed. The social network, i.e., the sources of support, was defined and conceptualized in the early 1980s. However, the functional aspects of support, a person's evaluation of the content of the relationships, proved to be a complex issue, and the research in the area has ended up with severe theoretical, conceptual, and methodological problems. These problems still exist although they were recognized already in mid-1980s (Cohen & Wills 1985, Sherbourne & Stewart 1991).

In research, the dimensions of social relationships have been divided into structural aspects, quantity of social relationships or *'social network',* and functional aspects of support derived from the networks, *'social support'*. Social networks (number of relationships, frequency of contacts) are the sources of social support. Functional support has been shown to be a stronger predictor of physical health outcomes than the social network (Cohen & Wills 1985). It has been argued that the perceived adequacy of the support is partially independent of the sources of support: adequate support may be derived even from only one very good relationship. On the other hand, a person may perceive lack of support although he/she has many social contacts (Cohen & Wills 1985). Empirical studies have shown that a person's own subjective perceptions of received support are positively related to both psychological distress and physical health outcomes (Cohen & Wills 1985, Funch et al. 1986). Therefore the improvement in perceived social support is the target for psychosocial interventions.

Social network

The concept of social network was already in the 1960s defined as "a specific set of linkages among a defined set of persons, with the additional property that the characteristics of these linkages as a whole may be used to interpret the social behavior of the persons involved" (review by Eriksen 1994). These linkages operate as sources of social support. According to others, "social support is provided by the individuals 'convoy' which, at a given point in time, consists of the set of persons who are relied upon for support and who may rely upon that individual for support" (Kahn & Antonucci 1980, see Funch et al. 1986). The persons who provide support may also vary depending on the type of situation and the individual receiving the support (Funch et al. 1986). Social network has been operationalized, e.g., as size of network, frequency of contacts, or marital status.

Functional social support

There have been persistent difficulties in defining the support derived from the networks. In the first place, Cobb (1976) defined it as information leading the subject to believe that 1) he is cared for and loved, 2) he is esteemed and valued, and 3) he belongs to a network of communication and mutual obligation. This definition has been criticized of excluding instrumental assistance and claiming that the support functions predominantly in crisis situations (O'Reilly 1988). It has been proposed that there are three types of social support: affect (expressions of liking, respect), affirmation (expressions of agreement or endorsement of some act or statement), and aid (transactions involving direct assistance) (Funch et al. 1986). Functional social support has also been suggested to involve one or more of the following items: "emotional concern (liking, love, empathy), instrumental aid (goods and services), information (about the environment), and appraisal (information relevant to self-evaluation)" (House 1981, Funch et al. 1986, Dunkel-Schetter et al. 1987). When evaluating the definitions of social support from a number of studies, O'Reilly (1988) identified three common elements of social support: it is 1) an interactive process in which 2) particular actions or behaviors 3) may have a positive effect on an individual's social, psychological, or physical well-being.

Although the division of social support into functional subcategories has differed among writers, the division between emotional support and practical support seems to be generally accepted (Cohen & Wills 1985, Dakof & Taylor 1990, Sherbourne & Stewart 1991). Informational support has often been considered as a third separate function, which has been found to be important for cancer patients (Dakof & Taylor 1990). Each type of functional support can be obtained from many potential support providers, i.e., sources of support. On the other hand, functional definitions have been unstable across samples, which may be due to the low relialibility of many of the instruments in use.

Source of support. Who provides the support is another important consideration. Functional social support can be distinguished by source of support by rating the amount of support from different sources or groups of sources (Funch et al. 1986, Rowland 1989). In cancer research, several studies indicate that the spouse of the patient is the most important source of support, but that other sources may at times be equally, or even more, important. Medical care providers have even been reported to be almost as important sources of support as spouse (Dunkel-Schetter 1984). Relatives have been reported to be the least helpful source for managing psychological problems. Another important feature about multiple sources of support is that different sources often provide different types, i.e., functions of support (Rowland 1989, Dakof & Taylor 1990). For example, a spouse may satisfy affectional needs when other sources may provide more practical help. Even when the same type of support is concerned, it may be experienced differently depending on who provides it. A classical example is the phrase 'I understand how you feel', which may be really reassuring from a person in the same situation, but not so from a stranger or a staff member (Rowland 1989). Support from friends, acquaintances, neighbors, and co-workers has been reported to be different than support from spouse and close family members on one hand and health care professionals and self-help groups on the other (Rowland 1989, Dakof & Taylor 1990).

Actual versus available support. Although the terminology differs, the distinction between 'received' and 'available' functional support is commonly highlighted (Dunkel-Schetter & Bennett 1990). 'Received' or 'actual' social support refers to the support the person has actually received or reported to have received (Sarason et al. 1990). Received support has been referred to by many names with slightly different connotations, e.g., administered support reflects the provider's perspective whereas received support concerns the recipient's view. The concept of 'perceived' or 'perceived available' support is related to support usually referring to the availability of the various aspects of support people expect to receive *if* they needed it (Sarason et al. 1990, Sherbourne & Stewart 1991, Eriksen 1994). For cancer patients, the actual support may be more critical for well-being, and concrete evidence of help offered and received is probably an accurate mean of assessing social support in cancer (Rowland 1989). Furthermore, satisfaction or adequacy of both received and available support can be evaluated (Dunkel-Schetter & Bennett 1990).

Models of social support

Theoretical models for the association of social support and health have changed little since the mid-1980s (Broadhead & Kaplan 1991). The relationship between social support and well-being may occur through two very different processes. The first, *the main effect model*, proposes that social resources have beneficial effects irrespective of whether the persons are under stress or not; there is a direct link between social support and disease. These beneficial effects could occur because large social networks provide regular positive experiences and a set of stable, socially rewarding roles in the community. This kind of support could provide positive affect, a sense of predictability and stability in one's life situation, and a recognition of self-worth. Integration into a social network may also help to avoid negative experiences, e.g., economic or legal problems. It has also been referred to as social interaction or social integration. This model has been verified in epidemiological studies; it derives from a statistical main effect of support (Cohen & Wills 1985, Broadhead & Kaplan 1991). There is some evidence that the main effect of support on major health outcomes is stronger among people who are socially isolated, and weaker among those who already have moderate or high levels of support (Cohen & Wills 1985).

The *buffering model* suggests that social support is related to well-being when a person is under stress. This model proposes that support protects persons from the potentially pathogenic influence of stressful events (Cobb 1976, Cohen & Wills 1985). The stressful situations are defined to be those "in which the person perceives that it is important to respond but an appropriate response is not immediately available" (Cohen & Wills 1985). Stress appraisal includes negative affect, elevation of physiological response, and behavioral adaptations. Cohen and Wills (1985) have stated that "although a single stressful event may not place great demands on the coping abilities of most persons, it is when multiple problems accumulate . . ., that the potential for serious disorders occurs". The mechanisms linking stress to illness may include disorders in neuroendocrine or immune systems (Lewy & Wise 1987, O'Leary 1990, Butow et al. 1999) or changes in health related behaviors (alcohol use, poor diet, deficiencies in exercise patterns, failures in self care) or a combination of the two (Cohen & Wills 1985, Broadhead & Kaplan 1991). In the buffering model, social support is connected with coping, a person's efforts to manage psychological stress.

"The psychological components (of social support affecting health) are dependent on information from the social environment, identity and self-esteem, social influence, and tangible resources. All of these affect health by producing benign appraisal of stressful events, improved coping, prevention of stress-induced biological and behavioral responses that are harmful to health, suppression of neuroendocrine responses to stress, enhanced immune function, increases in healthy behaviors, and health maintenance" (Broadhead & Kaplan 1991).

Social support can be considered as a modifying factor to the coping processes of stress (Holahan & Moos 1986, Thoits 1986). Coping can be seen as a complex ongoing process (Folkman et al. 1986a and 1986b), thus the social support that buffers stress also forms a process. Some authors even count social support as a part of coping, as one social resource of coping (Folkman et al. 1986a and 1986b, Stewart 1989). For more of the connections of social support to coping processes, see the chapter 'Relations between the components in stress processes'.

Group differences in social support

The need for social support and its effectiveness varies between individuals but also by sex, ethnicity, and age (Vaux 1985). Gender has been proposed to be the most important dimension of social status influencing social support. Differences have been found which typically favor women, or, more precisely, the female sex role (Vaux 1985). Researchers have claimed that the support functions that are effective buffers for women may not be effective for men and *vice versa* (Cohen & Wills 1985). Or that women may have a greater capacity both to provide support and a greater dependence upon social support for psychosocial well-being (Flaherty & Richman 1989), and that women experience greater support than men do (Vaux 1985). Furthermore, women have been claimed to have an advantage in adjusting to the crisis of a life-threatening illness (Fife et al. 1994).

There are also differences in support between age groups or stages of the life cycle. In adolescence, social relationships undergo marked changes, and the relationships and support functions typical for adult people take shape. At the other end of the life cycle, some aspects of support may decrease across the adulthood (Vaux 1985) or the effect of support may change when people reach their 70s (Blanchard et al. 1995). Furthermore, old people (after retirement) begin to need more practical support than younger adults. In social support research, adults (age between approx. 30–65/70 years) are usually studied as one group.

Social network and social support research methodology

Methods[1] used to assess social support have varied due to different definitions of social support and lack of clear conceptualization (Cohen & Wills 1985, Dunkel-Schetter & Bennett 1990, Sherbourne & Stewart 1991, Winemiller et al. 1993), thus making comparison difficult between studies. Furthermore, the psychometric properties of many of the measures have not been convincingly documented (Orth-Gomer & Unden 1987, O'Reilly 1988, Sherbourne & Stewart 1991). In cancer research, there have been similar problems: measures have varied from study to study and the definition and operationalization of 'social support' have been poor. Some measures have dealt with marital status, others with marital satisfaction, confidant support, or financial and other tangible support. The measures used have rarely been standardized, or comparable with other measures of support (Broadhead & Kaplan 1991, Blanchard et al. 1995). Broadhead and Kaplan (1991) describe the literature as a morass of positive and negative studies of little value in the aggregate.

To obtain information on support, two different approaches or 'formats' (O'Reilly 1988) may be used: the *network format* (who provides support) and the *behavioral* or *functional format* (is support forthcoming or will it be forthcoming); thus there are structural and functional measures of support. Dunkel-Schetter and Bennett (1990) propose a classification into three categories, where the first two refer to the existence or contents of the network, their categories being social integration (existence of social relationships), social network (structure of social relationships), and social support (function of social relationships). Sarason et al. (1990) divide the measures of functional support into three separate categories: 1) network measures, 2) received support measures, and 3) perceived support measures.

The measures of social network may include variables such as marital status, number of family members and friends, frequency of contacts, etc. The measures of functional support address a person's evaluation of the contents of interpersonal relationships or perceived availability of functional support. Most studies have concentrated on one approach or the other; the two are seldom combined (Funch et al. 1986, Brown et al. 1987, Broadhead et al. 1988, Folkman & Lazarus 1988, Power et al. 1988, Sherbourne & Stewart 1991). As noted earlier, when both types of measures have been compared, the functional, perceived support has been found to be a stronger predictor of health outcomes than the social structure (Funch et al. 1986). The measures of social network proved to be relatively easy and quick to apply and easy to understand by the subjects. On the other hand, the measures of functional support have often been lengthy and time-consuming and included questions that have been difficult to understand (Funch et al. 1986, Orth-Gomer & Unden 1987). Furthermore, either general experienced

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[1] In the psychometric measures the respondents are usually asked to indicate the presence, frequency or intensity of a behavior, experience, feeling, symptom, etc.. The responses to the individual questions are aggregated to form scales, measuring particular subconstruct of the concept. These instruments produce several numerical values for different domains of the construct or a single score of the construct.

support or support from sources with respect to a specific situation (e.g., people who take part in the care of a disease) can be the research target.

Social network. The initial research on social networks was carried out by social anthropologists to clarify the relationship between the networks and social behavior. Later the use of the concept, particularly in health research, was limited to information about a person's social links. In an even more limited way, the measures of social network have included only significant or important ties which provide support (O'Reilly 1988). While a variety of definitions for 'social support' exist, there is widespread agreement on the definition of 'social network' in both the broad and narrow scope presented above. O'Reilly (1988) identified three levels in operationalizing of social network: 1) Specificity of questions refers to whether the questions are applicable for the general population or for a specific population only (e.g., for hospitalized people). 2) Specificity of the network refers to whether or not to limit the number of network members identified by the respondents (e.g., to the significant or important ones). 3) Division of the network components into 'structural' and 'interactional'. The structural components of the social network are measured by relationship, size, density, and proximity, the interactional component by durability, frequency of contact, and intensity of relationship (O'Reilly 1988).

Social support. In the1980s especially, there was wide heterogeneity in the measures of social support: what actions, interactions, and effects should be considered in relation to social support. In those days, almost anything remotely related to social relationships could be used to measure 'social support' (for an overview, see O'Reilly 1988). In the mid-1980s more precise definitions and clearer conceptualization of social support led to the division into 'social network' and 'social support' measures. However, the methodology of social support remained heterogeneous, and the number of measurements used to assess functional support in various health outcomes increased substantially. In the mid-1980s it was proven that the functional aspects of support and the structure of the network can be measured independently (O'Reilly 1988): the measure needs not concern the structures of social support at all to give a valid picture of the experienced functions. This led to a tendency to develop purely functional social support scales. In the late 1980s and early 1990s, the direction seemed to be towards very short scales (e.g., 14 to 20 items) measuring only the functional aspects of support (e.g., the scales of Funch et al. 1986, Broadhead et al. 1988, Sherbourne & Stewart 1991). However, the support consists of both the sources and the functional aspects, and little is known of how the structural measures are related to functional ones. It has been pointed out that further research using both types of measures is needed (Cohen & Wills 1985, Funch et al. 1986, Orth-Gomer & Unden 1987, Power et al. 1988). Today, the controversy of the structure, definition, conceptualization, and methodology of social support still persists (Blanchard et al. 1995).

Most measures of functional support have been self-report scales. Some of these questionnaires have been carefully tested for psychometric properties while others have been developed for the purposes of one study only (for reviews and lists of measures, see Sarason et al. 1983, Cohen & Wills 1985, Orth-Gomer & Unden 1987, O'Reilly 1988, Winemiller et al. 1993). The content of the items in the scales varies considerably.

The issue of specificity of the questions is also relevant in measuring social support. Are the questions constructed for general use, for a specific target population (O'Reilly 1988), or for a specific stressful event? Another critical issue is the specificity of the scale: is the objective an overall index of support, or does the measure evaluate different aspects and functions of support (O'Reilly 1988).

O'Reilly (1988) conjectured that the development of a single universally applicable social support questionnaire may not be possible. It may be possible to develop a widely-accepted, valid, and reliable instrument for studies with a fairly general population and/or general health outcomes. The more specific the study design, the less the likelihood of developing a single valid and reliable instrument. As a result, the choice between the variety of the available instruments is difficult (Orth-Gomer & Unden 1987). Most existing social support scales are not useful for cancer patients without some modifications. "There is a need for measures of supportive behaviors that are specific to the cancer patients' experience" (Broadhead & Kaplan 1991).

Divisions of the social relationship measures. In addition to the division according to the format of the scale presented above, measures of social relationship can be assessed by the degree of *specificity* versus *globality* of the scale (Cohen & Wills 1985, O'Reilly 1988). Specificity indicates whether a measure assesses a specific structure/function or combines several structural or functional submeasures into a global index. Global structural measures combine items about social connections with, e.g., relatives, neighbors, and (health care) organizations (e.g., Sherbourne & Stewart 1991). Global functional measures combine several functions of support (emotional, practical, informational) into a single measure (O'Reilly 1988).

According to Cohen & Wills (1985) the implications of specificity versus globality are different for the two types of measures, which can be illustrated as follows:

	Low globality	**High globality**
Low specificity	(low reliability)	shows main effects
High specificity	shows buffering effects	(may not show buffering effects)

Social network measures should be global, whereas functional social support measures should be high in specificity. Global structural (social network) measures (second column, first row) are necessary for showing strong main effects, because they tap a wide variety of connections. For functional measures, the specificity of a scale refers to whether the support is measured as a single broad entity, or whether the measure is tapping different components, e.g., functions separately (O'Reilly 1988). Cohen & Wills (1985) predict that a buffering effect will be observed when a functional measure is well matched to the stressful event under study: only a specific functional measure can show buffering effects (first column, second row). A global functional measure may lose the relevant function (second column, second row).

Like other psychological or psychosocial phenomena, social support can also be measured using *quantitative* as well as *qualitative* methods. The quantitative measures, the structured and usually validated questionnaires described above, are not the only alternative; qualitative methods have also been successfully used to assess the contents of interpersonal relationships in cancer (Dakof & Taylor 1990). Furthermore, a variety of methods between these two have been used (see Sarason et al. 1983, Cohen & Wills 1985, Orth-Gomer & Unden 1987, Winemiller et al. 1993). The heterogeneity of the methodology reflects the theoretical difficulties of the research area. When it has not been clear which particular aspects of the social support formula are of importance, qualitative research designs have given useful information about the empirical dimensions of social support (Dakof & Taylor 1990).

Coping

Coping is the major determinant in the process from stressful events to adaptational outcomes such as psychological symptoms and somatic illness (Folkman et al. 1986a and 1986b, Lazarus 1993). The concept of coping originated from the psychoanalytic theory of unconscious intrapsychic conflict and defense mechanisms. In the stress research of the 1980s, the interpretation shifted towards coping as an active conscious response to an encounter that has been appraised to be stressful (Lazarus 1990 and 1993, Somerfield & Curbow 1992). Early research on coping processes handled coping as traits or stable dispositions, which approach was increasingly criticized from the 1970s (Somerfield & Curbow 1992). In the newer approach coping styles refer to the actual ways in which people deal with certain situations. When coping is seen as a stable trait, there is little hope of psychosocial interventions having an affect. The process-oriented view offers promise that coping styles of a patient can change and that they can be deliberately changed by interventions (Somerfield & Curbow 1992).

The process-oriented model of coping

According to the process, or transactional, oriented model by Folkman and Lazarus, developed from the year 1966, coping is defined as "the person's constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the person's resources" (Folkman et al. 1986a and 1986b, Lazarus 1993).

Folkman and Lazarus claim that there are three major postulates when coping is seen from the process oriented view: 1) It is a process which deals with the person's actual behavior in the situation. 2) It is contextual, it takes place in an environmental context and is thereby influenced by the person's appraisal. This means that particular person and situation variables together form the coping effort. 3) There are no assumptions about what is good or bad coping, coping is simply a person's efforts to manage demands. Thus, coping activity has no built-in value. The term is used whether the process is adaptive or non-adaptive, successful or unsuccessful (Folkman et al. 1986b, Lazarus 1993).

The coping theory of Folkman and Lazarus actually identifies two different processes: *cognitive appraisal* and *coping*. These together are critical mediators of stressful person-environment relationships and in their immediate and long-term outcomes. Through cognitive appraisal the person evaluates the particular encounter: is the encounter with the environment relevant to his/her well-being and, if so, in what way. Taken in detail, cognitive appraisal consists of primary and secondary appraisal. In the primary appraisal, a person evaluates whether there is anything at stake in this encounter, e.g., is there potential harm or benefit to self-esteem or is a loved person's health or well-being at risk. In the secondary appraisal a person evaluates what can be done to the situation in order to overcome or prevent harm or to improve the prospects for benefit (Folkman et al. 1986a and 1986b).

The actual coping process refers to the person's cognitive and behavioral efforts to manage, that is, to reduce, minimize, master, or tolerate, the person-environment transaction that has been appraised to be demanding. Coping has two major functions: dealing with the problem that is causing the distress (problem-focused coping), and regulating stressful emotions (emotion-focused coping) (Folkman et al. 1986a and 1986b). Problem-focused coping consists of efforts to change the actual circumstances of an adaptational encounter, for example, by changing either the environment or oneself (Lazarus 1990). It includes both aggressive interpersonal efforts to alter the situation, as well as cool, rationale, deliberate efforts to solve the problem (Folkman et al. 1986a). Emotion-focused coping involves purely cognitive activities which do not directly alter the actual relationship with the environment but which do alter the way this relationship is cognized. A person can try to manage the situation by avoidance or attempt to reappraise certain facts, for example by 'denial', which is nowadays usually referred as 'optimism', or by 'distancing', 'self-controlling', 'escape-avoidance', 'accepting responsibility', or 'positive reappraisal' (Folkman et al. 1986a, Lazarus 1990). On the other hand, active, interpersonal problem-focused forms of coping such as 'confrontive coping', 'seeking social support', and 'planful problem solving' may be used (Folkman & Lazarus 1988). People use both forms of coping in almost every type of stressful encounter (Folkman et al. 1986a, 1986b, and 1991). Moreover, certain strategies have been found to serve both problem-focused and emotion-focused functions (Folkman & Lazarus 1988).

Even when coping has been investigated from the perspective of the process-oriented model, several ways to distinguish between the different coping styles have been described (Folkman & Lazarus 1988, Lazarus 1990, Dunkel-Schetter et al. 1992). It has been discussed whether the styles investigated should be theoretically or empirically derived, and how detailed the division should be, that is, how many different styles should be distinguished (Carver et al. 1989, Endler & Parker 1990). An early method derived from the process-oriented theory (Ways of Coping Checklist) (Folkman & Lazarus 1988, Lazarus 1990) distinguished coping strategies into 1) defensive or palliative coping, such as avoidance, magical or wishful thinking, intellectualization, isolation, and suppression, and 2) problem-solving coping, such as information-seeking, inhibition of action, and direct action. According to the new version of the method by Folkman and Lazarus (1988), the Ways of Coping Questionnaire, coping should be diveded into eight forms: 'confrontive coping', 'distancing', 'self-controlling', 'seeking social support', 'accepting responsibility', 'escape-avoidance', 'planful problem solving', and 'positive reappraisal' (Folkman & Lazarus 1988).

An adaptive strategy for coping with physical discomfort caused by a disease may be problem-focused, whereas for dealing with ambiguity about the future, the best strategies may be emotion-focused (Dunkel-Schetter et al. 1992). The coping form used depends on whether one thinks something can be done to change the harmful or threatening conditions. When little can be done, the emphasis may be on emotion-focused coping such as avoidance or distancing. When the person sees the situation changeable or controllable, problem-focused strategies dominate (Lazarus 1990). Lazarus (1990) reports that the form of coping used depends on the type of stakes the person has in the outcome. When self-esteem is at stake, people tend to use 'seeking social support' less than on occasions where other goals are at stake. Social support or comfort will be sought more in situations when there is anxiety – without shame – about one's well-being. Because coping is a mediator of emotional reactions during stressful encounters, some forms of coping may increase positive emotions and decrease negative ones, whereas some other forms may make things worse. Planful problem solving appears to belong to the first of these, confrontive coping and distancing to the latter (Lazarus 1990). Problem-focused coping strategies have been reported to vary more, i.e., to be contextual, and emotion-focused strategies to be moderately stable by an individual across encounters (Folkman & Lazarus 1988). In summary, coping may have an effect on the stressful situation itself, or on emotional well-being, health, and adjustment of the patient (Lazarus 1990, Dunkel-Schetter et al. 1992).

Gender and coping. Large amount of research on gender differences in stress and its outcomes has been carried out. The sex difference/gender role paradigm considers sex differences in personality and orientation apparently a consequence of the "social organization of gender", acquired through socialization processes and continuously reinforced over the life span (Gore & Colten 1991). These may be both the cause and consequence of gender-linked role behavior. Sex differences have been investigated in the context of femininity, masculinity, and psychological androgyny, as well as differences in instrumentality and expressiveness, self-esteem, sense of mastery, dependence on others, and assertiveness, and recently in cognitive and attributional processes that may shape adjustment.

Because women commonly report higher levels of psychological distress than men (e.g., Gore & Colten 1991), a question has been raised whether there are gender differences in the coping or stress processes. Men and women have claimed to experience different types of stressors, or to experience the same stressor differently, or there might be gender differences in the coping styles used (Cohen & Wills 1985, Thoits 1991). Some authors have argued that coping strategies commonly used by women give them an advantage in adjusting to the crisis of a life-threatening illness (Fife et al. 1994). It has been suggested that women use coping strategies that focus on altering emotional responses, whereas men tend to use more coping strategies directed towards problem solving (a review by Thoits 1991). These hypotheses have been disconfirmed in studies with better designs (Thoits 1991). Recent studies have failed to detect any gender differences in coping with cancer (Dunkel-Schetter et al.

1992), or in coping and/or perceived controllability of a negative event (Thoits 1991). Folkman & Lazarus (1988) have also reported that gender differences in coping have been minimal when the type of encounter has been controlled.

Age and coping. Coping styles may differ with age. Younger people may use proportionately more active, interpersonal problem-focused forms of coping (confrontive coping, seeking social support, and planful problem solving) than older people. On the other hand, older people may use more passive, intrapersonal emotion-focused forms (distancing, acceptance of responsibility, and positive reappraisal) (Folkman et al. 1987, Folkman & Lazarus 1988). Older cancer patients have been reported to manage to cope better than younger ones (Stanton & Snider 1993).

Coping research methodology

Coping can be measured either with *standard* or *situationally-oriented* measures. Standard measures derived from the literature have, in principal, several potential benefits, such as strong psychometric properties and generalizability. However, according to Somerfield and Curbow (1992) these benefits may not be fully realized when measuring coping for several reasons. Firstly, many standard measures suffer from psychometric problems (Endler & Parker 1990), such as the earlier mentioned difficulties to empirically distinguish between the various coping styles. Secondly, there have been differences in scoring of the same standard measure (e.g., either raw or relative scores have been used) and, as a result, the interpretation and comparison of results across studies are difficult. Thirdly, the generalizability is compromised because different types and varying numbers of dimensions have been used from the very same standard measure (e.g., different number of factors has been used). Furthermore, standard measures may be valuable in health research only if they define and measure the major coping responses used with this particular health stressor. Problems arise if the measure excludes key coping strategies. Researchers have avoided this by adding themselves certain items to the scales in order to improve the assessment of coping behavior in the context of a particular illness. In addition, standard measures have been claimed to offer little information on the specific processes of coping (Somerfield & Curbow 1992).

In their cancer-specific review on coping methodology Somerfield and Curbow (1992) argued that the items of standard measures may not provide information on the precise actions that are taken. On the other hand, the situationally-oriented approaches aim to tap the very specific actions in the process. The situationally-oriented measures of coping may include, e.g., semi-structured interviews to assess specific coping modes used in dealing with specific problems related to a disease or its treatment. This approach may provide a detailed list of various coping efforts used to manage specific illness-related stressors. It may also determine more precisely the nature and functions of coping efforts, which in turn may assist in explaining how coping affects stress and well-being. Even more, the situationally-oriented measures may point to the concrete coping responses that are especially effective for managing the present stressor.

Standard measures are noted to be more economical, less time-consuming, often psychometrically superior, and more easily generalizable to other settings. Somerfield and Curbow (1992) argued, however, that standard measures have not proved to be psychometrically sound or generalizable. They concluded, however, that it is doubtful whether study-specific instruments could lead to additional information on coping with cancer. They called for greater efforts towards developing a cancer-specific standardized coping instrument for research purposes. They also propose that a given person should be observed repeatedly – in different contexts or at different times – for managing the same stressor; this has been more seldom done (Stanton & Snider 1993).

Type C personality

For centuries various personality traits have been claimed to be associated with cancer onset or progression (Temoshok 1987, Gross 1989). Be that as it may, it is a substantial and misleading oversimplification to say that adapting a positive attitude will help one overcome cancer (Friedman 1991). It is obvious that personality factors influence, or are a part of, larger entities of stress and coping processes. Although the construct of personality refers to something more constant than the person's way to cope with stressful situations, coping strategies typical for a person may be seen as a part of his/her personality. It may be difficult to examine the role of personality in health and illness without including the concept of psychological stress (Lazarus 1990). Personality is partly developed by the coping strategies the person learns to use during his/her life cycle. The so-called Type C behavior can be seen either as a personality pattern or as a coping behavior (Temoshok 1987).

In the 1980s, a pattern labeled 'Type C' behavior was developed (Greer & Watson 1985, Burgess 1987, Temoshok 1987, Eysenck 1994). Contrary to previous personality patterns connected to cancer (Gross 1989), it is coping-related. The main elements of this pattern are suppression of emotional responses, particularly anger and fear, and inappropriate coping mechanisms. The Type C individual is over-co-operative and appeasing, unassertive, over-patient, avoiding conflict, unexpressive of negative emotions, self-sacrificing, and compliant with external authorities. Suppression of the responses seems to be important, not repression: the subjects have been aware of their negative emotions (Greer & Watson 1985). Potentially stressful situations may be more threatening for people with Type C pattern, because they cannot allow themselves to express negative emotions. This might contribute to less effective coping.

In her review and modeling article, Temoshok (1987) found a constellation of factors which seemed to constitute a risk factor for both developing cancer and/or its more rapid progression. The factors involved were 1) personality traits of stoicism, niceness, industriousness, perfectionism, sociability, conventionality, and more rigid defensive controls, 2) difficulty in expressing emotions, and 3) an attitude or tendency towards helplessness/ hopelessness. She suggested that each of these groups of factors plays a major part in cancer promotion, but at different times along the continuum of adaptation. Thus her model emphasizes the process nature of both coping and psycho-physiological homeostasis.

The Type C coping style evolves during early family interactions: a child learns to cope with stressors and possible traumatic events in a certain manner. The child learns to block expression of needs and feelings, and grows to be nice, friendly and helpful to others. Over time the chronically blocked emotions can have negative biological and psychological consequences. The Type C individual may also be seen as chronically hopeless and helpless because the person believes that it is useless to express one's needs. Furthermore, the Type C coping style interacts with stressors to create increased stress, which is in turn dealt with by even stronger Type C mechanisms. Finally the Type C coping style may not be adequate to deal with the accumulated stressor load, or with an especially severe stressor, for instance cancer diagnosis. Temoshok (1987) calls this point 'break at overwhelming stressor load': the Type C person cannot cope with a new difficult situation. It is important to note that the situation is not hopeless because the coping style of a person can change. Emotional expression is seen as contributing to the development of a more adequate coping: the individual begins to express needs and feelings, recruits more genuine social support, and may, through this process, have a more positive health outcome as psychological and biological equilibrium is achieved. Psychological intervention may play a part at this point in helping the individual change behavioral and cognitive patterns.

Stressors

A stressor has been defined to be a stimulus or situation occurring in the external or internal environment of an individual that may produce a stress or adaptation response (Burgess 1987, Folkman et al. 1991) or an experience of negative life events and chronic life strains (Thoits 1986). By the first of the definitions, stressors may be either physical stimuli, such as pain, or psychosocial stimuli, which have their origin in the social environment. Stressors may be life events referring to external verifiable changes in a person's life (Holmes & Rahe 1967, Sarason et al. 1978, Burgess 1987, Paykel 1987) and include normative life transitions such as the empty nest syndrome, bereavement, and retirement, as well as non-normative changes such as divorce, job loss, and serious illness (Thoits 1986). Cancer diagnosis is undoubtedly one of these.

The latter definition highlights only negative life events, which are culturally or personally undesirable changes that require behavioral adjustment (Thoits 1986). Some theorists have assumed that the number of life changes *per se*, whether positive or negative, can overwhelm the individual's ability to behaviorally readjust (Holmes & Rahe 1967). At any rate, it has been empirically established that only negative stressors, which are *subjectively* rated as undesirable, increase distress or disorder (Zimmerman 1983a, Thoits 1986). At the minimum, the desirable and undesirable events should be measured separately (Sarason et al. 1978, Zimmerman 1983a).

It is important to note that the disease usually includes multiple situations to cope with, e.g., symptoms (the physical discomfort or psychological effect), prognosis, or changes in social activities (Dunkel-Schetter et al. 1992). Treatment of the disease, including both diagnostic and treatment procedures, is also a stressor or may include various stressors. In addition to the disease, the patients may have various other potentially stressful events or stressors in their lives.

Chronic strains are persistent conditions that require daily readjustment. These are ongoing states of psychological nature, which repeatedly interfere with the adequate performance of ordinary role-related activities (Thoits 1986). Chronic strains include poverty, marital conflict, parental problems, work overload, and chronic illness (Cohen & Wills 1985, Thoits 1986). Stressors disrupt routine activities either acutely or chronically and initiate the appraisal and coping processes.

Relations between the components in stress processes

The sociological theories of symbolic interactionism, role, and anomie have been proposed to be precursors of the social support theory (Stewart 1989). Conceptual interpretations about social support can also be derived from several psychological theories (including attribution, coping, social-exchange, social-comparison, and loneliness theories). All these theories encompass appraisal and helping, and are thus relevant to both social support and health care (Stewart 1989). One of them is the theory about coping, stress management.

Coping is a part of the processes of psychological stress which include 1) stressors, 2) appraisal and coping processes, and 3) outcome(s) of stress. These do not necessarily form a time continuum but are easily illustrated as one (for a visual presentation, see Appendix 1, figure by Folkman et al. 1991). In the primary appraisal, an individual appraises an encounter as involving harm, threat of harm, or challenge. If the encounter is appraised to be stressful, coping resources are evaluated during secondary appraisal after which coping responses may take place. The result of appraisal and coping processes is not constant, it may change by reappraisal. These appraisal and coping processes, in which stressors are sometimes included, form a complex system that describes how a person cognitively, emotionally and behaviorally "acts" when he/she meets a potentially stressful event. Social support for the patient emerges as a critical factor in coping, as does the presence of other stressors at the time of illness (Dolbeaut et al. 1999).

According to the buffering model, social support protects the individual from the potentially harmful effects of stress (Cobb 1976, Cohen & Wills 1985). In cancer this means that support from interpersonal resources protects the patient from the full onslaught of stressors produced by the disease experience (Blanchard et al. 1995). Thoits (1986) has illustrated coping processes and stress buffering processes of social support with an integrative model. In a more detailed way, Stewart (1989) describes the influence of social support on different stages of coping. The three types of cognitive appraisal mentioned above intervene between the encounter and reaction in the coping process (Stewart 1989, Folkman et al. 1991). There is no consensus regarding in which particular stage(s) in the coping processes the social support is operating. For instance, information provided by other people about stressors influences the primary appraisal: it may prevent the stress appraisal responses (Cohen & Wills 1985, Stewart 1989, Broadhead & Kaplan 1991). Social support may also intervene between the experience of stress and onset of outcome (Cohen & Wills 1985). Stewart (1989) proposes that support plays a major role in secondary appraisal when the individual assesses the potential coping resources: social support broadens the coping options perceived to be available, it offers resources, referrals to professional services, encouragement to seek assistance, provision of information and problem-solving techniques. Social support also provides norms about behavior, sets constraints on coping activities, affects self-perceptions, and enhances self-esteem. Furthermore, social support may influence reappraisal by inhibiting maladaptive responses or facilitating adaptive counter responses (Broadhead & Kaplan 1991).

Coping strategies typical for a person may be seen as a part of his/her personality. Personality is partly developed by the coping strategies the person learns to use. Anger expression – which has been considered the most powerful personality risk factor in cancer – has been proposed to influence coping. Type C behavior can be seen either as a personality pattern or as a coping behavior (Temoshok 1987), its key concept being emotional expression, particularly suppression of anger.

Recently, a model has been presented to guideline research in psycho-oncology (Dolbeaut et al. 1999). The model consists of three groups of factors: independent variables, mediating variables, and outcome variables. The independent factor evinced is cancer and its treatment. The mediating factors consist of four major categories of variables: 1) personal (including a wide variety of dimensions, i.e., sociodemographic factors, both personality and coping style, adjustment, and spiritual and religious beliefs), 2) medical (including illness-related behaviors, doctor-patient relationship, and treatment and rehabilitation factors), 3) social supports (including support from family and friends, community resources with spiritual aspects, and cultural affiliation), and 4) life stresses. The outcome is presented to consist of two kinds of factors 1) quality of life (physical, psychological, social, vocational, and sexual aspects) and 2) survival.

Here it is assumed that the impact of coping processes on symptoms and/or well-being (quality of life) is a continuous process and operates in interaction with personality factors, and, furthermore, that social support acts as a stress buffer and thus helps coping (Figure 1). The influence of coping on health outcomes is modified by personality factors and social support, and initiated or interfered by stressors. A mediating factor (here coping) and modifying factor(s) can also be separated empirically and statistically, as pointed out by Baron and Kenny (1986). The factors in the psychological stress processes and their interrelations are presented in Figure 1.

Well-being and quality of life

Outlined in the WHO definition, “health is not only the absence of infirmity and disease but also a state of physical, mental, and social well-being” (Constitution of the WHO 1952). As a consequence, ‘health’ should be defined and operationalized in a way that includes all the three dimensions of health: physical, mental, and social well-being (Moinpour et al. 1989, Osoba 1994, Velikova et al. 1999). These – with various levels

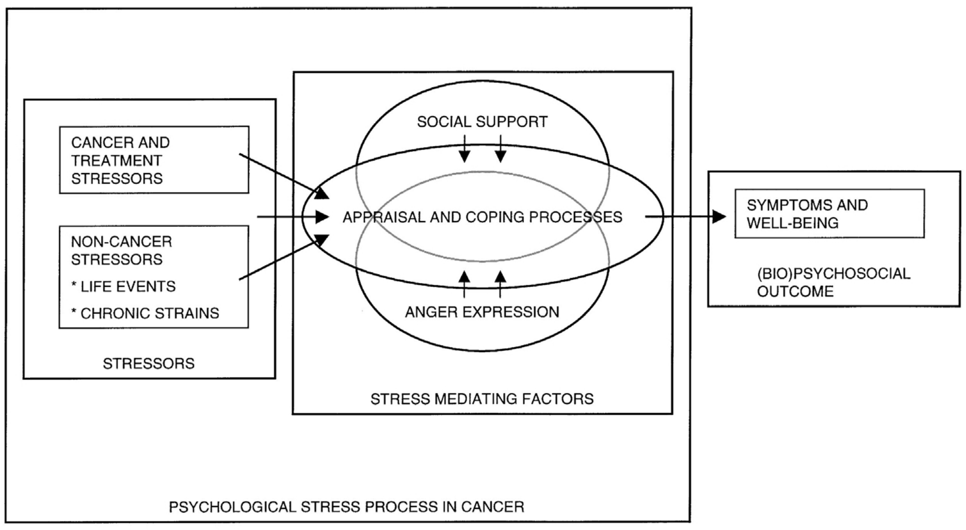

Figure 1. Psychological stress processes.

of emphasis and in various combinations – have been included in the broad concept of 'quality of life'. The growth rate of titles containing the phrase was in the early 1990s logarithmic, with a doubling time of 3 years, which, no doubt, reflected the rapidly increasing interest in the field (Osoba 1994).

In traditional biological oncological research, particularly in clinical trials, measurement of quality of life has increased rapidly over the past 10–15 years, and become common when the efficacy of new cancer treatments are investigated (Osoba 1999). Many clinical trials research groups routinely include quality of life assessment in their trials and several even claim that quality of life should be considered as a potential endpoint in all new clinical trials (Fayers et al. 1997). However, it has been argued that while the number of studies assessing 'performance status' has clearly increased, the number of studies adequately assessing 'quality of life' had not increased in four of the major oncological journals (Batel-Copel et al. 1997). This may reflect the difficulties in the definition and assessment of the concept.

In health research, the term 'quality of life' is often used in a more precise form as 'health-related quality of life'. The definitions of the concept and the subconcepts involved have varied, and – partly due to the conceptual difficulties – quite often quality of life has been defined operationally. The measurement of such an all-encompassing and subjective concept has become possible due to extensive contributions from behavioral, psychosocial, and health services researchers (Velikova et al. 1999). A decade ago, quality of life was defined as the "subjective evaluation of life as a whole" (de Haes 1988), or "the patients' appraisal and satisfaction with their current level of functioning compared with what they perceive to be possible or ideal" (Cella & Cherin

1988, Velikova et al. 1999). In his review, Osoba (1994) defined quality of life to be "a multidimensional construct encompassing perceptions of both positive and negative aspects of dimensions such as physical, emotional, social, and cognitive functions, as well as the negative aspects of somatic discomfort and other symptoms produced by a disease or its treatment". The definitions emphasize the subjective and evaluative nature of the concept as well as its multidimensionality (Velikova et al. 1999).

Osoba (1994) has outlined six 'lessons' learned from measuring health-related quality of life in oncological clinical settings: 1) Health-related quality of life is a multidimensional construct and should be measured with multidimensional instruments. Unidimensional instruments (physical performance, psychological well-being, or psychosocial adjustment to illness) are insufficient and should not be called quality of life measures. 2) Observers are poor judges of how patients feel about their health-related quality of life; it is the patients' opinions that should be sought. 3) It is possible to achieve high rates of compliance in the collection of self-report health-related quality of life data. 4) Aggressive cancer therapy may result in improved health-related quality of life. 5) Symptoms are associated with quantifiable disruptions in the quality of life; measurement of health-related quality of life provides information in addition to that provided by measurement of standard outcomes, such as survival and toxicity. 6) Pretreatment health-related quality of life status may predict the on-treatment status and survival. Velikova et al. (1999) concluded that, at minimum, quality of life instruments should include the key dimensions of physical functioning, disease and treatment related symptoms, psychological functioning, and social functioning. Attention has also been paid to the spiritual or existential concerns, sexual functioning, body-image, satisfaction with health care, and the doctor-patient relationship (Velikova et al. 1999).

In summary, health-related quality of life can, and in oncology should, be measured with multidimensional self-report scales, which, at minimum, include dimensions of physical, psychological, and social functioning. Along these, the disease and treatment related symptoms should be recorded. These measurements can provide important additional information on the patients' experiences of their health when compared to the traditional biological outcome measures.

A variety of self-report scales have been developed and used in cancer research to assess symptoms or quality of life of the patients (Moinpour et al. 1989, de Haes et al. 1990, Aaronson et al. 1993, Velikova et al. 1999). A large number of well-constructed and psychometrically valid quality of life questionnaires have been developed and are available for use with cancer patients. These include 1) measures of quality of life used for non-cancer medical patients, 2) instruments especially developed for cancer populations, and 3) cancer site-specific or treatment specific instruments. In some studies, questionnaires that measure specific dimensions in quality of life (such as anxiety or depression) have been added. The first instruments allow comparisons to be made across conditions, but may not focus on the area of specific interest. Disease-specific and site-specific instruments are less likely to do so, but are not comprehensive. Thus, some researchers recommend that quality of life in cancer should be measured with a general questionnaire supplemented by a site-specific or even 'trial-specific' module (Velikova et al. 1999).

The relatively new instrument of the European Organization for Research and Treatment of Cancer (EORTC) QLQ - C30 and its site specific modules have received growing attention. This modular approach was developed by the EORTC Study Group as an assessment tool to monitor the quality of life of patients entered into international clinical trials (Aaronson et al. 1988 and 1993). These measures are videly used and proved to have good validity and psychometric properties. As a whole, researchers may face difficulties in choosing between psychometric quality of life instruments because of the confusingly wide variety available.

Psychosocial factors in cancer research

Since the beginning of recorded medicine there has been an interest in the role of psychological and social factors in the onset and progression of cancer, among the most famous of these are the observation notes of the Roman physician Galenus. Since classical times clinicians have described certain personality attributes apparently characteristic of cancer patients as well as the occurrence of life crisis immediately preceding the appearance of cancer (Greer & Watson 1985, Gross 1989). The development of methodologically sound epidemiological designs in the 1950s started a renewed interest in this area. Further work in psycho-neuro-immunology throughout in the 1960s to 1990s demonstrated intriguing associations between the neuroendocrine system and psychosocial variables, as well as links between immunological functioning and malignant growth (Levy & Wise 1987, O'Leary 1990, Butow et al. 1999). Over the past 20 years, psychosocial oncology[2] has developed as one of the subspecialities of oncology, dealing with two psychological dimensions of cancer: 1) the patients', families', and health care professionals' emotional reactions to cancer and its treatment (can be referred to as 'psychosocial'), and 2) the psychological and behavioral factors that influence cancer risk and survival (can be referred as 'psychobiological') (Dolbeaut et al. 1999).

Since recently, the psychological, social, and spiritual dimensions of cancer were neglected in most countries; the focus of the care was almost totally on the biomedical aspects and the patients' psychosocial situation and/or problems were usually not addressed (Engel 1977, Dolbeaut et al. 1999). During the last two decades, interest in the 'human side' of the patients, i.e., more comprehensive care, has increased. One example of this is the emphasis on the concept of quality of life. Despite the fact that cancer is more treatable today than earlier and that the number of survivors is constantly growing, a cancer diagnosis still involves fear: the fear of death, pain, loss of independence or attractiveness, and the fear of suffering associated with progressive illness (Dolbeaut et al. 1999). There have been changes in attitudes,

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[2] Known both as 'psychosocial oncology' and 'psycho-oncology', depending on preference.

partly due to the fact that cancer has become a more common and more treatable disease, and that psychological issues are currently discussed more openly than earlier.

Since the mid-1980s a consensus has begun to emerge regarding which psychological factors or processes required further investigation (Baltrusch & Waltz 1985, Greer & Watson 1985, Pettingale 1985, Temoshok 1987, Gross 1989). The biological mechanisms and pathways of these processes have often been found to deal with psychological stress; various stressors, both in empirical and experimental studies, were shown to have a negative impact on immune functions (Levy & Wise 1987, O'Leary 1990). The prediction of an individual immune response must, however, take into account the psychosocial variables that appear to moderate responses, namely negative affects and their expression, cognitive style, and social support (Levy & Wise 1987).

Psychosocial factors and onset of cancer

For decades three major areas of psychosocial factors were continuously assumed to influence in the onset of cancer: 1) antecedent stressors, 2) antecedent depression, and 3) cancer-prone personality (Greer & Watson 1985). In more recent studies eight categories of psychosocial factors have been suggested to influence the development of breast cancer, namely anxiety/depression, childhood family environment, conflict-avoidant personality, denial/repression coping, anger expression, extraversion-introversion, stressful life events, and separation/loss experiences (McKenna et al. 1999). In contrast to many uncontrolled clinical observations, controlled studies often failed to show significant association between the frequency of stressful events in recent or remote past and diagnosis of cancer (Greer & Watson 1985). The issue has, however, been continuously studied and some positive associations have been detected (Ewertz 1986, Kviksted et al. 1994, Kvikstad & Vatten 1996, Johansen & Olsen 1997). In their recent meta-analysis, McKenna et al. (1999) found that stressful life events have a modest association with the development of breast cancer. Separation/loss experiences, which the authors did not include in life events, had an effect on development of breast cancer.

Clinical observations suggesting that depression precedes the appearance of cancer are common. However, because the date of the onset of cancer cannot be accurately determined, it has often been stated that the reported states of depression may have been caused by the malignant disease and not *vice versa*. Results of controlled studies on depression preceding cancer were contradictory (Greer & Watson 1985), and recent studies have disconfirmed these findings (McKenna et al. 1999).

Certain personality factors have been continuously claimed to have an effect in the onset of malignant disease (Greer & Watson 1985, Burgess 1987, Temoshok 1987, Gross 1989, Eysenck 1994). During the 1980s Type C personality pattern was introduced, see above. The most important of the personality traits investigated have been Type C related anger (non)expression and the trait of extraversion/introversion. Recently, either of these two was found to be capable of affecting the development of breast cancer (McKenna et al. 1999). Furthermore, the evidence concerning certain personality traits that have been supposed to be factors of the cancer-prone personality was contradictory. However, other characteristics, labeled either as personality traits or as coping styles, have also been examined in order to find an effect on the development of breast cancer, i.e., conflict/avoidant personality and denial/repression coping. Both of these have been found to have a modest association with the development of breast cancer (McKenna et al. 1999).

The development of cancer appears to result from a combination of risk factors such as genetic predisposition and physical imbalance, as well as from the possible role played by psychosocial factors, moderating and/or mediating the relationships between these factors. For example, genes that predispose to certain personality factors may also influence the development of cancer, or psychosocial factors may include characteristics that affect behavior or exposure to carcinogens (McKenna et al. 1999). In summary, only a moderate association between psychosocial factors and the development of e.g., breast cancer has been found. The hypothesis that breast cancer patients use a coping strategy based on denial/repression in response to life stressors, have experienced separation and loss, and have a history of stressful life experiences appear most promising (McKenna et al. 1999).

Psychosocial factors and progression of or adaptation to cancer

Since the 1950's, several psychological factors have been investigated in the context of cancer progression, but this research area also produced contradictory results, and often earlier findings could not be replicated (Gross 1989, Butow et al. 1999). Some prospective studies found no relationship between psychosocial factors and outcome of patients with cancer (Cassileth et al. 1988), while others reported that psychological factors predicted the outcome measured by the survival time (e.g., Spiegel et al. 1989). Longer survival time was found to be associated with fighting spirit (Greer et al. 1979), outgoing personality, i.e., the absence of Type C personality (Greer & Watson 1985, Temoshok 1987, Gross 1989), denial and the related concept of optimism (Greer et al. 1979), and low level of emotional distress and complaints (Butow et al. 1999). The classic study of this research area is that of Greer et al. (1979) with findings of adjustment styles of denial and fighting spirit leading to longer survival than those of stoic acceptance or helplessness/hopelessness. This study has recently been replicated (Watson et al. 1999), but only the helplessness/hopelessness factor was found to influence survival: patients with more helplessness/hopelessness response were more likely to relapse or die within five years.

Adaptation to cancer has been proposed to be affected by three variables: 1) life stage at which illness occurs, 2) person's interpersonal style or coping capacity, and 3) interpersonal resources (Rowland 1989). Interpersonal resources are important because they are a necessary feature of normal development, a major focus of illness-related disruptions (impact on interpersonal relations), important characteristics of interventions at all ages, and a powerful modifier of the capacity for coping. As in the area of stress and coping, research on the impact of social support on health has burgeoned during the last 20 to 25 years. This reflects increased public awareness of and research concern on the determinants that mediate stress and illness. Furthermore, the applied research tradition suggests that social support represents an area in which it is easiest, most effective, and most economical to intervene psychosocially (Rowland 1989).

In fact, social support has been widely studied as a factor with an impact 1) on the patient's psychological adjustment to cancer, 2) on the well-being outcomes, and 3) recently and inconclusively, on survival (Rowland 1989, Broadhead & Kaplan 1991, Blanchard et al. 1995). As in other fields of psychosocial cancer research, the study design deficiencies described above have also been common in social support research (Blanchard et al. 1995). The most important and indisputable finding has been the fact that patients who confide their fears and concerns to a close person – and feel that they have been heard and/or understood – feel better emotionally.

The relationship between social support and survival in cancer has also been studied (Blanchard et al. 1995). In breast cancer, emotional support has been found to be a protective factor predicting better survival among patients with localized disease but not with more advanced disease. Other authors have reported similar findings (e.g., Waxler-Morrison et al. 1991). Furthermore, the effect of psychosocial interventions on survival have been studied. Sometimes no effect has been found (Gellert et al. 1993), but recently psychosocial interventions have repeatedly been claimed to be capable of influencing the progression or survival of cancer (Spiegel et al. 1989, Fawzy et al. 1993 and 1995, Bottomley 1997, Fobair 1997a and 1997b, Iacovino & Reesor 1997). Studies on immune functioning as a factor capable of improving outcome in cancer have been contradictory (Blanchard et al. 1995).

The heterogeneity in the reported results may be due in part to the complexity of cancer itself, but there are also many methodological problems in the research on psychosocial oncology. These methodological shortcomings include at least 1) small and/or heterogeneous samples, 2) failure to control for stage, severity and symptomatology of cancer, 3) use of a single and/or simple assessment of psychosocial status, 4) inadequate definition and measurement of the psychosocial concepts, and 5) uses of inappropriate or improper statistical methods (Butow et al. 1999). Furthermore, qualitative research methods also provide valuable, and yet too rare, insight into the aspects of the subjective experiences of cancer patients, among them on experienced social support, or other disease or treatment issues (Johnson 1999).

AIMS AND HYPOTHESES

Main goals of the study

The study has three main goals, listed as follows:

I. To investigate the structure, definition, conceptualization, and methodology of social support in somatic health research and to present own implications of the former on the basis of data on newly diagnosed cancer patients. To develop a new measure of social support experienced by patients with a severe disease, the *Structural-Functional Social Support Scale (SFSS).*

II. To investigate factors in the psychological stress processes: coping with cancer, experienced social support, Type C personality related anger expression, and stressors, and to assess the predicting power of the other factors on coping with cancer in newly diagnosed cancer patients.

III. To evaluate psychological and physical symptoms and well-being of newly diagnosed cancer patients and to assess their connections with the psychological stress processes described in Goal II.

In what follows, the background hypotheses of the study will be described, and the detailed aims within each of the three main goals given above outlined.

Study hypotheses and specific aims

Goal I: Social support

It has been suggested that cancer diagnosis provides a useful context to examine social support processes (Dakof & Taylor 1990). Here the aim is to evaluate the various dimensions of social support experienced by cancer patients during 3–4 months after cancer diagnosis. In most studies social support scales are based on personal experiences; they measure functional social support reported by the respondents themselves. The sources of support (the social network, i.e., the social relationship from which the support is derived) are not generally evaluated together with functional support. The focus will be on the functional support because it has been found to promote psychosocial well-being and physical health in somatic diseases. On the other hand, the evaluation of the sources of support is essential, because functional support is derived from the social network of the patient. Furthermore, the structure of experienced support will be investigated: is it a general dimension or can it be divided into factors (e.g., functions) as has been reported (e.g., Cohen & Wills 1985), and are there differences between functions provided by different sources? If support from different sources can be empirically separated, it would probably mean that there are real differences in the support the patient gets from different sources. Finally, I will try to clarify the relationship between structural and functional aspects of support. For this purpose, a new measure, the *Structural-Functional Social Support Scale (SFSS),* has been devised. SFSS addresses both structural and functional aspects of social support experienced by patients with a chronic disease (Lehto-Järnstedt et al. 1999). The scale was created on the basis of the theoretical work by Cohen & Wills (1985), and the items in the functional part of the measure have been derived from the empirical work of Dakof & Taylor (1990).

The specific aims in Goal I are:

1) To describe the cancer-specific social network and the amounts of functional social support during the first months after cancer diagnosis: what specific sources of social support the patient has, and what kind and what amounts of functional social support are experienced from these sources.
2) To evaluate the validity and reliabilities of the new scale the *Structural-Functional Social Support Scale*. A validated scale should have respectable reliabilities (internal consistency, homogeneity). When validating a scale, one should know whether the new scale offers additional information to what can be obtained with earlier measures, and to what extent the results obtained correspond to those obtained with well-accepted previous scales addressing to the same phenomena. The new measure will be compared with two other quite different measures of social support.

Goal II: Psychological stress processes

The study hypothesis is that coping is a mediating factor in the stress-illness relationship and that social support and personality factors are modifiers which affect coping (Figure 1). Social support, coping, and personality together mediate the effects of stressors on health and illness. For a cancer patient there are three main categories of stressors: cancer-related factors (physical and psychological effects of the disease and its treatment), other stressful life events, and chronic stressful conditions (chronic strains). The mediating factor (coping) and the modifiers (social support and personality) together form a process that acts as a buffer of a psychosocial nature. All stressful stimuli go through these interacting psychological processes. Because the processes are continuous, the outcome is not constant and can change over time (Figure 1).

Social support, as a hypothetical stress buffer, is assumed to increase the use of adaptive coping forms with cancer. If more social support is present, it leads to more use of certain coping styles (e.g., more use of problem-focused, but not necessarily emotion-focused strategies). The personality factors affect or influence the coping processes. Cancer patients with dominant anger-in personality are supposed to use different kinds of (maladaptive) coping with their disease. The non-cancer stressor load affects – or interferes in – the coping processes with cancer. Goal II deals with factors in the psychological stress processes and associations between these factors in the case of newly diagnosed cancer.

The specific aims in Goal II are:

1) To describe the coping styles the patients have used and the amounts of different coping styles used with cancer during the first months after cancer diagnosis. To evaluate the personality trait anger expression, and to assess the amounts and intensity of stressors experienced shortly before or simultaneously to the cancer diagnosis.
2) To investigate, according to the presented hypothetical model, associations between these factors. To investigate the stress buffering qualities of social support (does experienced social support help in coping with cancer?) and to evaluate the effect of Type C behavior related anger expression and stressors in the process.
3) To find and test proper measures to evaluate the stress processes of cancer patients for the follow-up of these patients and for future studies.

Goal III: Symptoms and stress processes

If social support and personality factors are assumed to modify coping, which is the main mediating factor in the stress illness relationship; the three factors together mediate the effects of stressors on health and illness. The health of the patients can be operationalized as health related quality of life and/or experienced symptoms and psychosocial well-being of the patients. It is assumed that social support, coping with cancer, Type C related anger expression, and experienced cancer and non-cancer stressors affect the experienced well-being, psychological and/or physical symptoms, and quality of life of the patients.

The specific aims in Goal III are:

1) To describe and evaluate various psychological and physical symptoms and well-being of cancer patients 3–4 months after the diagnosis.
2) To investigate the connections between psychological stress processes, and symptoms and well-being, that is, how the psychological stress factors, alone and in different combinations, are connected with experienced symptoms and psychosocial well-being of newly diagnosed cancer patients.

MATERIALS AND METHODS

Patients

The basic material consisted of all 28–70 year old melanoma and breast cancer patients who were newly diagnosed and entered for treatment and/or follow-up to the Oncology Clinic of Tampere University Hospital (Finland) from June 1995 to May 1998 (melanoma) or from January to September 1996 (breast cancer)[3]. The oldest (> 71 years) and youngest (< 28 years) patients were excluded because social support has been reported to be different in different age groups. The patients had to have sufficient mental and neurological health status for a time-consuming and psychologically burdensome interview (no acute psychosis, not mentally retarded, no serious neurological disorders), and no previous cancer. Two breast cancer patients were excluded because of chronic schizophrenia, and one melanoma patient and two breast cancer patients because of previous cancer. One breast cancer patient and two melanoma patients were excluded because of being under 28 years of age. *In situ* melanomas were included because the treatment and follow-up procedures were similar to those of other melanoma patients. *In situ* breast cancers were excluded.

After exclusions the patient material comprised 84 melanoma and 126 breast cancer patients. As many as 86 % of these eligible melanoma patients and 82 % of the eligible breast cancer patients participated in the interview: the final material thus consisted of 72 melanoma patients (70 non-metastatic[4], eight had *in situ* tumor) and 103 breast cancer patients (102 non-metastatic). Half of the melanoma patients were males (36/72). In addition, there was one male breast cancer patient. The mean age was about 54 years for both melanoma and breast cancer patients.

Procedure

The same psychologist (the author) interviewed the patients according to a structural form approx. 3–4 months after cancer diagnosis. At the interview, the patients completed several structured questionnaires (listed below). The measures concerned social support (two questionnaires), coping with cancer (two questionnaires), Type C personality (i.e., anger expression), experienced non-cancer stressors (a questionnaire for both experienced life events and chronic strains), psychological and physical symptoms, well-being, certain breast cancer specific symptoms, and depression.

Because the previously validated measures were used as such, the time periods covered by different measures varied. Coping with cancer and experienced social

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[3] Nearly one third of these patients were over 71 years of age, they were not included in the basic material.

[4] The metastatic patients were taken for interview before it was known that the disease was not localized.

support were measured for the entire period after the diagnosis. Stressful life events were measured for one year preceding the interview. With a measure developed for the purposes of this study, chronic strains were measured from even a few years' time. Symptoms were measured for the previous week, breast cancer specific symptoms for the previous week (questions concerning sexuality for the previous four weeks), and depression for the previous month.

Sociodemographic variables, including age, marital status, number of children, number of members and income group of the household, patient's basic and occupational education, working status, and time since retirement, were also recorded.

The psychologist who was present when data were collected could change the content or duration of the interview, or even stop it, if it seemed to become overwhelming for the patient (all patients were still more or less in psychological crisis). Each interview lasted approximately two hours, varying from $1^1/_2$ to $4^1/_2$ hours (the longest ones were divided into two sessions).

Background factors on the disease and treatment were collected from hospital records. The ethical committee of Tampere University Hospital approved the research protocol. The researcher was bound by national (The Union of Finnish Psychologists) and international (American Psychological Association[5]) ethical codes of psychology.

Measures

List of measures

- Social support
  - Structural-Functional Social Support Scale (SFSS)[6]
  - MOS Social Support Survey (Sherbourne & Stewart 1991)
- Coping with cancer
  - Ways of Coping Questionnaire (WCQ) (Folkman & Lazarus 1988)
  - Coping With Illness Scale (CILL-26) (Julkunen 1996)
- Type C related anger expression
  - Anger Expression Scale (AX Scale) (Spielberger et al. 1985, 1994 and 1995a)
- Stressors
  - Life Experience Survey (LES) (Sarason et al. 1978)
  - Chronic Strains Survey (13 items)[7]
- Symptoms and well-being
  - Rotterdam Symptom Checklist (RSCL) (de Haes et al. 1990)
  - The Depression Scale (DEPS) (Salokangas et al. 1995 and 1996)
  - EORTC QLQ – Breast 23 Module (Aaronson et al. 1993).

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[5] Ethical Principles of Psychologists and Code of Conduct, can be found in internet: http://www.apa.org/ethics/code.html.

[6] Developed by Lehto-Järnstedt, Ojanen, Kilpikari and Kellokumpu-Lehtinen 1994–1999.

[7] Developed by Lehto-Järnstedt, Ojanen, Kilpikari and Kellokumpu-Lehtinen in 1994.

Social support

Structural-Functional Social Support Scale (SFSS)

The *Structural-Functional Social Support Scale (SFSS)* is a multidimensional social support scale which measures structural (social network) and functional aspects of social relationships experienced by patients with a severe disease, in this case cancer patients. The patients themselves are asked to evaluate the existence and amounts of support providers and support they have felt to receive. This new measure was compared with two validated and widely used social support scales: the *MOS Social Support Survey* (Sherbourne & Stewart 1991) and the *Ways of Coping Questioonaire*'s Seeking Social Support items (Folkman & Lazarus 1988). SFSS was developed for measuring experienced social support from different potential sources among people suffering from a severe physical disease or a chronic physical condition. The existence of cancer-specific social relationships and the structure of those relationships (cancer-specific social network) are evaluated because the network is the source of social support and thus essential for the existence of functional social support.

The SFSS focuses on two aspects of social relationships: 1) the existence and the amounts of cancer-specific sources of social support, and 2) the amounts of experienced support derived from these sources. (SFSS also measures whether the experienced support corresponds to the expectations of the patient; these results are reported elsewhere.) Thus, the measure has two parts: one deals with the network, i.e., the sources of support, and the other with the experienced functions of support from these sources. The first part can also be used separately. The scale is multidimensional and attempts to widely cover the most important disease associated aspects of social relationships and support. This potentially burdensome measure was used as a part of a psychological interview.

The scale was developed from the year 1994 in co-operation with the University of Tampere (Medical School, Department of Psychology, and Tampere School of Public Health) and Tampere University Hospital, Department of Oncology. So far the scale has only been applied to cancer patients.

The first part of SFSS, **cancer-specific social network,** measures the existence of potential sources of social support and the number of individuals in those sources. Patients are asked to indicate from a maximum of 10 groups of people the amount of persons they have discussed their disease. The sources investigated were: 1) spouse or partner, 2) other family members, 3) relatives (own or spouse's), 4) friends, 5) acquaintances, 6) other cancer patients, 7) physicians, 8) nurses, and 9) and 10) other significant (maximum two) relationships. The structural items of the SFSS are given in Appendix 2. It was decided not to measure social structure as a whole but to concentrate on the specific network, i.e., the sources of support associated with the acute crisis of cancer diagnosis, operationalized as people with whom the patients had discussed about the subject. The list of support sources found or used by other authors (Dakof and Taylor 1990) was supplemented by the source 'relatives' and two optional sources (other than those eight explicitly mentioned in the questionnaire). In Finnish culture, ‘family’ and ‘relatives’ are usually seen as two separate groups of people, family referring only to those living in the same household. However, the patient was allowed to decide who belonged to the family (e.g., whether adult children were included). Of physicians and nurses, only those who were involved in the treatment of cancer were included. In addition, the patients were asked to indicate whether they have experienced to have an important doctor-patient or nurse-patient relationship with some of the health care professionals. The optional sources were directed for patients with few “ordinary” social relationships and/or several important contacts with people in, e.g., working life, union activities, or health care organizations. A given relationship could be mentioned in one of the source groups only, the exception being the source ‘other cancer patients’ which was allowed to include relatives, friends and acquaintances who themselves had or had had cancer.

The second part of the scale, **functional social support**, addresses the functions of the support derived from the different sources presented above. It consists of a 10-item functional questionnaire on each of the sources mentioned by the patient. The items were ranked on a scale from 0 (not at all or not appropriate) to 4 (much). The same items were asked regarding each source. Thus the maximum score by a source is 10 x 4 = 40. If the patient did not have (that is: had not discussed with) some source or sources, the items regarding that source were not completed. If one source had multiple members (e.g., friends), the patient was asked to focus on the category as a whole when answering. In the introduction the patient was asked to think about experiences described in the items during the period from the diagnosis of cancer to the time of interview. The functional items of the measure were derived from the “specific categories of helpful actions”[8] of Dakof & Taylor (1990). The 10 categories represented the common social support taxonomy into emotional, informational, and practical support (five items on emotional support, three on informational support, and two on practical support). The categories were translated into Finnish, modified into items, and clarified to a certain extent. The shortened items are presented in Table 4. The psychometric properties, e.g., reliabilities, and different alternatives for dividing SFSS into subscales will be presented in the Results section.

The MOS Social Support Survey

The *MOS Social Support Survey* (Sherbourne & Stewart 1991) is a brief 20-item self-report scale for adult patients with chronic conditions, aiming at evaluating “recent thinking about the various dimensions of social support” irrespective of the source.

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[8] The categories of helpful actions (Dakof & Taylor 1990): 1) Esteem/Emotional support: – physical presence, – expressed concern, empathy, or affection, – calmly accepted patient’s cancer, – expressed a special understanding (because of being a similar one), – was pleasant and kind. 2) Informational support: – provided useful information, – is optimistic about prognosis or patient’s ability to successfully live with cancer, – acted as a positive role model. 3) Tangible (practical) support: – provided practical assistance, – provided (technically competent medical) care.

The items of MOS are presented in Appendix 3. In addition to the functional/perceived items, the scale contains a single-item structural support measure: ‘number of close friends and relatives’. Sherbourne and Stewart (1991) claim that MOS is capable of measuring four dimensions of functional support: emotional/informational, tangible (practical), affectionate, and positive social interaction. Affectionate support had not earlier been emphasized to be a distinct type of support. MOS has been validated in a sample of patients of four diseases: hypertension, diabetes, coronary heart disease, and depression.

The *MOS Survey* addresses aspects of support slightly different from those of the SFSS. MOS measures the support the patients evaluate to be available to them *if* needed (available or perceived support). The translation of MOS Survey into Finnish had been previously validated in a population-based study (Aalto et al. 1995). There has been some controversy whether the scale should be used as an overall index or divided into subscales, and what kind of division should be used (Sherbourne & Stewart 1991, Aalto et al. 1995). In spite of the note by the developers that their findings did not support the distinctness of, e.g., emotional and informational support, they recommend scoring and using the support subscales separately (Sherbourne & Stewart 1991). In our data the responses to the MOS items were skewed towards the positive end of the distribution, as also reported by the developers. This made it difficult to apply some statistical techniques to the MOS data. The internal consistencies of the MOS subscales ranged from .79 to .93 (Cronbach’s Alpha, Cronbach 1951, Bland & Altman 1997).

Coping with cancer

The *Ways of Coping Questioonaire* (WCQ) (Folkman & Lazarus 1988, Lazarus 1993) is derived from a cognitive-phenomenological theory of stress and coping which Lazarus and Folkman have developed since 1966, and it is based on an earlier version of the questionnaire named the Ways of Coping Checklist. The questionnaire has been primarily used as a research instrument rather than a test. It is a 50-item self-administered scale “to identify the thoughts and actions an individual has used to cope with a specific stressful encounter”. The items have been designed to be answered in relation to a selected, specific stressful encounter (Folkman & Lazarus 1988). In this study, the patients were instructed to answer in relation to any aspect of cancer. Individuals respond to each item on a 4-point Likert scale from 0 (does not apply/not used) to 3 (used a great deal).

The authors have divided the questionnaire into eight forms (scales) of coping: Confrontive Coping, Distancing, Self-Controlling, Seeking Social Support, Accepting Responsibility, Escape-Avoidance, Planful Problem Solving, and Positive Reappraisal. These forms comprise variations of the two basic functions of coping: problem-focused and emotion-focused coping (Folkman & Lazarus 1988, Lazarus 1990). By factor analysis it was not possible to identify the division of the WCQ scale into eight coping scales presented above. Furthermore, none of these coping scales, except the scale Seeking Social Support, had satisfactory reliability (Alphas ranging from .37 to .76).

Dunkel-Schetter et al. (1992) and Stanton and Snider (1993) have investigated coping structures in cancer by WCQ. In agreement with them, five patterns of coping were identified: Focusing on the Positive, Distancing, Seeking Social Support, Cognitive Escape-Avoidance, and Behavioral Escape-Avoidance. The contents of the identified coping patterns and factor loadings of items are presented in Appendix 4. The homogeneities were satisfactory, ranging from .62 to .83.

In addition, the sum categories 'problem-focused' and 'emotion-focused' coping strategies were used. The 'problem-focused coping strategies' consisted of Lazarus and Folkman's coping styles Confrontive Coping, Seeking Social Support, and Planful Problem Solving (18 items), 'emotion-focused coping strategies' of the styles Distancing, Self-Controlling, Escape-Avoidance, and Positive Reappraisal (28 items). Accepting responsibility was excluded from further analysis because of weak homogeneity and validity. 'Problem-focused coping strategies' and 'emotion-focused coping strategies' had good or satisfactory reliabilities (Alphas .82 and .69, respectively).

Coping with illness was also measured by *Coping With Illness Scale (CILL-26)* proposed for studies of coping with major life crisis and severe illnesses (Julkunen 1996). As recommended by the author, 21 of the original 26 items of the scale were used, each item being measured with a 5-point scale from 5 (totally agree) to 1 (totally disagree), the mid-point 3 indicating that the patient cannot say. The scale was divided into five subscales: Optimistic persistence (the old concept of 'denial') (Alpha .70), Resignation (Alpha .78), Withdrawal (Alpha .73), Avoidance-repression (Alpha .69), and Re-orientation (Alpha .56). The factorial structure of the scale was similar to that presented by Julkunen (1996). The measure is two-dimensional; Optimistic persistence *versus* Resignation on one hand and Avoidance *versus* Approach on the other hand have been presented to be two ends of the same dimension (Julkunen 1996).

Type C related anger expression

The *Anger Expression (AX) Scale* (24 items, each with a 4-point scale) (Spielberger et al. 1985) was used to measure personality factors in the context of the theory of cancer prone Type C personality: a personality trait that tends to suppress feelings of anger (Greer & Watson 1985, Temoskok 1987). The *AX Scale* refers to "the extent that an individual engages in aggressive behaviors when motivated by angry feelings" and taps two relatively independent underlying dimensions: anger-in and anger-out traits. It has been developed to assess individual differences in anger expression, not so much the intensity of the expression of anger at a particular moment of time (Spielberger 1985, Spielberger et al. 1985, Spielberger & Sydeman 1994, Spielberger et al. 1995a and 1995b). In factor analysis the AX Scale was divided into 'Anger-in' (8 items, Alpha .89) and 'Anger-out' (6 items, Alpha .75) subscales[9] as reported in coronary heart disease

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[9] Spielberger et al. have reported Alphas of .81 – .84 in 'Anger-in' scales and .73 – .75 in 'Anger-out' scales.

by Spielberger and collaborators. Only six clear anger-out items were obtained in factor analysis, while Spielberger et al. (1985) reported eight. In addition, 'Anger control' factor was identified (5 items, Alpha .68), in coherence by Spielberger et al. (1985, Julkunen 1996).

Stressors

The patients reported their stressful life events in the year preceding the interview by means of the *Life Experience Survey (LES)* (Sarason et al. 1978). Because the measurement took place 3–4 months after the diagnosis, some reported events had taken place simultaneously or after the discovery of cancer. LES is a 50-item self-report scale assessing life stress, operationally defined in terms of self-reported life changes and physical illness. LES allows respondents to indicate events experienced during the past year. (Examples of the events can be found in Table 17.) Furthermore, the format of LES calls for subjects to rate separately the desirability and the evaluated impact of events (the weighted score) at the time of occurrence they have experienced. Ratings are on a 7-point scale ranging from –3 (extremely negative) to +3 (extremely positive). LES also included one item concerning the impact of 'major personal illness' (here cancer diagnosis).

The more persistent stressors were evaluated by the *Chronic Strains Survey* (13 items). This measure was developed for the purposes of this study. Its items concern, among others, the presence of economic and social difficulties, strains in work life, alcohol or drug abuse, and other chronic diseases (of the patient or of a family member). The patients indicate whether they have experienced the strain mentioned. Furthermore, the subjective burden of each of the strains experienced is evaluated with a scale from 1 (mildly burdensome) to 3 (extremely burdensome).

The potential stressors related to the biological nature of the disease and its medical treatments were taken from the hospital records, e.g., cancer type, stage, and treatments.

Symptoms and well-being

For measuring symptoms perceived by the patients, the *Rotterdam Symptom Checklist (RSCL)* (de Haes et al. 1990) was used. This was developed to measure the symptoms reported by cancer patients in the framework of clinical research. This self-report scale includes 30 separate symptoms the patients may have experienced during the last three days or a week. (Examples of the symptoms can be found in Table 19.) The patients were asked to indicate the symptoms during the week preceding the interview. RSCL measures both psychological and physical symptoms, each with a 4-point scale ranging from 0 (not at all) to 3 (very much)[10]. In addition, the 'perceived quality of life' of the patients is evaluated by a single-item index, with a 7-point scale between 1 (poor) to 7 (very good). The RSCL total scale had high homogeneity: Cronbach's Alpha was

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[10] Some versions of the scale use the range from 1 (not at all) to 4 (very much).

.90. In factor analysis RSCL was divided into several factors concerning different physical symptoms (Alpha of these together .85), and to a factor of eight psychological symptoms (Alpha .89)[11].

Depression. The *Depression Scale (DEPS)* was developed for screening of depression in Finnish primary health care settings (Salokangas et al. 1995 and 1996). It is an easily adjustable self-report scale with 10 items[12], each with a scale between 0 (not at all) to 3 (extremely), the total potential range being thus 0–30. The questions covered the previous month. DEPS had a good reliability (Alpha .88). The authors have recommended a cut-off point of 9, the result of 9 or more indicating a possible clinical depression (a need for additional examination).

Breast cancer specific symptoms. Breast cancer patients completed the *EORTC QLQ-BR23* questionnaire (Aaronson et al. 1993). (Examples of the breast cancer specific symptoms used can be found in Table 21.) *EORTC QLQ-BR23* is the breast cancer module of EORTC (The European Organization for Research and Treatment of Cancer) QLQ-C30 quality of life questionnaire. The *QLQ-BR23* comprises 23 questions with a 4-point scale between 1 (not at all) to 4 (very much) assessing "disease symptoms, side-effects of treatment (surgery, chemotherapy, radiotherapy and hormonal treatment), body-image, sexuality, and future perspectives". It covers the matters of body-image and sexuality more widely than non-specific quality of life measures. The whole scale as well as the 'breast area symptom' items had reasonable homogeneities (Alphas .73 and .71). Four of the items concerned body-image with a good homogeneity (Alpha .84).

Statistical analyses

In this work the relationships between variables in psychological stress processes – with some sociodemographic and medical variables – were explored in a cross-sectional design. Differences between the subgroups were explored using independent samples t-test for equality of means. Adequate psychometric procedures were applied to study the structure of the data by the questionnaires and their subscales used. Explorative factor analyses were undertaken to investigate the empirical structure of the measures (Mulaik 1972). Internal consistencies of the scales were analysed by Cronbach's Alpha (Bland & Altman 1997). Associations between the variables in the stress process were explored using the Pearson correlation. Multivariate regression techniques were undertaken – on the basis of the correlation analyses and the theoretically based hypothesized connections of the variables – using stepwise regression analyses (Krzanowski 1988, Draper & Smith 1998).

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[11] De Haes et al. have reported .71 – .88 in 'Physical symptoms', and .88 – .94 in 'Psychological symptoms'.

[12] The items were: 1) Suffered from insomnia, 2) Felt blue, 3) Felt everything was an effort, 4) Felt low in energy or slowed down, 5) Felt lonely, 6) Felt hopeless about the future, 7) Not got any fun out of life, 8) Had feelings of worthlessness, 9) Felt all pleasure and joy have gone from life, and 10) Felt that cannot shake off the blues even with help from family and friends.

RESULTS

Sociodemographic factors

The mean age was respectively 55 years and 54 years for melanoma and breast cancer patients, but the range was wider in melanoma (SDs 12.1 and 8.5, respectively). Female melanoma patients were slightly younger than males (mean ages 51 and 58 years) (Table 1). About 70 % of the patients were married or cohabiting, 13 % were divorced, 11 % were single, and 7 % widowed. Half were employed, every tenth was unemployed (6 % in melanoma, 14 % in breast cancer), and about one-third were retired (43 % in melanoma, 31 % in breast cancer). The most common income groups of the household were 100,000–149,000 FIM/year (27 %) and < 100,000 FIM/year (26 %). Over half of the patients had been educated only at elementary school (6–9 years), one-fourth had lower secondary education, and about 20 % had completed upper secondary school (12+ years at school, potentially leading to university studies). One-fourth had no occupational education, one-fifth had a college qualification, and 11 % had some university education (4 % had a university degree). Nearly half of the patients lived in a town with over 190,000 inhabitants (city area of Tampere), one-fifth in some other town, and only slightly more than a tenth in rural areas. Seventeen percent had no children, 60 % had one or two children. About one-fifth (22 %) of the patients were living alone, the mode (by 43 %) was a two-member household.

Tumor type and treatment

Tumor type and stage. In melanoma, Clarke's classification was identified in 69 of the 72 patients. Clarke's category was I ('in situ' tumor) in 11 % (8 cases), II in 24 %, and III in 40 % of the melanomas. Twenty-one percent of the melanomas were identified to have Clarke's classification of IV or V (18 % classification IV and 3 % classification V). Breslow's classification (tumor thickness in mm) was identified in 82 % of the patients and had a mean of 1.80 mm (in men 2.00 mm and in women 1.56 mm) and SD 1.69. The median was 1.10 (in men 1.45 and in women 1.00), mode 0.50 (in men 1.00 and in women 0.50), and range from 0.2 to 7.0 mm (Table 2).

Of the breast cancers, 72 % were ductal and 19 % lobular carcinomas. When detected, two-thirds (67 %) of the breast cancer patients had a localized disease, and 33 % had axillary lymph node metastases (one had also distant metastases). The tumor stage was I in 55 % of the cases, II in 40 %, and III in 4 % of the cases. The tumor was well differentiated (grade 1) in 46 %, moderately differentiated in 38 %, and poorly differentiated in 15 % (undetermined in 17 patients). The tumor biological aggressiveness score (Kallioniemi et al. 1991) was 1 in 40 %, 2 in 36 %, and 3 in 24 % (undetermined in 12 patients). Eighty-six percent of the tumors had estrogen receptors, and 68 % had progesterone receptors (Table 2). More than half (56 %) of

Table 1. Sociodemographic variables of patients by cancer type.

	Melanoma (n = 72)			Breast cancer (n = 103)		
Variable	%	M	SD	%	M	SD
Age, years		54.6	12.1		54.1	8.5
Number of children		1.9	1.4		1.8	1.1
Number of persons in the household		2.4	1.2		2.3	1.1
Gender						
Male	50			1		
Female	50			99		
Place of residence						
Big city[1]	40			45		
Town	19			24		
Township	18			20		
Rural area	15			11		
Not known	7			–		
Basic education						
Elementary school	53			47		
Lower secondary	22			21		
Higher secondary	17			19		
Not known	8			13		
Occupational education						
None	26			23		
Labor school	43			38		
College qualification	18			22		
University education	7			13		
Not known	6			3		
Work status						
Employed	47			54		
Unemployed	6			14		
House mother/father	4			1		
Retired	43			31		
Marital status						
Single	10			12		
Married or cohabiting	72			68		
Divorced	10			15		
Widowed	8			6		
Annual income group of the family (FIM)						
< 100,000	24			27		
100,000 - 149,000	29			26		
150,000 - 199,000	18			19		
200,000 - 249,000	11			15		
250,000 - 299,000	7			5		
300,000 +	4			5		
Not known	7			3		

[1] Over 190,000 inhabitants.

the patients were recorded to have another severe or chronic disease, and 59 % were reported to use some medication regularly. Forty-one percent of breast cancers were detected in breast cancer screening mammography.

Treatment. Surgery was the primary treatment for all patients. The breast cancer operation had been radical mastectomy (the whole breast had been removed) in 41 % of the cases, and 59 % had a breast conserving surgery. In melanoma, the local tumor removal was done according to the general guidelines depending on tumor thickness (Clarke's and Breslow's classifications), usually a second, larger surgical operation took place after the melanoma was diagnosed in the biopsy specimen of the first operation. The non-metastatic melanoma patients came to the outpatient ward only for follow-up: they would visit the oncology department every three or four months after primary surgery. More than one-fourth (27 %) of the breast cancer patients came just for follow-up. The remaining patients received or had received adjuvant treatments: 69 % were treated with radiotherapy, 24 % with chemotherapy (usually with radiotherapy), and 24 % with hormonal therapy[13] in addition to the other treatments. The breast cancer patients with adjuvant treatments visited the department regularly because of radiotherapy (usually five times a week, total five weeks) and/or chemotherapy (usually a visit every third week, six cycles altogether). Only few melanoma patients (n = 6) received adjuvant interferon treatment[14] (Table 2).

Social support

The Structural-Functional Social Support Scale (SFSS*)*

Sources of social support

The majority of the patients were married or cohabiting (72 % in melanoma, 68 % in breast cancer) and 11 % were dating regularly. They all had discussed their cancer disease with their partner. The mean duration of the partnership was 19 years (SD 15). Most patients also discussed their disease with other people, the proportion varying from 96 % for relatives in breast cancer to 60 % (56 % in women, 64 % in men) with other cancer patients in melanoma (Table 3). Breast cancer patients talked more frequently than melanoma patients with acquaintances and other cancer patients. When family members, relatives, and friends were considered together as 'close relationships', breast cancer patients had had significantly more contacts with these (mean 16.5 in melanoma, 23.4 in breast cancer, p = .003). Only two patients had not told about or discussed their disease with intimate relations. One patient actively avoided telling anyone about his melanoma.

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[13] Hormonal treatment was conducted with tamoxifen which is an antiestrogen hormone. Tamoxifen-associated side effects range from hot flushes, vaginal dryness, and associated dyspareunia with reduced libido, to insomnia, depression, ocular irritations, gastrointestinal symptomatology with nausea, and weight gain (Ragaz 1997).

[14] Interferon treatment may have neuropsychological side-effects (Jones & Itri 1986, Dorr 1993).

Table 2. Disease variables of patients by cancer type.

2A Melanoma (n = 72)

Variable	%
Breslow's classification	
mm (M 1.80, SD 1.69)	
Clarke's level	
I	11
II	24
III	40
IV	18
V	3
unidentified	2
Stage	
I	97
II	1
III	1
Metastases	
None	97
Regional	1
Distant	1
Treatment [1]	
Operation only	94
+ Radiotherapy	–
+ Chemotherapy	3
+ Hormonal therapy	–
+ Interferon therapy	4

[1] Some patients received several adjuvant treatments.

2B Breast cancer (n = 103)

Variable	%
Histologic type	
Ductal carcinoma	72
Lobular carcinoma	19
Stage	
I	54
II	39
III	4
undetermined	2
Grade	
1	39
2	32
3	13
undetermined	17
Biological aggressiveness [1]	
1	35
2	32
3	21
undetermined	12
Hormone receptors	
Estrogen receptors	86
Progesterone receptors	68
Metastases	
None	67
Regional	33
Distant	1
Treatment [2]	
Operation only	27
+ Radiotherapy only	31
+ Chemotherapy	24
+ Hormonal therapy	24
+ Interferon therapy	–

[1] By Kallioniemi et al. (1991).
[2] Some patients received several adjuvant treatments.

Physicians and nurses were the sources with whom all patients had discussed during the treatment (Table 3). More than half of the patients reported they had had an important doctor-patient relationship (asked by a dichotomy yes/no) during the treatment (56 % in melanoma, 68 % in breast cancer), and about one-third had had an important nurse-patient relationship. Only 65 patients (37 %) (21 in melanoma and 44 in breast cancer) had discussed with all sources (from spouse to nurses) mentioned in the scale.

One-third of the patients had discussed with people from the source 'other significant relationships' (source categories 9 and 10 in SFSS). These included members from work groups, hobby groups, and different kinds of organizations, and individuals offering professional help (e.g., psychosocial help including clergy or health care professionals who had treated some other disease). Only three patients had a second 'other significant relationship' (it was possible to indicate two of these); these were excluded from further analyses. The proportions, means, standard deviations and ranges of the numbers of individuals in each source group of social support are presented in Table 3.

Table 3. Percentage and mean number of people with whom patients had discussed their disease, by cancer type.

Source of support [1]	Melanoma (n = 72)				Breast cancer (n = 103)			
	%	M	SD	Range	%	M	SD	Range
Spouse or partner [2]	83				79			
Family members	67	1.7	1.84	0 - 9	69	2.1	2.68	0 - 13
Adult children (>18 yrs.)	44	0.8	1.24	0 - 6	55	0.9	0.96	0 - 3
Other family members	24	0.3	0.71	0 - 4	22	0.5	1.13	0 - 6
Relatives	93	10.4	9.82	0 - 50	96	15.1	13.34	0 - 71
Children + families	28	0.9	2.76	0 - 20	33	1.6	3.15	0 - 21
Parents	49	0.9	1.23	0 - 4	42	0.7	0.95	0 - 4
Siblings + families	83	6.1	7.29	0 - 41	85	9.9	11.15	0 - 54
Aunts, uncles + families	47	1.7	2.83	0 - 15	56	2.3	3.24	0 - 15
Other relatives	17	0.8	2.82	0 - 20	12	0.6	2.98	0 - 21
Friends	86	4.4	4.09	0 - 19	91	6.2	5.63	0 - 36
Close friends	67	2.0	2.19	0 - 10	80	2.6	2.45	0 - 10
Other friends	57	2.4	3.21	0 - 15	69	2.6	4.64	0 - 30
Acquaintances	68	mode 0			87	mode 5 - 10		
Other patients	60	mode 1 - 2			95	mode 1 - 2		
Physicians	100	4.4	1.86	2 - 14	100	4.7	1.47	2 - 9
Nurses	100	mode 5 - 10			100	mode > 10		
Other significant relationships 1	32	2.1	7.18	0 - 50	38	4.7	10.52	0 - 70

[1] The number of members in each source of support is given by exact number. However, the numbers of Acquaintances, Others with cancer, and Nurses were measured with a classified variable. Acquaintances: 0, 1-4, 5-10, 11-20, and more than 20 acquaintances. Others with cancer: 0, 1-2, 3-5, and more than 5 patients. Nurses: less than 5, 5-10, and more than 10 nurses.

[2] All patients with spouse or partner had discussed with them.

Experienced functional social support

There are two different ways to calculate the means and distributions for the sums of the functional items: 1) to use the sources as subscales (total support from each of the sources measured), or 2) to use the item sums (item 1 from each of the sources, item 2 from each of the sources, etc.) as subscales.

The latter is similar to the way that is, implicitly, used in the functional social support scales which do not take the source into account. The average amount of experienced support by items (summed over the sources: the item sums) is shown in Table 4. The homogeneities of these scales (Cronbach's Alpha) were not satisfactory. In different sources the items concerned different things. It appeared that breast cancer patients had experienced significantly more support measured by nearly all items than melanoma patients (Table 4). All the item sums correlated highly significantly with each other, Pearson correlation (r) varied from .26 (between items 'take part in the care' and 'is optimistic') to .90 (items 'express concern, empathy, or affection' and 'understands really'), p value at least .01, usually < .001.

When the functional subscales are established according to the sources of support (the first way above), there are two ways to present the proportions. One can either 1) take into account every patient irrespective of whether they mentioned the source or

Table 4. Mean social support scores (with SD, range, and homogeneity) of the functional item sums in SFSS by cancer type.

Functional item [1] sums	Melanoma (n = 72)				Breast cancer (n = 103)				Sig. [2]
	M	SD	Range	α [3]	M	SD	Range	α	
1. Spend time with	14.9	4.70	3 - 30	.50	16.8	3.85	7 - 27	.28	.005**
2. Is optimistic	21.2	5.40	9 - 36	.40	24.2	5.50	9 - 36	.59	.001***
3. Provide information	13.6	5.45	3 - 27	.63	16.6	5.16	7 - 30	.65	.001***
4. Help with practical matters	10.0	5.82	0 - 26	.68	12.8	5.50	1 - 27	.59	.002**
5. Understand really	20.4	5.51	4 - 34	.52	23.6	5.26	9 - 36	.57	.001***
6. Express concern, empathy, or affection	19.9	5.66	3 - 35	.52	22.3	5.20	9 - 36	.53	.005**
7. Act as a role model	13.6	6.75	1 - 30	.73	15.4	7.90	0 - 32	.82	ns [4]
8. Is pleasant and kind	23.1	5.14	8 - 33	.42	25.9	4.81	0 - 29	.46	.001***
9. Take part in the care	10.2	3.87	4 - 23	.54	11.5	5.03	0 - 29	.63	.045*
10. Accept patient's cancer	22.5	6.23	3 - 36	.61	26.8	5.35	9 - 36	.56	.001***

Note. These descriptives have been counted from the sums of the items over all nine sources of support. Maximum score 9 x 4 = 36. The items were derived from the 'categories of helpful actions' by Dakof & Taylor (1990).

[1] The shortened translations of the Finnish items.

[2] p-value of t-test for equality of means between the two cancer types.

[3] Cronbach's Alpha for internal consistency.

[4] Statistically non-significant.

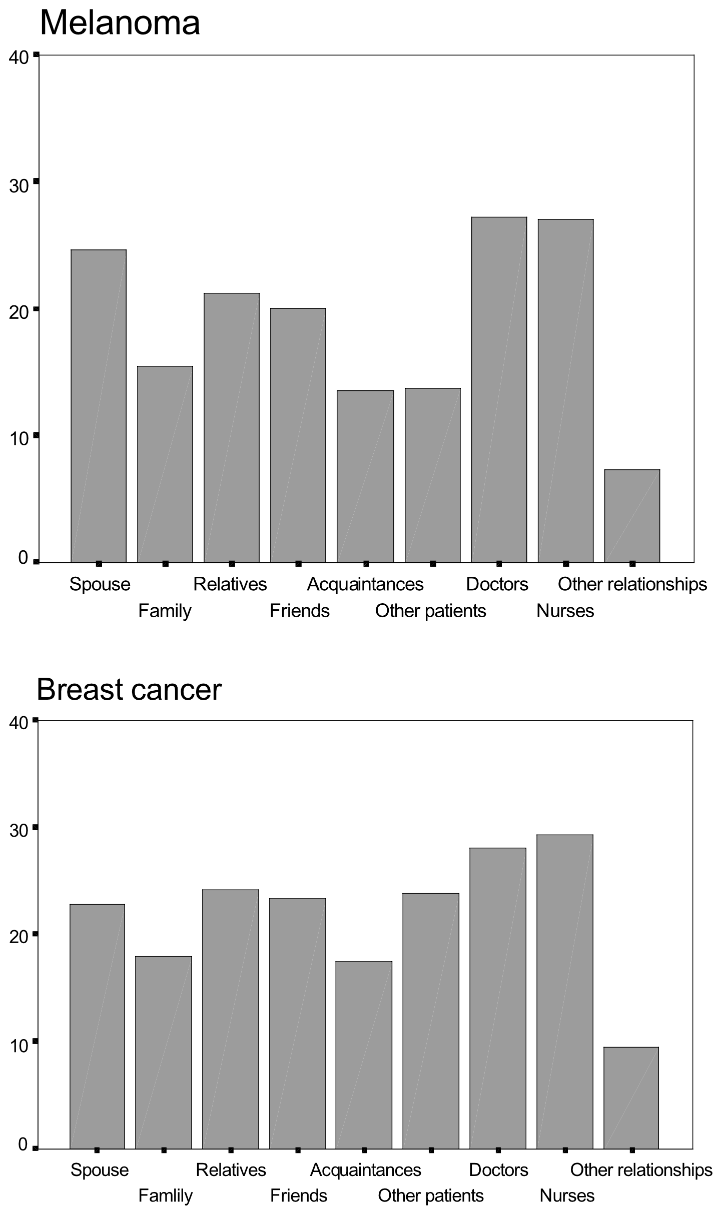

Figure 2. Mean scores of experienced functional support by sources in SFSS (all patients, irrespective of whether they had the source of support or not).

not (Figure 2), or 2) include only those patients reporting the given support source (Table 5). The first way gives information about the total amount of support reported in the study material, the second about the distribution of the support within the given source. Both ways were used to analyze different dimensions of the social support phenomena.

Table 5 shows the proportions of experienced support by source over all ten items (possible range 0–40). Figure 2 shows the average support from different sources among all patients, i.e., when the patient did not have the source in question, the items were scored as 0. There is a clear difference in the amount of support experienced from different sources. However, when taking into account only those patients having the source in question (Table 5), the differences between different sources were small, indicating that the differences demonstrated in Figure 2 are mainly due to the mere existence of the source. The existence of the source (structural support) seems to be enough to produce experience of support.

When the amount of experienced support was evaluated among all patients, most support was, somewhat unexpectedly, experienced from physicians and nurses. When the evaluation was restricted to those having the source, the highest amount of support was received from the spouse or partner; still, in breast cancer, physicians and nurses were experienced to give as much support as the respondent's own partner. Acquaintances were the only source that was clearly less supportive than the rest of the source groups. Doctors and nurses were the only sources that were always present. The internal consistencies (Cronbach's Alpha) were quite high (Table 5), and were not affected by the type of cancer, except for physicians and nurses, for which the melanoma group showed smaller but still satisfactory homogeneities.

Table 5. Mean social support scores (with SD, range, and homogeneity) by sources of support in SFSS by cancer type.

Source of support	Melanoma (n = 72)					Breast cancer (n = 103)				
	n	M	SD	Range	α[1]	n	M	SD	Range	α
Spouse or partner	60	29.6	6.49	6 - 40	.79	80	29.0	6.33	13 - 40	.81
Family	48	23.2	7.50	9 - 37	.77	70	26.0	6.52	13 - 39	.82
Relatives	67	22.8	5.87	8 - 37	.80	97	25.2	5.84	11 - 38	.80
Friends	62	23.2	5.26	12 - 38	.74	91	25.6	5.47	15 - 40	.80
Acquaintances	49	19.8	6.04	8 - 39	.83	86	20.1	5.18	8 - 37	.81
Other patients	43	22.7	5.64	11 - 35	.84	94	25.1	5.24	6 - 36	.78
Physicians	72	27.1	4.79	17 - 38	.69	99	28.1	5.79	14 - 40	.79
Nurses	72	26.9	5.73	16 - 39	.75	99	29.2	6.33	10 - 40	.85
Other significant relationships	23	22.4	6.65	4 - 30	.84	39	24.6	6.06	14 - 40	.84

Note. These descriptives have been counted only from the patients with this source of support. Scale from 0 to 40 in every source: 10 items with a scale from 0 (not appropriate or not at all) to 4 (much).

[1] Cronbach's Alpha for internal consistency.

Differences in support between subgroups

Treatment. The differences in social support observed between melanoma and breast cancer patients may, at least partly, be related to different treatments. Breast cancer patients experienced more support from their relatives ($p < .05$) and friends ($p < .01$) than melanoma patients. However, when the differences in support between treatment groups were tested (operation only *versus* operation plus adjuvant treatment), patients with "less" treatment reported less support. The patients with adjuvant treatment(s) had discussed their disease with a much greater number of acquaintances, other patients, and nurses (ANOVA $p < .001$), with a greater number of relatives ($p = .030$) and friends ($p = .011$) and, of course, with a greater number of physicians ($p < .05$) than patients with operation only (Table 6). They had also experienced more support from relatives, friends, and acquaintances ($p < .05$), and especially from other patients ($p = .001$) and

Table 6. Differences in cancer specific network (mean number of people) and in social support (mean of experienced amount of support) by cancer treatment.

Social network/ social support	Treatment [1]		Sig.[2]
	Operation only (n = 98)	Adjuvant treatment (n = 73 – 76)	
Social network [3]			
Family members	2.2	1.6	ns [4]
Relatives	11.4	15.4	.030*
Friends	4.6	6.6	.011*
Acquaintances	1.5	2.3	.001***
Other patients	0.9	1.8	.001***
Physicians	4.3	4.9	.029*
Nurses	2.0	2.7	.001***
Social support			
Spouse or partner	22.5	24.8	ns
Family	16.4	17.4	ns
Relatives	21.8	24.4	.028*
Friends	20.6	23.6	.039*
Acquaintances	14.4	17.6	.023*
Other patients	16.3	23.9	.001***
Physicians	27.6	27.8	ns
Nurses	27.0	30.0	.002**
Other significant relationships	7.2	10.1	ns

[1] As a dichotomy: patients with operation only versus patients with operation plus adjuvant treatment.
[2] p-value of t-test for equality of means, ANOVA-significance in number of acquaintances, other patients, and nurses.
[3] Number of people in a given source the patients had discussed their cancer.
[4] Statistically non-significant.
* Significant at the .05 level, ** significant at the .01 level, *** significant at the .001 level.

nurses (p = .002), than those patients who had only had surgery. In the breast cancer group, patients undergoing combined treatment had experienced more support from family members (p = .031) and spouse (p = .044) than those with operation only. The breast cancer patients whose disease was classified to be stage II or higher experienced more support from their relatives (p < .45).

Gender (melanoma only). In terms of the structural variables, the only gender difference was that female melanoma patients had discussed more with their parents (own or spouse's) than had male patients (p < .05). In functional support, female patients had experienced slightly more support from friends than males (p = .057), while male patients experienced more support from health care professionals in general (p = .030).

Sociodemographic and economic status. The age of the patient was a determinant of the social structure, i.e., the measured differences were explained by life cycle factors: younger patients had younger children and were more likely to have living parents, whereas older patients had more other relatives with whom to discuss their cancer disease. Despite the greater number of members in the sources, older melanoma patients had experienced less support from relatives (p = .001) and friends (p = .004) than the younger ones. In breast cancer, older patients had discussed with a greater number of intimate relations (family members, relatives, and friends, all together) but experienced less support from family and close relationships than younger patients (p < .05).

Working status affected the amount of support: those who were employed experienced more support from family, relatives and friends than those who were not. In melanoma, more support from relatives (p = .017) and friends (p = .047) was reported by the employed patients than by those who were not employed. In breast cancer, those who were employed had discussed with a greater number of relatives (p = .014), and experienced more support from family (p = .046) than those who were not in working life.

The income group of the household was associated with the experienced support. In melanoma, increase in income was weakly associated with support from family (ANOVA p = .028). In breast cancer, increase in income increased the experienced support from spouse (p < .001), from all close relationships taken together (p = .041), and from 'other significant relationships' (source 9) (p = .034).

Content of support from different sources

The average amounts of functional support by items in SFSS from different sources of support, by cancer type, are presented in Table 7. These figures were calculated for all patients irrespective of whether they had the source in question or not. There were slight differences between the functions of support derived from different sources. Overall, in most sources most functional support was experienced by item 2 (is optimistic), item 8 (is pleasant and kind), and item 10 (accept patient's cancer), followed by item 6 (express concern, empathy, or affection). For friends, acquaintances, other patients, and other significant relationships item 5 (understand really) was among the most highly ranked items (Table 8). For physicians and nurses, in melanoma, item 9 (take part in the care) was among the most prevalent, whereas in breast cancer, item 3 (provide information about disease) for physicians and items 3 and 9 for nurses were among the most prevalent items of functional support (Table 7). The most important functional social support items by sources from all patients are presented in Table 8.

Table 7. Average amounts of functional support items in different sources of support, by cancer type.

Functional social support items	Mean of items[1]								
	Spouse/ partner	Family	Relatives	Friends	Acquain- tances	Other patients	Physi- cians	Nurses	Other relationships
MELANOMA (n = 71 – 72)									
1. Spend time with	2.69	1.88	1.96	1.83	1.06	0.79	1.92	2.06	0.76
2. Is optimistic	2.90	1.89	2.89	2.72	1.90	1.82	3.24	2.85	0.96
3. Provide information	1.43	0.65	1.38	1.32	0.96	1.47	3.17	2.70	0.54
4. Help with practical matters	2.34	1.43	1.28	0.82	0.47	0.32	1.00	1.96	0.38
5. Understand really	2.75	1.78	2.72	2.81	1.82	1.86	2.93	2.83	0.94
6. Express concern, empathy, or affection	2.79	2.10	2.79	2.75	1.86	1.75	2.46	2.52	0.90
7. Act as a role model	1.92	1.21	1.74	1.61	1.01	1.42	2.03	2.08	0.56
8. Is pleasant and kind	2.83	2.18	3.10	2.93	2.14	2.00	3.48	3.45	0.99
9. Take part in the care	2.12	0.57	0.42	0.35	0.19	0.10	3.25	3.00	0.15
10. Accept patient's cancer	2.83	1.76	2.93	2.81	2.07	2.01	3.68	3.49	0.94
BREAST CANCER (n = 98 – 102)									
1. Spend time with	2.52	1.78	2.15	2.27	1.36	1.61	1.97	2.26	0.87
2. Is optimistic	2.67	2.31	3.17	2.96	2.49	3.06	3.26	3.00	1.30
3. Provide information	0.95	0.85	1.84	1.84	1.14	2.79	3.40	3.13	0.71
4. Help with practical matters	2.48	1.74	1.50	1.30	0.52	0.82	1.58	2.39	0.47
5. Understand really	2.55	2.16	3.06	3.03	2.41	3.14	3.08	3.01	1.19
6. Express concern, empathy, or affection	2.60	2.17	3.07	2.90	2.30	2.89	2.44	2.73	1.21
7. Act as a role model	1.65	1.29	1.76	1.98	1.31	2.41	2.01	2.21	0.81
8. Is pleasant and kind	2.65	2.29	3.34	3.26	2.72	3.33	3.50	3.51	1.29
9. Take part in the care	1.83	0.95	0.95	0.64	0.30	0.41	3.03	3.22	0.20
10. Accept patient's cancer	2.84	2.28	3.35	3.14	2.88	3.41	3.82	3.74	1.79

[1] Calculated from all patients, irrespective of whether they had the source. With a scale from 0 (not appropriate or not at all) to 4 (much) in every item.

Table 8. Most important functional support items, by different sources in SFSS (melanoma and breast cancer patients taken together).

Source of support	Most highly ranked items [1]	Mean [2]
Spouse or partner	10. accepts patient's cancer	2.84
	2. is optimistic	2.76
	8. is pleasant and kind	2.72
	6. express concern, empathy, or affection	2.68
Family members	8. are pleasant and kind	2.25
	2. are optimistic	2.14
	6. express concern, empathy, or affection	2.14
	10. accept patient's cancer	2.07
Relatives	8. are pleasant and kind	3.24
	10. accept patient's cancer	3.17
	2. are optimistic	3.05
	6. express concern, empathy, or affection	2.95
Friends	8. are pleasant and kind	3.12
	10. accept patient's cancer	3.00
	5. understand really	2.94
	2. are optimistic	2.86
Acquaintances	10. accept patient's cancer	2.54
	8. are pleasant and kind	2.48
	2. are optimistic	2.25
	5. understand really	2.16
Other patients	10. accept patient's cancer	2.82
	8. are pleasant and kind	2.77
	5. understand really	2.60
	2. are optimistic	2.54
Physicians	10. accept patient's cancer	3.76
	8. are pleasant and kind	3.49
	3. provide information	3.30
	2. are optimistic	3.25
Nurses	10. accept patient's cancer	3.64
	8. are pleasant and kind	3.48
	9. take part in the care	3.13
	3. provide information	2.95
Other relationships	10. accept patient's cancer	1.20
	8. are pleasant and kind	1.17
	2. are optimistic	1.16
	5. understand really	1.09

[1] The shortened translations of the Finnish items.
[2] Mean in a score between 0 (not appropriate or not at all) to 4 (much).

Association between structural and functional support in the sources

The number of people in the relationships with whom the patient had discussed, and the experienced functional support from that source, were calculated only for the patients with the source in question. The cancer-specific social network (number of members in a group) and functional support from that source were only slightly associated (r) with each other, if at all (Table 9). The duration of marriage or partnership was not associated with the amount of support experienced from the partner. In breast cancer, the number of members in a source was related to the amount of support

Table 9. Associations between cancer specific social network (size of source) and experienced social support from that source by cancer type.

Social network/ social support -variable pair	Melanoma			Breast cancer		
	n[1]	r[2]	Sig.[3]	n	r	Sig.
Family: size/ support from them	48	.08	ns[4]	70	.25	*
Relatives: size / support from them	67	-.01	ns	97	.01	ns
Friends: size / support from them	62	.25	ns	91	.13	ns
Acquaintances: size / support from them	49		ns	86		*
Other patients: size / support from them	43		ns	94		ns
Physicians: size / support from them	72	-.28	*	99	-.02	ns
Nurses: size / support from them	72		ns	99		ns

[1] The patients who had this source of support.

[2] Pearson correlation.

[3] Significance of the association by Pearson correlation, except in sources Acquaintances, Other patients, and Nurses by ANOVA significance.

[4] Statistically non-significant.

* Significant at the .05 level.

experienced from family ($r = .25$, $p < .05$), and from acquaintances (ANOVA $p < .05$). In melanoma, only the number of friends was positively associated with the amount of support from them ($p = .05$). However, the increasing number of doctors involved in the treatment of melanoma diminished the experienced support from doctors ($r = -.28$, $p = .019$) (Table 9). When the melanoma patients had an important nurse-patient relationship, they had also received a greater amount of support from nurses ($p < .05$) than those without a personal nurse-patient relationship.

Dimensions of the functional items in SFSS

When the proportions of functional support were investigated by factor analysis, there were, again, two different ways to perform the analysis. First, the items from a non-existing source were scored as 0's. Second, these items ('missing values') were replaced by series means. In both cases, the SFSS functional items formed subcategories according to the sources of support. Items 4 and 9 have been claimed by Dakof & Taylor (1990) to indicate practical support, items 2, 3, and 7 to indicate informational support, and the rest items to indicate emotional support (see Table 4). In some sources there was a tendency towards division into emotional and practical support, but it was weak and did not concern every source. The source 'other significant relationships' was excluded from factor analyses because of the low n.

When the experienced support from a non-existent source was scored as 0, a Varimax rotated model of six factors (eigenvalues > 4) was performed. The factor solutions were clear: the items from the same sources of support loaded together as factors. The factors are given below in their factor number order (with a decreasing percentage of variance, P of Var), and the names of the factors indicated with a capital first letter.

Factors of the functional social support items (support from a non-existent source scored as 0)

Melanoma
Factor 1. Support from ‘Acquaintances and other patients’ (P of Var 18.1),
Factor 2. Support from ‘Relatives’ + some items from doctors and nurses (P of Var 11.6),
Factor 3. Support from ‘Spouse’ (P of Var 8.2),
Factor 4. Support from ‘Family’ (P of Var 7.3),
Factor 5. Support from ‘Friends’ (P of Var 6.0), and
Factor 6. Rest items from physicians and nurses (P of Var 5.6).

Breast cancer
Factor 1. Support from ‘Spouse’ (P of Var 15.6),
Factor 2. Support from ‘Family’ (P of Var 11.8),
Factor 3. ‘Non-practical support from friends and acquaintances’ (P of Var 9.7),
Factor 4. ‘Non-practical support from relatives and other patients’ (P of Var 7.4),
Factor 5. Support from ‘Physicians and nurses’ (P of Var 6.4), and
Factor 6. Practical support (items 4 and 9) and information about disease (item 3) from four sources: relatives, friends, acquaintances, and other patients (P of Var 5.1).

When the ‘missing values’ were replaced by series means, an eight-factor solution (eigenvalues > 2.5) with Varimax rotation was performed. This factor solution was less clear than the one given above. In both cancer types, Factor 1 (P of Var 16.4 in melanoma and 16.6 in breast cancer) concerned mainly items 2, 5, 8, and 10 from relatives, friends, acquaintances, and other patients. The following factors were, again, mainly formed after the sources of support. The solution was clearer in breast cancer than in melanoma (more items from a source loaded in the same factor). In melanoma, the first factor was followed by support from ‘Physicians and nurses’ (P of Var 7.0), support from ‘Family’ (P of Var 5.6), support from ‘Relatives’ (P of Var 5.5), support from ‘Spouse’ (P of Var 4.1), ‘Practical support’ items (items 4 and 9) from friends, acquaintances, and other patients (Factor 6, P of Var 4.0), and a factor with some items from acquaintances (P of Var 3.5). The eighth factor comprises only items 7 (role model) (P of Var 3.3). In breast cancer, the support derived from ‘Spouse and family’ (Factor 2, P of Var 7.3) loaded partially together, support from ‘Nurses’ (Factor 3, P of Var 6.1) and ‘Physicians’ (Factor 4, P of Var 4.5) were partially separable, and item 7 was not distinctive.

When factor analysis was performed over the sums of item by sources, the support from different sources clearly divided into three factors (solution with eigenvalues > 1 and after Varimax rotation) (loadings given Table 10). Factor 1 concerned support from relatives, friends, acquaintances, and other patients, and was named to be ‘Optional support’ (P of Var 39.4 and 38.3 in melanoma and breast cancer, respectively). Factor 2 was ‘Professional support’ (physicians and nurses) (P of Var 15.8 and 14.5), and Factor 3 ‘Close support’ (spouse and family) (P of Var 12.2 and 13.3).

Because previously validated measures have usually measured functional support irrespective of its source, a similar situation was created by adding the items from all sources (item 1 from all of the sources, item 2 from all of the sources, etc.). When factor analysis was run over these sums of items, two factors were partly separable:

Table 10. Factor loadings of functional item sums by sources of support in SFSS.

	Factor 1	Factor 2	Factor 3
Item sums by sources of support	Optional Support	Professional Support	Close Support
MELANOMA (n = 72)			
Spouse or partner	.04	.19	**.79**
Family	.15	.13	**.78**
Relatives	**.78**	.03	.32
Friends	**.78**	.12	.21
Acquaintances	**.71**	.46	-.03
Other patients	**.69**	.10	-.07
Physicians	.10	**.85**	.17
Nurses	.19	**.82**	.20
BREAST CANCER (n = 103)			
Spouse or partner	.21	-.02	**.74**
Family	-.03	.30	**.80**
Relatives	**.71**	.13	-.06
Friends	**.63**	.07	.46
Acquaintances	**.77**	.11	.35
Other patients	**.73**	.20	.03
Physicians	.12	**.85**	.17
Nurses	.24	**.84**	.06

Note. All loadings after Varimax rotation. Loadings over .60 indicated with **bold** font.

Table 11. Factor loadings of functional item sums by items in SFSS.

	Factor 1	Factor 2
Sums of the items [1] over all sources of support	Overall Support	Practical Support
1. Spend time with	.60	.52
2. Is optimistic about prognosis	**.92**	.15
3. Provide information	.45	**.70**
4. Help with practical matters	.23	**.88**
5. Understand really	**.89**	.33
6. Express concern, empathy, or affection	**.85**	.37
7. Act as a role model	.45	.48
8. Is pleasant and kind	**.90**	.32
9. Take part in the care	.09	**.88**
10. Accept patient's cancer	**.89**	.17

Note. All loadings after Varimax rotation. Loadings over .60 indicated with **bold** font. Items 4 and 9 presented to indicate practical support, items 2, 3, and 7 to indicate informational support, and the rest items to indicate emotional support (Dakof & Taylor 1990).

[1] Item 1 from all sources, item 2 from all sources . . . , i.e., each item from all sources (maximum 9) of support.

‘Overall support’ (or ‘Emotional support’) and ‘Practical support’ (Table 11). ‘Practical support’ (items 4 and 9) was distinctive especially in breast cancer. Several ‘Overall support’ items loaded in the ‘Practical support’ factor, i.e., the division was not clear.

Associations between support from different sources in SFSS

When the intercorrelations (r) of functional support were evaluated for all patients, irrespective of whether they had the source or not, the subgroups by sources were fairly independent (Table 12). In melanoma, supports from the closest sources (i.e., spouse and family) did not correlate statistically significantly with each other, although supports from relatives, friends and acquaintances were slightly associated (p < .05). Support from health care professionals was associated with support from relatives (p < .01). In breast cancer, support from spouse was associated with that from other family members (p < .05) and acquaintances (p < .01), and associations between relatives, friends, and acquaintances were stronger than those in melanoma (p < .01) (Table 12). Professional support (doctors and nurses) intercorrelated strongly, both in melanoma and breast cancer (r = .55, p < .001). When the calculation of intercorrelations was restricted to those patients who had the source in question, the correlations were slightly stronger (data not given).

Table 12. Intercorrelations between total amounts of support from different sources by cancer type.

SFSS functional subscale by sources	1	2	3	4	5	6	7	8
MELANOMA (n = 72)								
1. Spouse or partner	–							
2. Family	.19	–						
3. Relatives	.09	.16	–					
4. Friends	.20	.12	.29*	–				
5. Acquaintances	.00	.10	.36*	.27*	–			
6. Other patients [1]	-.04	.03	.26*	.30*	.52***	–		
7. Physicians	.26*	.10	.35**	.21	.12	.03	–	
8. Nurses	.10	.11	.38**	.18	.14	.20	.55***	–
9. Other relationships	.09	.02	.01	.06	.01	.15	.01	-.06
BREAST CANCER (n = 99 – 103)								
1. Spouse or partner	–							
2. Family	.21*	–						
3. Relatives	.09	-.19	–					
4. Friends	-.08	.10	.26**	–				
5. Acquaintances	.30**	.02	.34**	.37***	–			
6. Other patients	.00	.03	.33**	.39***	.25*	–		
7. Physicians	-.01	.16	.06	.07	.21*	.14	–	
8. Nurses	.05	.19	.23*	.14	.14	.19	.55***	–
9. Other relationships	.04	.06	.18	.34**	.24*	.26**	.06	.17

[1] This source group may include members from the previous sources.
* Significant at the .05 level, ** significant at the .01 level, *** significant at the .001 level.

Comparison between SFSS and the two previously validated measures of social support

To investigate the validity of SFSS, the respondents also completed two previously validated measures of functional social support. The answers to SFSS were compared with those of the *MOS Social Support Survey* (Sherbourne & Stewart 1991) and *Ways of Coping Questionnaire*'s Seeking Social Support subscale, presented by Folkman & Lazarus (1988).

SFSS and the MOS Social Support Survey

The means and standard deviations of the functional subscales according to *MOS Survey* were different from those in SFSS, the proportions being skewed towards the positive end of the distribution (Appendix 3). The structural variables in SFSS (numbers of persons with whom the patients had discussed their disease) were not associated (r) with the MOS structural item 'number of close friends and close relatives' in melanoma, and were only slightly associated in breast cancer (with numbers of relatives and friends, $p < .05$). The whole functional MOS scale had a very good homogeneity (Alpha .94), but, as with the SFSS, there was no clear factorial structure in factor analysis. Practical Support (4 items) was separable, and Affectionate Support (or 'love') (4 items) partially separable in the breast cancer group. The remaining 12 (of the 20) items were labeled Emotional Support. The MOS subscales correlated highly with each other (r from .96 to .46). There were no statistically significant differences between the two patient or treatment groups.

The *MOS Social Support Survey*, and its functional subscales, were associated with the SFSS support from some sources only, mainly with support from the closest relationships (Table 13). In melanoma, the MOS Survey's subscales had no significant associations with SFSS's support from friends, other patients, nurses, or other significant relationships. In breast cancer, no associations were found with support from relatives, other patients, physicians, or nurses. One may conclude that experienced functional support in SFSS by different sources did not measure the same aspects of social support as the MOS Surveys's functional subscales.

SFSS and the Ways of Coping Questionnaire's Seeking Social Support items

The Seeking Social Support items[15] loaded as a factor (in factor analysis of the whole WCQ scale) and had reasonable homogeneities (Alphas .70 and .78). Breast cancer

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[15] The items used were: 1) Talked to someone to find out more about the situation. 2) Talked to someone who could do something concrete about the problem. 3) Asked a respected relative or friend for advice. 4) Talked to someone about how I was feeling. 5) Accepted sympathy and understanding from someone. 6) Got professional help.

Table 13. Associations (r) between the SFSS functional subscales by sources and MOS Social Support Survey subscales, and Ways of Coping Questionnaire's (WCQ) Seeking Social Support items, by cancer type.

SFSS subscales	MOS Survey				WCQ
	Total	Functional subscales			Seeking Social Support
		Emotional	Practical	Affectionate	
MELANOMA (n = 72)					
Spouse or partner	.61***	.52***	.58***	.57***	.08
Family	.31**	.27*	.41***	.16	.19
Relatives	.28*	.25*	.23*	.25*	.36**
Friends	.21	.18	.15	.21	.46***
Acquaintances	.25*	.30*	.02	.21	.30**
Other patients	.01	.08	.02	-.16	.41***
Physicians	.28*	.26*	.26*	.24*	.22
Nurses	.18	.18	.21	.09	.19
Other relationships	.12	.12	.09	.12	.23
BREAST CANCER (n = 103)					
Spouse or partner	.34***	.23*	.30**	.46***	-.09
Family	.28***	.23*	.25*	.24*	.00
Relatives	.14	.14	.11	.09	.11
Friends	.20*	.30**	-.00	-.00	.36**
Acquaintances	.32**	.34***	.24*	.08	.27**
Other patients	.04	.06	-.02	-.00	.15
Physicians	.04	.08	.11	-.17	.22*
Nurses	.03	.05	.06	-.10	.19
Other relationships	.20	.24*	.10	-.00	.16

* Significant at the .05 level, ** significant at the .01 level, *** significant at the .001 level.

patients made significantly more use of the coping style Seeking Social Support than melanoma patients, and so did the patients with adjuvant treatments compared to those who only had surgery (p < .001). Female melanoma patients used it more that male patients (p = .015). Seeking Social Support by WCQ was not associated (r) with SFSS support from spouse (Table 13). In melanoma, it was significantly correlated with the SFSS's support from relatives, friends, acquaintances, and other patients (p at least < .01). In breast cancer, the correlations were significant with support from friends and acquaintances (p < .01) and slightly significant with physicians (p < .05) (Table 13). Seeking Social Support items correlated mainly with Optional support.

It appeared that the WCQ's Seeking Social Support and the MOS Surveys's subscales were hardly at all associated with each other: in melanoma, Seeking Social Support correlated with MOS emotional subscale (r = .29, p = .014), whereas in breast cancer there were no significant associations.

Other factors in the psychological stress process

Coping with cancer

Ways of Coping Questionnaire

In accordance with the works of Dunkel-Schetter et al. (1992)[16] and Stanton and Snider (1993) five patterns of coping were identified: Focusing on the Positive, Distancing, Seeking Social Support, Cognitive Escape-Avoidance, and Behavioral Escape-Avoidance. The Seeking Social Support pattern differed slightly in its content from the one proposed by Folkman and Lazarus (1988). The first four patterns of coping were used, at least to some extent, by over 90 % of the patients, while Behavioral Escape-Avoidance was used by 71 % (melanoma) and 67 % (breast cancer) of the patients (Table 14). The Alphas were sufficient. The most intensively used (assessed by average score means) coping pattern for both melanoma and breast cancer was Seeking Social Support.

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[16] Mixed cancer data.

Table 14. Percentage of users and mean amounts of coping patterns used (with homogeneities of the scales) by cancer type.

Coping patterns [1]	Melanoma (n = 72)				Breast cancer (n = 103)			
	%	M	SD	α [2]	%	M	SD	α
Seeking Social Support	92	1.11	0.74	.83	99	1.60	0.61	.70
Distancing	99	0.79	0.42	.64	98	0.89	0.47	.67
Focusing on the Positive	99	0.70	0.40	.68	99	0.77	0.52	.82
Cognitive Escape-Avoidance	96	0.71	0.44	.66	95	0.62	0.43	.68
Behavioral Escape-Avoidance	71	0.23	0.30	.62	67	0.28	0.34	.65
Sum strategies								
Problem-focused strategies [3]	99	0.6	0.38	.83	100	0.9	0.38	.82
Emotion-focused strategies [4]	100	0.8	0.30	.68	100	0.8	0.33	.70
WCQ total	100	0.7	0.29	.85	100	0.8	0.31	.86

[1] Coping patterns by Dunkel-Schetter et al. (1992) and by average scores: item sums in a scale divided by number of items.

[2] Cronbach's Alpha for internal consistency.

[3] 'Problem-focused coping strategies' consists of Folkman & Lazarus's (1988) coping styles Confrontive Coping, Seeking Social Support, and Planful Problem Solving.

[4] 'Emotion-focused coping strategies' consists of Folkman & Lazarus's (1988) coping styles Distancing, Self Controlling, Escape-Avoidance, and Positive Reappraisal.

In general, the coping patterns were used to the same extent in both cancers, only Seeking Social Support being used in breast cancer more than in melanoma ($p < .001$). The only gender difference (melanoma patients) was that Seeking Social Support was more used by female patients ($p < .001$). Of the main categories, 'problem-focused coping strategies' were used more by breast cancer patients, 'emotion-focused strategies' showing no difference. In melanoma, older patients were less active copers than younger ones in terms of all patterns except Cognitive Escape-Avoidance. In breast cancer age had no influence. The patterns of coping with breast cancer did not differ by the mode of treatment (operation only *versus* operation plus adjuvant treatments).

The amounts of the coping patterns used correlated with each other highly positively, correlation (r) ranging from .12 to .68 (Table 15). The only exception was that Behavioral Escape-Avoidance was not associated with Seeking Social Support in breast cancer ($r = -.01$).

Table 15. Intercorrelations between the Ways of Coping Questionnaire[1] (WCQ) patterns by caneer type and gender.

WCQ coping patterns	1	2	3	4	5
MELANOMA					
Women (n = 36)					
1. Focusing on positive	–				
2. Distancing	.24	–			
3. Seeking social support	.68***	.49**	–		
4. Cognitive escape-avoidance	.25	.40*	.30	–	
5. Behavioral escape-avoidance	.30	.23	.20	.27	–
Men (n = 36)					
1. Focusing on positive	–				
2. Distancing	.28	–			
3. Seeking social support	.38*	.41*	–		
4. Cognitive escape-avoidance	.57***	.12	.13	–	
5. Behavioral escape-avoidance	.31	.16	.34*	.48**	–
BREAST CANCER (n = 103)					
1. Focusing on positive	–				
2. Distancing	.53***	–			
3. Seeking social support	.38***	.38***	–		
4. Cognitive escape-avoidance	.28**	.22*	.27**	–	
5. Behavioral escape-avoidance	.20*	.15	-.01	.43***	–

[1] Ways of Coping Questionnaire by Folkman & Lazarus (1988), coping patterns by Dunkel-Schetter et al. (1992).

* Significant at the .05 level, ** significant at the .01 level, *** significant at the .001 level.

Coping With Illness Scale

The most often used coping style on the *Coping With Illness Scale (CILL-26)* (Julkunen 1996) was Optimistic persistence (average score mean 4.00) followed by Re-orientation (3.56). Withdrawal was used more by melanoma patients (p = .022) and Re-orientation more by women (p = .021). Coping styles according to CILL differed by type of treatment of breast cancer: Resignation and Re-orientation were used more by patients with adjuvant treatments (p values .005 and .045), whereas Withdrawal was more used by patients with operation only (p = .021). Between Optimistic persistence and Resignation correlation was highly negative (r = –.65, p < .001).

Correspondence between the coping measures

The WCQ and CILL subscales had some significant correlations (r) with one another, but there was no correspondence between the individual scales of the two measures. Furthermore, there were differences between the two cancer types (Table 16). Distancing on WCQ did not correspond to any of the CILL measures. Optimistic persistence was correlated negatively with the Escape-Avoidance measures of WCQ (from –.42 to –.16), whereas Resignation and Withdrawal were positively correlated to them (.49 to .21). Avoidance-repression had no other associations than negative correlation to Seeking Social Support (–.31 and –.14). Reorientation was positively correlated to all WCQ measures except Distancing in breast cancer.

Table 16. Associations (r) between the two coping measures: Ways of Coping Questionnaire (WCQ) patterns and Coping With Illness Scale[1] (CILL) subscales, by cancer type.

Coping by CILL	WCQ coping pattern				
	Focusing on Positive	Distancing	Seeking Social Support	Cognitive Escape-Avoidance	Behavioral Escape-Avoidance
MELANOMA (n = 72)					
Optimistic persistence	-.26*	-.01	-.05	-.31**	-.16
Resignation	.40***	.10	.35**	.49***	.45***
Withdrawal	-.04	-.07	-.30*	.22	.25*
Avoidance-repression	-.08	-.01	-.31*	.10	.10
Re-orientation	.27*	.18	.46***	.37**	.15
BREAST CANCER (n = 103)					
Optimistic persistence	.03	.05	.02	-.21*	-.42***
Resignation	.07	-.06	.11	.37***	.42***
Withdrawal	-.02	.03	-.36***	.21*	.48***
Avoidance-repression	-.06	.10	-.14	-.08	.13
Re-orientation	.37***	.06	.23*	.28**	.15

[1] Coping With Illness Scale (CILL-26) (Julkunen 1996).

* Significant at the .05 level, ** significant at the .01 level, *** significant at the .001 level.

Anger expression related to Type C personality

The anger-in trait was dominant when compared to anger-out trait (anger-in average mean 2.9, anger-out average mean 1.9, $p < .001$). In melanoma, anger-in was more scored and anger-out less scored among older patients (p values $< .01$). In breast cancer age had no effect on anger expression. There were no statistically significant differences between the two cancer types or between genders.

Stressors

Cancer diagnosis

The impact of the cancer diagnosis ('Major personal illness' in *Life Experience Survey*) was experienced as extremely negative by 45 % and as moderately negative by 26 % of the patients. There was no difference between the genders. Melanoma patients who had a spouse reported the diagnosis as a more negative experience than single people ($p = .040$). Among patients with adjuvant treatments the impact of the diagnosis had been more negative than among the others ($p = .015$). Older breast cancer patients had experienced the diagnosis to be less negative than younger ones ($p = .008$). A more positive impact of other (non-cancer) life events was associated with more positive impact of cancer diagnosis ($p = .015$ in melanoma and $< .001$ in breast cancer).

Cancer treatment

The stressfulness of cancer treatment was described by a dichotomous variable 'operation only' *versus* 'adjuvant treatments'. All patients had been operated on. In addition, almost three-fourth of the breast cancer patients received one or multiple adjuvant cancer treatments. In the total sample, 56 % of the patients ($n = 98$) had only had surgery and 44 % of the patients ($n = 77$) received adjuvant treatment(s) in addition to the surgery.

Non-cancer life events

The mean number of non-cancer life events according to the *Life Experience Survey* during the last 12 months was almost 3 in both diagnoses (excluding the cancer diagnosis). The maximum number of events experienced was 11, while 24 % of melanoma patients and 20 % of breast cancer patients reported none (Table 17). The patients with both diagnoses reported significantly more negative than positive events ($p < .001$). The total change score (impacts of all events counted together) had a mean of –2.6 (range –16 – 10) in melanoma and –3.0 (range –14 – 19) in breast cancer. The average impact of the events was –1 (somewhat negative) in both diagnoses. The weighted (the patients' opinion of the impact of the events) and unweighted (number of life events *per se*) scales correlated strongly: the total change score correlated highly positively to the number of positive events and highly negatively to the number of negative events (Table 19). Older melanoma patients had fewer positive and negative life events than younger ones (p values < .001 and .05). There were no statistically significant differences between the patients with the two diagnoses. Women had experienced a greater number of life events in general (p = .008) as well as more negative events (p = .011) than men.

Table 17. Mean number of non-cancer stressors experienced and percentage of patients with these stressors, by cancer type.

Stressors	Melanoma (n = 72)				Breast cancer (n = 103)			
	M	SD	Max.	%	M	SD	Max.	%
Number of life events [1]	2.7	2.60	9	76	2.8	2.35	11	80
Number of positive events [2]	1.2	1.57	5	53	1.2	1.41	7	59
Number of negative events [3]	2.4	1.78	7	96	2.7	1.77	8	97
Total change score [4]	-2.6	4.65	10		-3.0	5.15	19	
Average impact of the events [5]	-1.1	1.24	1.33		-1.0	1.23	2.38	
Number of chronic strains [6]	1.9	1.60	8	86	2.3	1.65	7	88
Burden of the strains [7]	4.0	4.05	20		5.0	4.07	20	

[1] From preceding 12 months by Life Experience Survey (Sarason et al. 1978), maximun 50 events.
[2] Included in number of life events.
[3] Included in number of life events.
[4] Impacts of the event counted together (scales -3 to 3 in every event).
[5] Impacts of the event counted together (scales -3 to 3 in every event) and divided by number of events.
[6] By Chronic Strains Survey, maximum 13 strains.
[7] By Chronic Strains Survey, scale 0 – 3 in every strain (maximum 36).

The most frequently mentioned events were serious illness or injury of a close family member, a major change in sleeping habits, and death of a family member (each by 20 % of the patients), followed by a major change in financial status, in social activities, in eating habits, and changed work situation (Table 18). Fourty-eight patients had experienced an event not mentioned in the scale, and 10 patients mentioned two such events, the most common of these being the birth of a grandchild and another chronic disease in addition to the present cancer.

Table 18. Percentage and average impact of most prevalent non-cancer stressors.

Stressor	Melanoma (n = 72) %	Breast cancer (n = 103) %	Total %	Average impact of stressor [1]
Life event [2]				
Serious illness or injury of family member or relative	15	25	20	- 2.30
Major change in sleeping habits	14	25	20	1.20
Death of family member or relative	21	20	20	- 1.43
Major change in financial status	18	17	17	- 0.97
Major change in social activities	15	15	15	- 0.15
Major change in eating habits	17	13	14	0.24
Changed work situation	11	15	13	- 0.48
Major change in type/amount of recreation	11	12	12	0.65
Major change in living conditions	8	9	9	- 0.47
Major change in closeness of family	7	10	9	0.87
Adult child leaving home	3	12	8	1.14
Sexual difficulties	8	8	8	- 1.50
Outstanding personal achievement	8	7	8	2.62
New job	7	6	6	1.55
Change of residence	8	4	6	1.40
Birth of grandchild	3	9	6	2.91
Other severe illness	10	3	6	- 1.67
Death of close friend	8	3	5	- 2.00
Change in husband's work	4	6	5	0.00
Chronic strain [3]				
Burdensome work facilities or circumstances	34	41	38	1.94
Chronic illness	41	31	35	1.92
Chronic illness of a family member	24	23	23	2.54
Chronic illness of spouse	11	24	19	1.97

[1] Life events with scales from -3 (extremely negative) to 3 (extremely positive) in every event. Chronic strains with scale 1 (mildly burdensome) to 3 (extremely burdensome) in every strain.
[2] From preceding 12 months by Life Experience Survey (LES) (Sarason et al. 1978).
[3] By Chronic Strains Survey.

Chronic strains

The patients with both diagnoses reported an average of two chronic strains (Table 17). Only 14 % of melanoma patients and 12 % of breast cancer patients reported none, and 4–5 % of the patients reported five or more strains. The most common strains experienced were burdensome work facilities or circumstances, own chronic illness (diagnosed over a year ago), and chronic illness of a family member. The first two of these were experienced by more than one-third of the patients (Table 18). The homogeneity of the scale was poor (Alpha .48): the scale included a wide variety of chronic difficulties in life. Breast cancer patients reported economical difficulties ($p = .05$), and a chronic disease of spouse more often ($p < .05$) than did melanoma patients. Women reported burden in the work activities or circumstances ($p = .05$) more often than men.

Associations between stressors

The stressor measures were strongly intercorrelated (Table 19). The number of life events during the past year was associated with both the number and burden of chronic strains (p values < .001). An increasing number of negative life events during the last year associated with more negative experience of cancer diagnosis ($p < .01$). The more positive the life events (total change score and average impact of the events), the less negative the diagnosis was felt to be ($p < .001$).

Table 19. Intercorrelations between the reported stressors.

Stressors	1	2	3	4	5	6	7
1. Number of life events [1]	–						
2. Number of positive events	.70***	–					
3. Number of negative events	.80***	.13	–				
4. Total change score [2]	-.10	.58***	-.62***	–			
5. Average impact of life events [3]	.34***	.74***	-.15	.73***	–		
6. Impact of cancer dg [4]	-.11	.08	-.22**	.36***	.40***	–	
7. Number of chronic strains	.45***	.27***	.40***	-.09	.10	.01	–
8. Total burden of chronic strains	.48***	.29***	.42***	-.11	.09	.01	.95***

[1] From the preceding 12 months by Life Experience Survey (LES) (Sarason et al. 1978).
[2] Sum of the impacts of experienced life events by LES ('a total change score').
[3] Sum of the impacts of experienced life events divided by number of events by LES.
[4] Score from -3 to +3, by LES.
* Significant at the .05 level, ** significant at the .01 level, *** significant at the .001 level.

Symptoms, well-being, and depression

Psychological and physical symptoms, and well-being

Only 2.3 % of the patients reported no symptoms according to the *Rotterdam Symptom Checklist (RSCL)*. The most common symptoms reported by patients with both cancer types were worrying, fatigue, and lack of energy (Table 20). Worrying was the only one of the eight psychological symptoms that was ranked among the most prevalent symptoms. Twelve percent of melanoma patients and 11 % of breast cancer patients did not report any psychological symptoms. Most psychological symptoms were experienced by about half of the patients, only worrying being experienced more frequently (69 % and 76 %) and anxiety less frequently (about 40 % of the patients) (Table 20). The mean score for physical symptoms in RSCL (22 symptoms) was of 9.3 in melanoma and 10.2 in breast cancer; the potential range was 0 – 66.

There were no differences in the total amount of psychological or physical symptoms between patients with the two diagnoses.

Of the individual symptoms, breast cancer patients reported more fatigue (p < .001), more lack of energy (p = .028), and slightly more nausea (p = .042) than melanoma patients. In decreased sexual interest the difference between patients with the two diagnoses was statistically non-significant (mean 0.74 in melanoma, and 0.90 in breast cancer). There were no differences between patients with the different treatment modalities of breast cancer in any RSCL submeasures or in the amounts of individual symptoms.

Female melanoma patients reported psychological symptoms (p = .009), particularly worrying (p = .005) and depressed mood (p = .001), more often than male patients. The younger the melanoma patients, the more they experienced psychological symptoms (r = –.40, p = .001) and depression (r = –.24, p < .05). Breast cancer patients with a spouse or partner experienced more both psychological and physical symptoms than those without (p values .037 and .028).

The one-item question ‘experienced quality of life’ (scale 1 – 7) had a mean between quite good (score 5) and good (score 6). As many as 12 % of melanoma patients and 11 % of breast cancer patients reported their life quality as excellent (score 7). Nobody felt their life quality to be very poor (score 1), one breast cancer patient perceived it to be poor. There were no disease, gender, or treatment differences in this measure.

Depression

The *Depression Scale (DEPS)* had a good reliability (Alpha .88). The mean of the total scale was 5.7 (SD 4.8) in melanoma, and 6.4 (SD 5.2) in breast cancer, the range in both diagnoses being 0 – 23 (potential range 0 – 30). Female melanoma patients reported more depressive symptoms than male patients (p = .015). A score of 9 (the proposed cut-point for additional examination for clinical depression) or more was reported by 19 % of the melanoma patients (the frequency for women was 11, for men only 3), and by 26 % of the breast cancer patients. The most common depressive

Table 20. Amounts of most common symptoms[1] and, separately, psychological symptoms, by cancer type.

Most common symptoms	Number of patients by score						Mentioned by
(30 items) by RSCL	0	1	2	3	Mean	SD	% of patients [2]
MELANOMA (n = 72)							
Worrying	22	26	19	4	1.07	0.9	69 %
Fatigue	24	32	13	2	0.90	0.8	67 %
Lack of energy	26	32	8	3	0.83	0.8	64 %
Sore muscles	30	27	11	3	0.82	0.8	58%
BREAST CANCER (n = 103)							
Fatigue	19	38	34	11	1.36	0.9	81 %
Lack of energy	23	52	20	7	1.11	0.8	78 %
Worrying	24	54	17	7	1.07	0.8	76 %
Decreased sexual interest	48	29	8	15	0.90	1.1	52 %

Psychological symptoms	Number of patients by score						Mentioned by
(8 items) by RSCL	0	1	2	3	Mean	SD	% of patients
MELANOMA (n = 72)							
1. Worrying	22	26	19	4	1.07	0.9	69 %
2. Tension	30	30	6	5	0.80	0.9	58 %
3. Nervousness	31	30	5	5	0.77	0.9	57 %
4. Depressed mood	36	23	8	4	0.72	0.9	50 %
5. Irritability	29	35	5	1	0.68	0.7	60 %
6. Problems concentrating	32	31	7	-	0.64	0.7	56 %
7. Desperate feelings about future	35	28	6	1	0.61	0.7	51 %
8. Anxiety	46	19	2	4	0.49	0.8	36 %
Total	measured range 0 - 20				5.80	4.8	88 %
BREAST CANCER (n = 103)							
1. Worrying	24	54	17	7	1.07	0.8	76 %
2. Depressed mood	44	43	12	3	0.75	0.8	57 %
3. Desperate feelings about future	48	42	9	2	0.65	0.7	52 %
4. Irritability	49	43	10	-	0.62	0.7	52 %
5. Problems concentrating	48	46	8	-	0.61	0.6	53 %
6. Tension	51	41	8	1	0.59	0.7	50 %
7. Nervousness	53	40	7	2	0.59	0.7	48 %
8. Anxiety	60	30	8	3	0.53	0.9	41 %
Total	measured range 0 - 21				5.42	4.2	89 %

[1] By Rotterdam Symptom Checklist (RSCL) (deHaes et al. 1990).

[2] Percentages of the patients who scored at least 1 in this item.

symptoms were experienced by two-thirds of the patients: ‘felt blue’ (72 %), ‘felt low in energy or slowed down’ (67 %), and ‘felt everything was an effort’ (62 %). There were no statistically significant differences between patients with the two diagnoses or treatment modalities.

Breast cancer specific symptoms

Every breast cancer patient had at least some symptoms mentioned in the scale of *EORTC QLQ – BR23*. The mean amount of the breast cancer specific symptoms was 30.0 (SD 5.7); the potential range was 20 – 80 (reported maximum 44) (Table 21A). Over 90 % of the patients still had symptoms in the breast area (seven items, mean 11.2, potential range 7 – 28).

The most common and most strongly experienced symptom according to the breast 23 module was worrying about future health, experienced by 79 % of the patients. The next strongly experienced symptoms were hot flushes (56 %), skin problems on or in the affected area (59 %), pain in the arm or shoulder (64 %), pain in the affected breast area (68 %), and oversensitiveness of the area of affected breast (61 %) indicating that most of the patients had still local symptoms in the treated breast area (Table 21B).

Four of the items concerned body-image. One-third (34 %) of the patients reported that breast cancer had not affected their (feminine) body-image (mean 6.0, potential range 4 – 16) (Table 21A). Only 6 % of the patients scored above the scale mean; the distribution was far from normal. Eight percent of the patients felt that the disease had made them less attractive, 14 % that the disease had affected their femininity, 4 % that it was difficult to see oneself naked, and 8 % reported that they were dissatisfied with their body (proportions based on those who had scored more than ‘slightly’ to these questions). About 60 % of the patients reported that they were sexually active, the sexual well-being (note that this is a positive measure) of the sexually active patients had a mean of 7.1 of the possible range of 3 – 12 (Table 21A). The patients with adjuvant treatments had more symptoms in the breast area than the others ($p < .001$).

Table 21A. Mean amounts of breast cancer specific symptoms.

EORTC QLQ – Breast 23 module [1]			Range	
	Mean	SD	Measured	Potential
“Total” score (20 items) [2]	30.00	5.7	21 - 44	20 - 80
Breast area symptoms (7 items)	11.16	2.7	7 - 20	7 - 28
Influence in feminine body-image (4 items)	6.05	2.4	4 - 16	4 - 16
Sexual well-being (3 items) (n = 63 [3])	7.14	1.7	4 - 12	3 - 12

[1] The European Organization for Research and Treatment of Cancer (EORTC) QLQ breast cancer module, 23 items, scale 1 - 4 in every item (Aaronson et al. 1993).

[2] ‘Total’ score without the three items concerning sexual well-being.

[3] Only sexually active patients, score 4 indicating highest well-being.

Table 21B. Amounts of most common breast cancer specific symptoms.

Most common symptoms in Breast23	Number of patients by score 1	2	3	4	Mean	SD	Mentioned by % of patients[1]
Worried about health in the future	21	55	17	7	2.10	0.8	79
Hot flushes	44	30	12	13	1.94	1.0	56
Skin problems on or in the area of affected breast *	41	43	12	4	1.79	0.8	59
Pain in the arm or shoulder *	36	53	10	1	1.76	0.7	64
Pain in the area of affected breast *	32	60	7	-	1.75	0.6	68
Area of affected breast oversensitive *	39	50	9	2	1.74	0.7	61

[1] Percentages of the patients who scored at least 1 in this item.
* Included in 'breast area symptoms'.

Associations between symptoms

The symptom measures were strongly associated (r) with each other (p values < .001) (Table 22). The amount of psychological symptoms was strongly positively correlated with that of physical ones in both melanoma and breast cancer (r .65 and .47, respectively). Depression by DEPS correlated strongly with other symptoms (r from .51 to .72). The one-item question on experienced quality of life was highly negatively correlated with reported symptoms (r from –.41 to –.64). Symptoms in the breast area by BR23 were separate from the other symptom measures: they were not at all associated with psychological symptoms or depression, but correlated slightly positively with the physical symptoms.

Table 22. Intercorrelations between the amounts of symptoms, and between the amounts of symptoms and age, by cancer type.

Reported symptoms	1	2	3	4	5
MELANOMA (n = 72)					
1. RSCL[1] psychological symptoms	–				
2. RSCL physical symptoms	.65***	–			
3. DEPS Scale [2] total	.72***	.53***	–		
4. Quality of life [3]	-.52***	-.41***	-.64***	–	
5. Age	-.40***	-.06	-.24*	.03	–
BREAST CANCER (n = 103)					
1. RSCL psychological symptoms	–				
2. RSCL physical symptoms	.47***	–			
3. DEPS Scale total	.64***	.51***	–		
4. Quality of life	-.60***	-.46***	-.58***	–	
5. Age	-.08	.00	-.08	.02	–

[1] Rotterdam Symptom Checklist (RSCL) by de Haes et al. (1990).
[2] The Depression Scale (DEPS) by Salokangas et al. (1995 and 1996).
[3] A one-item question, scale from 1 (poor) to 7 (excellent).
* Significant at the .05 level, ** significant at the .01 level, *** significant at the .001 level.

Relationships between the factors in the stress processes and with the experienced symptoms

The connections between the mediating factors – coping, social support, and personality – in the stress processes and those between the mediating factors and stressors, and, finally, the connections between psychological stress processes and symptoms were evaluated by Pearson correlations (r) and thereafter by stepwise regression analysis (RA). This was done on the basis of the hypothesis that social support and personality are modifiers of coping, and that stressors initiate the mediating process. All these factors were hypothesized to influence the experienced symptoms of the patients (Figure 1, side 33). Two regression models were performed: 1) The predictors of coping were investigated: coping patterns were used as dependent factors, and experienced social support, Type C personality related anger expression trait, and stressors as independents. 2) The predictors of symptoms and well-being were investigated: the dependent factors were the symptom measures, and all the previous factors, i.e., factors in the psychological stress processes, were used as independents factors.

The analyses consisted of the following three main issues:

1) The associations between
    - experienced social support and coping with cancer
    - experienced social support, Type C personality related anger expression, and coping with cancer
    - stressors and social support, coping, and anger expression.
2) The predicting power of the modifiers, i.e., experienced social support and Type C personality related anger expression, and stressors, on coping with cancer.
3) The predicting power of factors in the stress processes (all factors above: coping with cancer, experienced social support, Type C personality related anger expression, and stressors) on experienced symptoms.

Associations between the factors in the stress processes

Social support by sources and coping with cancer

Experienced social support was here considered for all patients irrespective of whether they had the particular source or not (i.e., the absence of a source was indicated by score 0), because the whole entity of social support by a source was handled as a positive risk factor in terms of the health status of the patient. In general, coping patterns correlated (r) neither with the support from the spouse or family nor with support from nurses (Table 23). The other associations differed by cancer type. Coping style Seeking Social Support was associated with several experienced supports (as expected, both being measures of support), but did not correlate significantly with support from spouse and family, or with support from health care professionals (physicians and nurses). Cognitive or Behavioral Escape-Avoidance were not associated with any support groups in melanoma. More use of Behavioral Escape-Avoidance was associated with less support from acquaintances in both diagnoses. In breast cancer, Cognitive Escape-Avoidance was more used when there was more experienced support from physicians. In melanoma, but not significantly in breast cancer, support from other patients was associated with more use of non-escape coping patterns (Table 23).

The main category ‘problem-focused coping strategies’ was, in melanoma, highly positively correlated with the amount of support from relatives, friends, and other patients (p values < .001), and slightly positively with amount of acquaintances and other relationships (p values < .05) (Table 24). In breast cancer, more ‘problem-focused coping strategies’ was used when more support was experienced from friends, acquaintances (p values < .01), and physicians (p < .05). The other part of the dichotomy – ‘emotion-focused coping strategies’ – had minor correlations, being statistically significantly correlated only with support from friends in melanoma (p < .05) (Table 24).

Anger expression and coping with cancer

Anger expression was associated (r) with coping in melanoma but hardly at all in breast cancer (Table 23). In melanoma, anger-in trait was less present and anger-out trait more present when all the five coping patterns were used more. Anger control trait scored higher with greater use of escape-avoidance patterns. In breast cancer, anger-out trait increased with both of the escape-avoidance patterns, and anger control increased with Cognitive Escape-Avoidance especially.

Anger expression was associated with ‘problem-focused’ and ‘emotion-focused coping strategies’ in melanoma: anger-in decreased with both strategies whereas anger-out increased with them. These main strategies were not associated with anger expression in breast cancer (Table 23).

Table 23. Associations (r) between social support by source in SFSS[1] and coping patterns[2], and between anger expression[3] and coping patterns by cancer type.

Moderators of coping	Coping patterns				
	Focusing on Positive	Distancing	Seeking Social Support	Cognitive Escape-Avoidance	Behavioral Escape-Avoidance
MELANOMA (n = 72)					
Social support					
Spouse or partner	.08	.03	.15	.04	-.01
Family	-.06	.06	.13	-.09	-.04
Relatives	.07	.37***	.30**	-.09	.01
Friends	.14	.36**	.50***	.03	.18
Acquaintances	.14	.12	.23	-.08	-.23
Other patients	.30*	.24*	.34**	.11	.04
Physicians	.10	.31**	.08	.02	-.02
Nurses	.17	.20	-.00	.04	-.11
Other relationships	.26	.18	.26	.03	-.06
Anger expression					
Anger-in	-.26*	-.23	-.40***	-.12	-.33**
Anger-out	.23	.38***	.46***	.33**	.41***
Anger control	.18	.11	.05	.27*	.34**
BREAST CANCER (n = 103)					
Social support					
Spouse or partner	-.05	-.05	-.15	-.18	-.05
Family	.07	.03	.01	-.05	.03
Relatives	-.09	-.02	.13	-.12	-.17
Friends	.18	.22*	.44***	-.07	-.12
Acquaintances	.26**	.11	.25*	-.10	-.29**
Other patients	.06	.20	.17	.06	.06
Physicians	.21*	.14	.18	.25*	.08
Nurses	.02	.13	.12	.09	.05
Other relationships	.12	.11	.21*	-.14	-.17
Anger expression					
Anger-in	.03	.10	-.00	-.13	-.16
Anger-out	-.08	-.10	-.04	.25*	.33***
Anger control	-.05	.05	.03	.23*	.19

[1] Structural-Functional Social Support Scale: functional social support experienced by sources.
[2] Ways of Coping Questionnaire by Folkman & Lazarus (1988), coping patterns by Dunkel-Schetter et al. (1992).
[3] Anger Expression (AX) Scale by Spielberger et al. (1985, 1994 and 1995a).
* Significant at the .05 level, ** significant at the .01 level, *** significant at the .001 level.

Anger expression and social support

Anger expression traits and experienced social support by source showed only few significant correlations, and the connections were different in the two cancer types

Table 24. Associations (r) between the main coping strategies in Ways of Coping Questionnaire (WCQ), and social support by source in SFSS and anger expression by cancer type.

Moderators of coping	Main coping strategies in WCQ [1]		
	Problem-focused strategies	Emotion-focused strategies	WCQ total score
MELANOMA (n = 72)			
Social support			
Spouse or partner	.12	.04	.08
Family	.11	.00	.04
Relatives	.38***	.12	.24*
Friends	.44***	.24*	.34**
Acquaintances	.25*	-.11	.05
Other patients	.40***	.14	.30*
Physicians	.21	.12	.18
Nurses	.15	.05	.12
Other relationships	.26*	.16	.21
Anger expression			
Anger-in	-.47***	-.21	-.38***
Anger-out	.52***	.37***	.50***
Anger control	.10	.26*	.25*
BREAST CANCER (n = 103)			
Social support			
Spouse or partner	-.10	-.16	-.14
Family	.00	.02	.02
Relatives	.04	-.17	-.09
Friends	.31**	.09	.20
Acquaintances	.26**	-.01	.12
Other patients	.13	.14	.15
Physicians	.24*	.19	.26*
Nurses	.15	.02	.10
Other relationships	.13	-.00	.05
Anger expression			
Anger-in	.02	-.04	-.02
Anger-out	-.01	.07	.05
Anger control	.02	.14	.10

[1] By Folkman & Lazarus 1988, the two main coping strategies (see Table 14); with WCQ total score (all 50 items).
* Significant at the .05 level, ** significant at the .01 level, *** significant at the .001 level.

(Table 25). In melanoma, patients had received more support from their friends when there had been less anger-in ($p < .05$) and more anger-out traits ($p < .01$). Other patients were also felt to give more support when anger-out trait was scored higher ($p < .05$). In breast cancer, relatives and other relationships gave less support when anger-out trait was scored higher, and acquaintances when anger control was scored higher (p values $< .05$).

Table 25. Associations (r) between experienced social support by source in SFSS and anger expression by cancer type.

SFSS subscales by sources	Anger expression traits		
	Anger-in	Anger-out	Anger control
MELANOMA (n = 72)			
Spouse or partner	-.00	.08	-.03
Family	-.22	.14	.16
Relatives	-.12	.14	.03
Friends	-.26*	.34**	.00
Acquaintances	.06	.04	.02
Other patients	-.18	.25*	.18
Physicians	.10	.02	.11
Nurses	.07	-.14	-.00
Other relationships	.05	.07	-.16
BREAST CANCER (n = 103)			
Spouse or partner	-.03	.01	-.06
Family	-.02	-.02	-.04
Relatives	.15	-.22*	-.11
Friends	.09	-.12	-.03
Acquaintances	.01	-.05	-.23*
Other patients	.07	-.03	-.08
Physicians	.14	-.08	.07
Nurses	.16	-.20	.13
Other relationships	.07	-.23*	.15

* Significant at the .05 level, ** significant at the .01 level, *** significant at the .001 level.

When the effect of anger expression was analyzed by stepwise regression analysis on experienced social support, there were clear differences between the patients with the two cancer types and especially between genders in melanoma (when separate models were created for both genders the effects were totally different).

In women with melanoma, support from family was increased by anger control, but in men it was decreased by anger-in. In melanoma, support from relatives was not affected. In melanoma women, support from friends was increased by anger-out trait, in men there was no effect. Support from acquaintances had no effect in melanoma. Support from other patients was not affected in women, but was increased by anger control in men. In breast cancer, the only support affected was that coming from relatives and acquaintances, and the effects were very weak: support from relatives was slightly decreased by anger-out trait and support from acquaintances by anger control. Anger expression traits did not affect support from spouse or professional support (Appendix 5).

Stressors and mediators (coping, social support, and anger expression) in the stress processes

The experienced non-cancer stressors correlated (r) with the stress mediating factors, especially with coping patterns.

Stressors and coping. The more negative the life changes and the more negative the overall amount of changes were during the previous year, the more the melanoma patients used various coping patterns. In melanoma, the patients used more Focusing on Positive, Seeking Social Support, and both escape-avoidance patterns when the number of negative events had been higher and the total impact of changes more negative (Table 26). In breast cancer, only Behavioral Escape-Avoidance was used significantly more when more negative events were noted. In breast cancer, Focusing on Positive and Distancing were associated with stressors different from those in melanoma: they were more used when there had been more positive events and less negative total change score. The less negative the impact of the cancer diagnosis, the less had the patients coped with it; only Distancing in breast cancer was more used when the diagnosis had been experienced to be less negative ('Impact of cancer diagnosis' in LES). The melanoma patients had used more Seeking Social Support ($p < .05$) and patients with both diagnoses more Behavioral Escape-Avoidance (p values $< .001$ and $.05$) when there had been more burden from chronic strains (Table 26). When compared within the total sample ($n = 175$), patients with adjuvant cancer treatments used more coping pattern Seeking Social Support (t-test $p < .001$) and 'problem-focused coping strategies' (t-test $p < .001$) with their cancer than the patients with surgery only. In breast cancer, the patients who had undergone total mastectomy used more 'emotion-focused coping' than the patients with the breast-conserving alternative ($p < .05$).

Stressors and social support. In melanoma, when the patients had experienced more negative stress, they had received more support from friends, other patients, and other significant relationships. With more positive life events they experienced less support from nurses. More chronic burden also led to more support from friends. In breast cancer, a greater number of positive events led to less support from relatives, and more negative total change score to more support from this source. The less negative the cancer diagnosis was felt to be, the more the patients reported support from acquaintances (Table 26).

When the patient had received adjuvant cancer treatment, the cancer-specific social network was larger and the amount of experienced social support greater when compared to those patients with operation only (see Table 6).

Stressors and anger expression. In melanoma, a higher score in anger-in trait was associated with fewer experienced negative life events, and higher scores in anger-out and anger control traits with more negative events, the association being particularly strong between anger-out trait and number of negative events (Table 26). A higher score in anger control was associated with more burden from chronic strains. In breast cancer, stronger anger control trait was associated with more negative stressors.

Table 26. Associations (r) between stressors[1] and social support by source in SFSS, stressors and coping patterns, and stressors and anger expression by cancer type.

Stress mediating factors	Stressors				
	Number of positive events	Number of negative events	Total change score	Impact of cancer diagnosis	Burden of strains
MELANOMA (n = 72)					
Social support					
Spouse or partner	.12	.01	.06	-.24	.02
Family	-.13	-.10	-.08	.14	.06
Relatives	.03	.06	.08	.13	.06
Friends	.16	.27*	-.17	-.11	.33**
Acquaintances	.09	-.06	.17	-.02	.06
Other patients	-.12	.24*	-.25*	-.03	.01
Physicians	-.06	-.09	-.00	.04	-.01
Nurses	-.27*	-.02	-.10	.07	.04
Other relationships	-.21	.13	-.33**	-.03	-.08
Coping with cancer					
Focusing on Positive	.02	.42***	-.33**	-.39***	.20
Distancing	.10	.18	-.03	.08	.05
Seeking Social Support	.15	.51***	-.29*	-.36**	.29*
Cognitive Esc-Avoidance	.19	.30**	-.17	-.26*	.19
Behavioral Esc-Avoidance	.10	.56***	-.40**	-.31**	.26*
Anger expression					
Anger-in	-.03	-.26*	.21	.10	-.05
Anger-out	.09	.41***	-.28*	-.17	.08
Anger control	.02	.28*	-.18	-.06	-.27*
BREAST CANCER (n = 103)					
Social support					
Spouse or partner	-.04	-.00	-.09	-.12	.03
Family	.11	.02	.05	.00	-.01
Relatives	-.24*	.13	-.22*	.09	.00
Friends	.03	.08	.02	.14	-.06
Acquaintances	.07	-.04	.09	.26*	-.07
Other patients	-.02	.01	.05	.06	.06
Physicians	.10	-.01	-.01	-.03	-.05
Nurses	-.01	-.06	-.02	.08	-.12
Other relationships	.12	.19	-.03	-.01	-.12
Coping with cancer					
Focusing on Positive	.35***	.12	.26**	.11	.02
Distancing	.24*	.19	.17	.20*	.07
Seeking Social Support	.05	.19	-.11	-.14	.07
Cognitive Esc-Avoidance	.09	.08	-.04	-.32***	.19
Behavioral Esc-Avoidance	.11	.30**	-.16	-.26**	.36***
Anger expression					
Anger-in	-.07	-.08	.03	.17	-.03
Anger-out	.04	.13	-.09	-.17	.13
Anger control	-.08	.16	-.21*	-.10	.12

[1] Life events and impact of cancer diagnosis by Life Experience Survey (LES) (Sarason et al. 1978), burden of strains by Chronic Strains Survey.

* Significant at the .05 level, ** significant at the .01 level, *** significant at the .001 level.

Predicting power of social support, anger expression, and stressors on coping with cancer

The effects of social support, anger expression, and stressors on coping were investigated by using coping patterns as dependent factors and the potential moderators of coping as independent factors in stepwise regression analysis (RA) procedure. Social support, anger expression, and stressors alltogether were regressed on coping with cancer. The results of the total RA model are presented in Table 27.

As hypothesized, experienced social support, anger expression, and stressors had an influence on coping with cancer. However, the predicting power of these factors varied markedly between patients with the two cancer types and between genders. Furthermore, age (within the sample, all patients were under 72 years of age) influenced the use of some coping patterns (Table 27).

Predicting power of experienced social support on coping

The predicting power of social support on coping (in RA) was investigated by SFSS social support by source. Because the *MOS Social Support Survey* measures social support from a different viewpoint than SFSS (as 'perceived' support) and from a more limited number of sources than SFSS, and because the most interesting research target was chosen to be the effects of experienced social support from all of the sources, the MOS Survey was not used in RA procedure. In melanoma, experienced social support predicted coping with cancer, whereas in breast cancer, the predicting power of social support was weaker (Table 27). Among men with melanoma the influence was far stronger than among women.

Which coping patterns are affected by social support? All the coping patterns were affected by social support (Table 27). In both diagnoses and genders, more social support predicted more use of Seeking Social Support. Distancing and the Cognitive and Behavioral Escape-Avoidance patterns were predicted by support in breast cancer only. Focusing on the Positive was predicted in melanoma men and in breast cancer. More support led to more use of other coping patterns in general, but decreased the escape-avoidance patterns. The addition of age into the model decreased regressions on Seeking Social Support in melanoma and increased those on Distancing in breast cancer. 'Emotion-focused coping strategies' (total score) was not predicted by social support, whereas 'problem-focused strategies' was affected in men and in breast cancer (gray tone in Table 27).

Which sources of social support have an effect on coping? For men, the most influential sources of social support were other patients and acquaintances, whereas for women, but to a lesser extent, the most influential source was friends (Table 27). Support from spouse, family, or relatives had only a minor effect on coping with cancer. Nurses were the only support group that did not affect coping. Among melanoma men, more support from relatives, other patients, and physicians led to considerably more use of 'problem-focused coping strategies', whereas among melanoma women there was no such effect. In breast cancer, the use of 'problem-focused coping strategies'

Table 27. Social support by source in SFSS, anger expression, stressors, and age predicting coping patterns in stepwise regression analysis by cancer type and gender (gray tone indicates the predicting power of experienced social support on coping).

Coping patterns [1]	Melanoma		Breast cancer
	Men (n = 36)	Women (n = 36)	(n = 103)
	β [2]	β	β
1. Focusing on the Positive			
Social support			
Other patients	.41**	–	–
Acquaintances	–	–	.20*
Stressors			
Positive events	–	–	.35***
Negative events	–	.47**	–
Impact of cancer dg	-.39**	–	–
Age	–	–	.19*
Total R²	*R² .38*	*R² .22*	*R² .22*
2. Distancing			
Social support			
Friends	–	–	.22*
Anger expression			
Anger-out	–	.51**	–
Stressors			
Positive events	–	–	.20*
Age	–	–	.24*
Total R²	*R² .21*	*R² .26*	*R² .15*
3. Seeking Social Support			
Social support			
Family	.23*	–	–
Friends	–	.42**	.49***
Acquaintances	.34**	–	–
Stressors			
Negative events	–	.39*	–
Impact of cancer dg	-.40***	–	-.19*
Chronic strain	.47***	–	–
Age	-.43*	–	–
Total R²	*R² .72*	*R² .42*	*R² .25*
4. Cognitive Escape-Avoidance			
Social support			
Spouse or partner	–	–	-.23*
Physicians	–	–	.27**
Anger expression			
Anger-out	–	.48**	.20*
Stressors			
Negative events	.54***	–	–
Impact of cancer dg	–	–	-.32***
Chronic strain	–	–	.21*
Total R²	*R² .29*	*R² .23*	*R² .31*

Coping patterns [1]	Melanoma		Breast cancer
	Men (n = 36)	Women (n = 36)	(n = 103)
	β [2]	β	β
5. Behavioral Escape-Avoidance			
Social support			
Acquaintances	–	–	-.27**
Anger expression			
Anger-out	–	–	.28**
Anger control	.34*	–	–
Stressors			
Negative events	.39*	.37*	–
Chronic strain	–	–	.32***
Age	–	-.35*	–
Total R^2	*R^2 .40*	*R^2 .36*	*R^2 .29*
'Emotion-focused coping' strategies			
Anger expression			
Anger-out	–	.50**	–
Stressors			
Positive events	–	–	.27**
Negative events	.52***	–	.22*
Age	–	–	.24*
Total R^2	*R^2 .27*	*R^2 .25*	*R^2 .18*
'Problem-focused coping' strategies			
Social support			
Friends	–	–	.30**
Relatives	.22*	–	–
Other patients	.32***	–	–
Physicians	.27*	–	.24*
Anger expression			
Anger-in	-.24**	–	–
Anger-out	–	.50**	–
Anger control	–	-.33*	–
Stressors			
Impact of cancer dg	-.39***	–	–
Chronic strain	.26**	–	–
Age	–	-.36*	–
Total R^2	*R^2 .83*	*R^2 .48*	*R^2 .15*
WCQ, total			
Social support			
Friends	–	–	–
Other patients	.39**	–	–
Physicians	–	–	.26**
Anger expression			
Anger-out	–	.58***	–
Stressors			
Negative events	.41**	–	.50***
Total change score	–	–	.42***
Total R^2	*R^2 .42*	*R^2 .34*	*R^2 .22*

Note. – Not entered in the model in stepwise procedure. *Total R^2* = R Square for the final model.

[1] Items by Ways of Coping Questionnaire (Folkman & Lazarus 1988), coping patterns by Dunkel-Schetter et al. (1992).

[2] Standardized Beta coefficient.

* Significant at the .05 level, ** significant at the .01 level, *** significant at the .001 level.

was, to a lesser extent, increased by support from friends and from physicians. The total coping activity (total score of WCQ) in men was predicted by support from other patients, in melanoma women there was no effect, and in breast cancer, with a minor R square, by support from physicians (gray tone in Table 27).

Combined effect of social support and anger expression on coping

In order to investigate the combined influence of both moderators – experienced social support and Type C related anger expression – on coping, the three anger expression variables were added to the RA model. The adding of anger expression factors did not explain away the influence of experienced social support on coping, but had an additional effect on coping with cancer (Table 27).

For men, anger control affected coping by leading to more Behavioral Escape-Avoidance, and anger-in trait to less use of 'problem-focused strategies' (Table 27). For women anger-out trait increased coping, but anger control decreased 'problem-focused strategies'. The combined effects of social support and anger expression explained a large amount of variation in the use of 'problem-focused coping strategies' in men.

Effect of stressors on coping

Because the stressor measures correlated strongly (Table 19), only five of them were chosen to be independent variables in the regression analysis (RA). Four stress variables concerned non-cancer life stress: number of positive events, number of negative events, total change score, and total burden of chronic strains. Impact of cancer diagnosis was included in RA, because it was the only variable measuring the experienced stressfulness of cancer (at the time the patient was informed of the diagnosis). In addition, in breast cancer the treatment dichotomy (operation only *versus* operation plus adjuvant treatments) was added to RA as a dummy variable.

The experienced stressor load affected coping with cancer. Non-cancer stressor load measured as number of negative events increased all coping patterns except Distancing (Table 27). Chronic strain also tended to increase coping with cancer. The number of positive events increased Distancing and 'emotion-focused coping strategies' in breast cancer. The impact of cancer diagnosis decreased several coping patterns, i.e., when the impact of diagnosis had been more negative it led to stronger coping effort. Higher age decreased Seeking Social Support in melanoma men, and Behavioral Escape-Avoidance and 'problem-focused strategies' in melanoma women. Higher age increased 'emotion-focused coping' in breast cancer. Breast cancer treatment (as a dummy variable) did not predict coping with breast cancer (Table 27).

Stepwise RA was also performed separately in patients with operation only and patients with adjuvant treatments. In the operation only group, ‘problem-focused coping strategies’ was strongly predicted (total R square .42) by the modifiers: it was increased by more support from friends, physicians, and other patients, and greater amount of negative events, but decreased by higher score in anger-in trait. In the adjuvant treatment group there was no effect at all on ‘problem-focused coping strategies’. The use of ‘emotion-focused coping strategies’ was mildly predicted by the modifiers in both treatment groups, but the effect emerged by totally different factors between the groups. In the operation only group, ‘emotion-focused coping’ was increased by more anger-out trait and greater amount of positive events (total R square .14), whereas, in the adjuvant treatment group it was increased by greater amount of negative events, greater total change score, and more support from physicians (total R square .21).

Psychological stress processes and experienced symptoms

Associations between stress processes and symptoms

Associations between mediators and symptoms. Connections between the stress mediating factors and the experienced symptoms were stronger in melanoma than in breast cancer (Table 28).

Coping patterns were strongly positively associated (r) with the amount of symptoms in melanoma, but less so in breast cancer (Table 28). In melanoma, more use of all other coping patterns except Distancing was associated with more experienced symptoms, both psychological and physical in nature, and with a poorer quality of life.

Table 28. Associations (r) between symptoms[1] [2] and social support by source in SFSS, symptoms and coping patterns, and symptoms and anger expression by cancer type.

Factors in the stress processes	Rotterdam Symptom Checklist			DEPS Scale
	Psychological symptoms	Physical symptoms	Quality of life [3]	Depressive symptoms, total
MELANOMA (n =72)				
Social support				
Spouse or partner	.08	.11	.07	-.04
Family	.02	.09	.11	.06
Relatives	-.00	.02	.18	-.08
Friends	.38***	.32**	-.15	.29*
Acquaintances	-.14	.02	.08	-.13
Other patients	.15	.22	-.22	.08
Physicians	-.06	.08	.14	-.13
Nurses	-.07	.12	-.07	.00
Other relationships	.01	-.00	-.12	.05
Coping with cancer				
Focusing on Positive	.33**	.47***	-.22	.23
Distancing	.13	.09	-.05	.06
Seeking Social Support	.48***	.45***	-.20	.32**
Cognitive Esc-Avoidance	.23*	.30**	-.22	.41***
Behavioral Esc-Avoidance	.65***	.44***	-.38***	.63***
Anger expression				
Anger-in	-.28*	-.11	-.02	-.21
Anger-out	.35**	.15	-.05	.37***
Anger control	.20	.22	-.18	.38***
Stressors				
Number of positive events	.16	.09	-.07	.10
Number of negative events	.61***	.60***	-.42***	.58***
Total change score	-.37**	-.40***	.25*	-.36**
Impact of cancer dg	-.36**	-.15	.13	-.23
Burden of chronic strains	.32**	.37**	-.35**	.48***

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[1] Rotterdam Symptom Checklist (RSCL) by de Haes et al. 1990.

[2] The Depression Scale (DEPS) by Salokangas et al. 1996 and 1996.

[3] A one-item question, scale from 1 (poor) to 7 (excellent).

Factors in the stress processes	Rotterdam Symptom Checklist			DEPS Scale
	Psychological symptoms	Physical symptoms	Quality of life	Depressive symptoms, total
BREAST CANCER (n = 103)				
Social support				
Spouse or partner	.05	.12	.07	-.05
Family	-.10	-.11	.20*	-.17
Relatives	.05	.04	-.12	-.02
Friends	.01	-.05	-.06	-.08
Acquaintances	-.17	.01	.17	-.26*
Other patients	-.15	.05	-.04	-.09
Physicians	-.05	-.05	.15	-.13
Nurses	.07	-.03	.09	-.05
Other relationships	-.10	.00	.07	-.05
Coping with cancer				
Focusing on Positive	-.07	-.01	.18	-.01
Distancing	-.07	-.00	.10	.01
Seeking Social Support	.19	.05	-.06	.22*
Cognitive Esc-Avoidance	.32***	.04	-.23	.28**
Behavioral Esc-avoidance	.33***	.05	-.19	.30**
Anger expression				
Anger-in	-.09	-.04	.18	-.12
Anger-out	.15	.10	-.16	.21*
Anger control	.31**	.07	-.18	.32**
Stressors				
Number of positive events	.03	.10	.00	.04
Number of negative events	.39***	.34***	-.33***	.42***
Total change score	-.35***	-.19	.29**	-.39***
Impact of cancer dg	-.26**	.00	.21*	-.25*
Burden of chronic strains	.31**	.27**	-.33***	.46***

* Significant at the .05 level, ** significant at the .01 level, *** significant at the .001 level.

More use of Behavioral Escape-Avoidance correlated strongly with the amount of depressive symptoms. In women, the score of 9 or more in DEPS (values over the proposed cut-point for additional examination for clinical depression) was present when more escape-avoidance coping patterns were used (t-test p value in melanoma < .001, and in breast cancer = .003). In men, this analysis was not possible, because only three men had scored 9 or more.

In breast cancer, both escape-avoidance patterns were associated with more psychological symptoms, but there were no associations with physical symptoms, and Focusing on the Positive and Distancing were not significantly associated with any of the symptoms.

Social support had minor, if any, associations with symptoms (Table 28). In melanoma, support from Friends was associated with more symptoms, in breast cancer, more support from Family was associated with better quality of life, and more support from acquaintances with less depressive symptoms.

Anger expression and symptoms were associated with psychological symptoms and depression, but not significantly with the physical ones or quality of life (Table 28). In melanoma, anger-in trait tended to be associated with less amount, and anger-out and anger control with greater amount of psychological symptoms/depression. In breast cancer, the correlation was significant only in the case of anger control.

There were hardly any associations between the breast cancer specific symptoms and factors in the stress processes (Table 29). Patients with more support from relatives experienced less breast area symptoms, and those with more support from family and acquaintances experienced better sexual well-being. More coping with Behavioral Escape-Avoidance associated with more problems with the body-image. The patients who had undergone mastectomy reported significantly greater effect on body-image (t-test $p < .001$) than those with breast-conserving treatment. Anger-out trait and greater amount of non-cancer stress tended to increase the total amount of symptoms.

Associations between stressors and symptoms. Associations (r) between the stressors and symptoms were strong (Table 28). Number of negative life events during the preceding year and the total experienced negativity of the changes were associated with greater amount of experienced physical and psychological symptoms and a poorer quality of life, this effect being especially strong in melanoma. Number of positive life events was not associated with symptoms or well-being. Burden from chronic strains was associated with greater amount of symptoms.

The score of 9 or more for additional examination for clinical depression was present when women had had more life events (t-test p value in melanoma $< .05$, and in breast cancer $< .01$) and more chronic strains (t-test p value in melanoma $< .05$ and in breast cancer $< .001$). Patients with adjuvant treatments reported more depressive symptoms (t-test $p = .046$) than those with operation only.

Effect of stress processes on experienced symptoms

In regression analysis, the predicting power of psychological stress processes on symptoms was strong, explaining as much as half or more of the variance (R square) of the symptoms (Table 30). The effect was stronger in melanoma. Social support by source, coping patterns, anger expression traits, and stressors (all the mediating factors treated together as independent factors), each have their effect on experienced symptoms.

Social support by source did not affect symptoms other than depression. More support from other patients led to more reported depression in men, and more support from acquaintances led to less depression in breast cancer patients. More use of coping pattern Behavioral Escape-Avoidance[17] predicted greater amounts of psychological symptoms, especially depression in melanoma. The anger expression traits anger-out and anger control increased the reported psychological symptoms. Non-cancer stressor

Table 29. Associations (r) between breast cancer specific symptoms[1] and factors in stress processes: social support by source, coping patterns, anger expression, and stressors.

Factors in the stress processes	EORTC QLQ – Breast 23 module			
	Total score	Sexual well-being[2]	Breast area symptoms	Body-image
Social support				
Spouse	.03	.18	.07	-.08
Family	-.15	.28*	-.00	-.12
Relatives	-.06	.04	-.21*	-.01
Friends	.01	.05	.02	-.03
Acquaintances	-.04	.33**	.09	-.15
Other patients	.10	-.10	.08	.16
Physicians	-.10	-.13	-.05	-.04
Nurses	-.02	.01	.10	-.02
Other relationships	-.04	.14	.04	-.04
Coping with cancer				
Focusing on positive	.02	.09	.10	-.03
Distancing	.13	-.10	.06	.17
Seeking social support	.17	.12	.13	.02
Cognitive escape-avoidance	.11	-.05	.03	-.01
Behavioral escape-avoidance	.20	-.14	-.01	.29**
Anger expression				
Anger-in	-.10	-.07	-.13	-.07
Anger-out	.21*	-.06	.13	.16
Anger control	.17	-.20	.02	.13
Stressors				
Number of positive events	.11	-.15	.20*	.01
Number of negative events	.27**	-.12	.08	.11
Total change score	-.08	-.02	.11	-.07
Impact of cancer diagnosis	-.12	-.13	.04	-.09
Burden of chronic strains	.24*	-.18	.17	.09

[1] EORTC QLQ-C30 quality of life questionnaire's breast cancer module (Aaronson et al. 1993).
[2] Sexual well-being as a positive score (not amount of symptoms), only sexually active patients (n = 63).
* Significant at the .05 level, ** significant at the .01 level, *** significant at the .001 level.

burden, operationalized as negative life events during the preceding year, increased both psychological and physical symptoms. Impact of cancer diagnosis affected men differently from women: in men, less negative experience of the impact of the diagnosis decreased the quality of life, whereas in melanoma women, it increased the quality of life and decreased psychological symptoms (Table 30).

Psychological symptoms. The amount of psychological symptoms experienced by the patients was strongly predicted by the stress mediating factors (R squares .52 in melanoma men, .65 in melanoma women, and .28 in breast cancer). The escape-avoidance coping patterns increased psychological symptoms, with Behavioral Escape-Avoidance increasing it in melanoma and Cognitive Escape-Avoidance in breast cancer.

More anger-out trait increased psychological symptoms in men and anger control trait in breast cancer. The number of negative non-cancer events increased experienced psychological symptoms in both female groups (Table 30).

Physical symptoms. Physical symptoms were predicted by stress mediating factors in melanoma but not at all in breast cancer (Table 30). More use of coping pattern Focusing on the Positive in melanoma women and more use of Cognitive Escape-Avoidance in melanoma men predicted more physical symptoms. As noted above, greater amount of physical symptoms was predicted by greater amount of negative non-cancer life events – this without any cancer type or gender difference.

Quality of life. The influence of stress processes on quality of life was totally different between the genders and the cancer types (Table 30). More Focusing on the Positive led to poorer quality of life in men with melanoma, but to better quality of life in breast cancer patients. More Cognitive Escape-Avoidance and more negative life events made the quality of life of breast cancer patients poorer. Unexpectedly, in men with melanoma, more positive experienced impact of the diagnosis decreased the quality of life, whereas in women with melanoma, it improved quality of life and decreased psychological symptoms. Quality of life was, no wonder, poorer after greater non-cancer stressor burden: in men after the burden of chronic strains, and in breast cancer after a greater number of negative events. In men, quality of life diminished with greater age.

Depression. Depression was predicted by all factor groups investigated, but by different factors in the different disease and gender groups (Table 30). In melanoma, greater degree of depression was strongly predicted by more use of coping pattern Behavioral Escape-Avoidance in both genders. In men, more support from other patients led to more reported depression. In breast cancer, more depression was predicted by more coping pattern Seeking Social Support, less support from acquaintances, more anger control trait, more positive life events, and more chronic strain. More chronic strain also led to more depression in melanoma women.

Breast cancer specific symptoms. Factors in the stress processes had minor predicting power on breast cancer specific symptoms (Table 30). However, the experienced social support from acquaintances and family tended to increase the experienced sexual well-being in sexually active patients, while support from physicians slightly decreased it. Patients who received adjuvant breast cancer treatment experienced still more symptoms in the treated breast area than the patients with operation only. Less support from relatives slightly predicted more symptoms in the breast area. The body-image was poorer when the patient had used more Behavioral Escape-Avoidance coping.

Table 30. Coping patterns, social support by source, anger expression, stressors, and age predicting symptoms in stepwise regression analysis by cancer type and gender.

Symptoms	Melanoma		Breast cancer
	Men (n = 36)	Women (n = 36)	(n = 103)
	β[1]	β	β
I OVERALL SYMPTOMS			
1. Psychological symptoms			
Coping			
Cognitive Esc-Avoidance	–	–	.20*
Behavioral Esc-Avoidance	.61***	.26	–
Anger expression			
Anger-out	.28*	–	–
Anger control	–	–	.22*
Stressors			
Impact of cancer dg	–	-.39**	–
Negative events	–	.42**	.36***
Total R^2	*R^2 .52*	*R^2 .65*	*R^2 .28*
2. Physical symptoms			
Coping			
Focusing on the Positive	–	.33*	–
Cognitive Esc-Avoidance	.30*	–	–
Stressors			
Negative events	.52***	.39*	.35***
Total R^2	*R^2 .52*	*R^2 .38*	*R^2 .12*
3. Quality of life			
Coping			
Focusing on the Positive	-.32*	–	.29**
Cognitive Esc-Avoidance	–	–	-.23*
Stressors			
Negative events	–	–	-.36***
Impact of cancer dg	-.47***	.49**	–
Chronic strain	-.37**	–	–
Age	-.50***	–	–
Total R^2	*R^2 .60*	*R^2 .24*	*R^2 .22*
4. Depressive symptoms			
Coping			
Seeking Social Support	–	–	.22*
Behavioral Esc-Avoidance	.60***	.54***	–
Social support			
Other patients	.36**	–	–
Acquaintances	–	–	-.24**
Anger expression			
Anger control	–	–	.18*
Stressors			
Positive events	–	–	.21
Total change score	–	–	-.37***
Chronic strain	–	.37**	.30***
Total R^2	*R^2 .54*	*R^2 .47*	*R^2 .45*
II BREAST CANCER SPECIFIC SYMPTOMS			
Breast area symptoms			
Social support			
Relatives			-.22*
Stressors			
Treatment (dummy)			.34***
Total R^2			*R^2 .16*
Feminine body-image			
Coping			
Behavioral Esc-Avoidance			.30**
Total R^2			*R^2 .09*
Sexual well-being			
Social support			
Acquaintances			.38**
Family			.32**
Physicians			-.28*
Total R^2			*R^2 .25*

Note. – Not entered in the model in stepwise procedure. *Total R^2* = R Square for the final model.

[1] Standardized Beta coefficient.

* Significant at the .05 level, ** significant at the .01 level, *** significant at the .001 level.

Summary of the relationships

As hypothesized, experienced social support, anger expression, and stressors had an influence on coping with cancer. However, the predicting power of these factors varied markedly between the two cancer types and/or cancer treatment, and between genders in melanoma. The difference between the two cancers was partly due to the differences in the treatment between these groups: among the patients with operation only the predicting power of the modifying factors on coping was weaker than among patients with more, i.e., adjuvant, cancer treatment. The influence of the factors on coping was stronger among men. Furthermore, age influenced the use of some coping patterns.

The experienced social support by sources predicted coping with cancer, but differently in the two cancers and genders. In breast cancer, the predicting power of social support was weaker than in melanoma. Among melanoma men the influence was far stronger than among women. All the coping patterns were affected by social support. More support decreased the two escape-avoidance patterns, but led to more use of other coping patterns in general. Among men, more support led to a remarkably greater use of 'problem-focused coping strategies'. 'Emotion-focused coping strategies' was not predicted by social support. Age affected the effect of social support on coping but differently in the different subgroups. In men, the most influential sources of social support were other patients and acquaintances, whereas in women, with a weaker effect, the most influential source of support was friends. Support from spouse, family, or relatives had only a minor effect on coping with cancer. Support from physicians had some effect, bur support experienced from nurses was the only support group that did not affect coping.

Anger expression factors did not explain away the influence of experienced social support on coping, but had an additional effect on coping with cancer. As to the individual coping patterns, there were differences between the two cancer types and between genders. Anger expression traits showed only a weak connection to experienced social support.

Negative non-cancer life events and chronic strain tended to increase coping with cancer. When the impact of the diagnosis had been more negative it led to stronger coping effort. In the total sample, patients with adjuvant treatment experienced more support from several sources and used more Seeking Social Support than patients with operation only.

The predicting power of psychological stress processes on symptoms was strong, explaining as much as half or more of the variance of the symptoms. The effect was stronger in melanoma. Social support by source, coping patterns, anger expression traits, and stressors, each had their effect on experienced symptoms. Different symptom groups were affected differently.

The amount of psychological symptoms was strongly predicted by psychological stress processes, the two escape-avoidance coping patterns increasing psychological symptoms. Number of negative non-cancer life events increased experienced psychological symptoms in women. Physical symptoms were predicted by coping patterns in melanoma, but not at all in breast cancer. Non-cancer stress increased physical symptoms. The influence of stress processes on quality of life was totally different between the genders and cancer types. In men, contrary to women, increasing age diminished quality of life. Depressive symptoms were predicted by all factor groups in the psychological stress processes investigated, but different factors worked in the different disease and gender groups. In melanoma, greater degree of depression was strongly predicted by more use of coping pattern Behavioral Escape-Avoidance in both sexes. In breast cancer, more reported depression was predicted by several variables. The presence of adjuvant treatment was associated with more depressive symptoms in all patients (the total sample, melanoma and breast cancer together). Factors in the stress processes had only a minor predicting power on breast cancer specific symptoms.

DISCUSSION

Several factors contributed to the successful completion of this study and to the validity of the results obtained. First, the participation rate was high: 86 % of eligible melanoma patients and 82 % of breast cancer patients participated and were interviewed. Within the research area, much lower participation rates have been reported (e.g., 34 % by Ell et al. 1989). Second, the representativeness of the study material is good, because the Finnish health care system is centralized, especially in the field of cancer care, and nearly all new melanoma and breast cancer patients from Tampere University Hospital district could be consecutively included among the eligible patients. The patients were treated according to the same protocol. Finally, the Finnish population is homogeneous by ethnic background, and ethnic differences potentially affecting stress processes hardly exist.

The two cancer types were chosen for the present study because they are very different diseases and, furthermore, because their post surgical treatments differ. Moreover, a sufficient number of patients had to survive long enough to study the process nature of the psychosocial factors investigated in the follow-up phase of the research project. Melanoma patients were chosen because melanoma is equally common among men and women, which allowed the evaluation of gender differences. Breast cancer offered a research target population that was very different than melanoma, and breast cancer patients were easy to reach with a good representativeness and rapid growth. Furthermore, it was hypothesized that there might be differences in the psychological stress processes between the groups investigated, e.g., in the stressfulness of the disease or treatment, in the coping patterns used, and/or in the psychosocial well-being of the patients, i.e., in the amount or the quality of symptoms experienced.

The study design and methodological decisions were carefully established. A wide spectrum of factors involved in the psychological stress processes were evaluated, most of them by multiple measures. A model of factors affecting the psychological stress processes, and the connections between these factors, was created on the basis of hypotheses derived from former research. The measurements were undertaken by quantitative, psychometric measures indicating the presence, frequency or intensity of a given factor in the stress processes. These instruments produce several numerical values for different domains of the factor or a single score of the factor. The measures used were self-report scales; the patients' own experiences were the research target. Most of the questionnaires were previously validated and widely used. The main social support measure, the *Structural-Functional Social Support Scale (SFSS)*, was developed within this study. Chronic strains were evaluated by a questionnaire constructed for the purposes of this study (the *Chronic Strains Survey*).

The questionnaires were completed in an interview and under the guidance of the same psychologist (the author), which enhanced the validity of the measurements. The measures had good or sufficient psychometric properties, e.g., the scales showed at least satisfactory homogeneities. The methods proved to be applicable in this kind of design: on the whole, the psychometric properties and structures of the measures used were similar to those found in previous research. The new social support scale, SFSS, has sufficient or good psychometric properties, which are described in detail here (in Finnish, see Lehto-Järnstedt et al. 1999). The structure of coping reported by Folkman & Lazarus (1988, Lazarus 1993) by the *Ways of Coping Questioonaire* (WCQ) was not detected in this study. On the other hand, the structure of coping with cancer reported by Dunkel-Schetter et al. (1992) and Stanton and Snider (1993) by WCQ was similar to that obtained in the present study.

Social support

Both cancer-specific social network (sources of support) and functional social support derived from that network were evaluated in adult melanoma and breast cancer patients 3–4 months after the diagnosis of cancer. The new method, SFSS, evaluates the existence and number of people with whom the patients had discussed their disease, and the amount of functional support experienced from these sources. For validation, SFSS was compared with two previously validated social support scales, both of which had a different focus on social support than the new scale. The SFSS proved to be applicable for research purposes and capable of producing interesting additional information about social support. This is summarized and discussed below.

Cancer-specific social network and functional social support. The patients had discussed or mentioned their cancer to a large number of people. Thus, the experience of cancer was shared with others and there was no tendency to keep the cancer diagnosis secret.

For all patients, irrespective of whether they had the potential source of support or not (i.e., whether the patient had discussed with this group of people), there were clear differences in the amount of functional support the patients had received from different sources. However, when taking into account only those who had the potential source, the variation in the amount of support experienced was small between the sources. Thus, the mere existence of a cancer-specific social network subgroup, that is, the source of support, seems to be enough to produce the experience of support, at least in the early stage of the crisis.

The amount of experienced social support had only weak associations with the number of support providers in that group. In previous studies the network measures and functional social support measures have also been only weakly positively associated, the correlations varying around .20 (Cohen & Wills 1985, Sarason et al. 1990). In accordance with previous findings, neither the size of the network nor the size of a subgroup in the network can indicate how much support a patient will actually experience. As presented above, the existence of a specific social network subgroup was enough to produce experienced functional support, but an increase in the number of the network members did not increase the experienced support.

The greatest amount of support was experienced from the spouse. It was interesting that physicians and nurses were nearly as important as spouse when evaluated by the amount of support experienced. This has also been reported earlier (Rowland 1989), thus health care professionals are very important sources of social support for cancer patients.

Breast cancer patients experienced more support than melanoma patients, which was related to differences in the medical treatment between the two groups. The patients with adjuvant cancer treatment experienced more social support from several sources. Almost three-fourths of the breast cancer patients received adjuvant treatment (radiotherapy and/or chemotherapy) in addition to surgery, while melanoma patients had only been operated on. The cancer treatments were discussed with the social network members.

The functional support measured by SFSS was analyzed both by using the item sums as entities and by using the sources of support as subscales. The first way is similar to that used, implicitly, in the functional social support scales, which do not take the source into account. The homogeneities (Cronbach's Alpha) of these scales were not satisfactory or they were weak: in different sources the items concerned different things. When the sources were used as subscales, the homogeneities were satisfactory. Furthermore, in factor analysis the items formed factors according to the sources of support. The dimensions of social support were found to be distinguished according to the sources, the commonly presented functional division was weaker and not present in every source. When the eight sources of support were grouped further, the division into Close Support (spouse and family), Professional Support (physicians and nurses), and Optional Support (relatives, friends, acquaintances, and other patients) was detected.

Older people got less support from close relationships than younger ones. Although older breast cancer patients discussed with a greater number of close relationships, they still experienced less support. This may be due to the fact that severe physical illnesses are less common among young people, so the social network was activated and provided more support for younger cancer patients than for older ones. In addition, working status seemed to influence the amount of support: those patients who were employed experienced more support from their close relationships than those who were not. High incomes in the household tended to result in more experienced support from the closest relationships and, in breast cancer, from other significant relationships (e.g., contacts in private health care). Contrary to some previous reports (Cohen & Wills 1985, Flaherty & Richman 1989, Fife et al. 1994), there were hardly any differences between genders in experienced support.

Comparison of SFSS and the previously validated measures. The SFSS was compared with two previously validated measures of social support: the *MOS Social Support Survey* (Sherbourne & Stewart 1991) and the *Ways of Coping Questioonaire* (WCQ) (Folkman & Lazarus 1988) Seeking Social Support subscale. These two measures address different aspects of social support than SFSS. MOS Survey measures 'perceived' or 'perceived availability' of social support, that is, the support the patient evaluates to be available *if* needed. Seeking Social Support items measure social support as 'coping activity'. The SFSS focuses on 'experienced' support, which has been 'actually received' in the recent past. The *MOS Social Support Survey*, and its functional subscales, were associated with the SFSS support mainly regarding closest relationships.

Correlations between received and perceived available support have been weak also in previous studies, ranging from –.13 to .46 (Dunkel-Schetter & Bennett 1990), and none of the earlier studies have reported more than 21 % shared variance between these two aspects of support. Thus, present findings concur with the previous studies. Perceived social support measured by the MOS Survey did not measure the support actually experienced from several important sources.

WCQ Seeking Social Support items measure social support as coping activity or behavior, as an effort to seek support. The Seeking Social Support subscale did not measure experienced support from spouse, and, in breast cancer, support from family. Associations with support from health care professionals were also weak. Social support as coping activity corresponded to the support experienced from those sources the patients could deliberately choose (the 'optional support').

In summary, it was found that when support was measured from a different viewpoint than 'experienced' support by SFSS, i.e., as 'perceived' support by MOS or as 'coping activity' by WCQ, the support actually experienced from several sources was not covered. Furthermore, it was interesting to note that the perceived support measured by MOS Survey and coping activity support by the Seeking Social Support subscale did not correspond with each other. All the three methods assessing social support seemed to give quite an independent view of the social support phenomenon; they addressed different aspects of social support, and these aspects were quite separate. When patients evaluate the perceived availability of support, they rely on support from close relationships. When they seek social support after a stressful encounter, they concentrate on the more distant relationships: friends, acquaintances, and other patients. The actually experienced support after an encounter is combined from these two and supplemented by support from health care professionals. Thus, when compared to the two other measures, SFSS produced additional information on social support after facing a major stressor, the cancer diagnosis.

Nature of experienced social support in the early phase of cancer. The functional items of the measures were strongly intercorrelated in all three methods: SFSS, MOS Survey and WCQ Seeking Social Support items. In factor analysis it was not possible to distinguish clearly between separate functions of support (emotional, practical, and informational) in all of the sources; the support was more clearly separable by the sources. This may be due, for example, to the time period investigated. It may be that in the early phase of the cancer crisis the experienced social support is a homogeneous entity without clear division into separate functions. The results suggest that an appropriate division of the experienced social support would be according to the sources that provide support. This homogeneity may, of course, change with time, because, in a favorable situation, the psychological burden of cancer will diminish during the continuum of the stress process.

The effect of social relationships on health consists of both the network (the sources of support) and the functional aspects of support, and it has long been indicated that further research using both approaches is needed (Cohen & Wills 1985, Funch et al. 1986, Orth-Gomer & Unden 1987, Power et al. 1988, O'Reilly 1988, Rowland 1989). Should the network aspects, defined as sources of functional experienced support, after all, have more emphasis in the measurement of social support than hitherto? The importance of the sources of functional support was, however, already pointed out in the late 1980s (e.g., Rowland 1989, Dakof & Taylor 1990, Sarason et al. 1990).

Coping with cancer

The structure of coping with cancer measured by the *Ways of Coping Questioonaire* (WCQ) (Folkman & Lazarus 1988) was contradictory in the present setting. It was not possible to identify the division of coping into the eight coping styles presented by Fokman & Lazarus (1988). One reason for this may be that WCQ has been developed to assess coping with a specific, optional stressful encounter, not necessarily a disease-related one. In factor analysis, five patterns of coping were identified: Focusing on the Positive, Distancing, Seeking Social Support, Cognitive Escape-Avoidance, and Behavioral Escape-Avoidance. In cancer research, the same five patterns have been identified by Dunkel-Schetter et al. (1992) and Stanton and Snider (1993), the former authors with mixed cancer data and the latter with prospective data from the diagnostic phase of breast cancer.

Seeking Social Support was the most intensively used pattern to manage the stress caused by a newly diagnosed cancer. This is consistent with Lazarus (1990), according to whom social support will be sought when "there is anxiety without shame about one's well-being". Cancer diagnosis is undoubtedly such a situation. The first four of the five coping patterns (Focusing on the Positive, Distancing, Seeking Social Support, and Cognitive Escape-Avoidance) presented above were used, at least to some extent, by most of the patients. Behavioral Escape-Avoidance was used by only three-fourths of the patients. Thus, a dichotomy into those patients who used a certain pattern and those who did not was not possible. In previous studies most patients have also reported coping with cancer in multiple ways; that is, they have used several or even all of the coping patterns (Lazarus 1990, Dunkel-Schetter et al. 1992).

WCQ and the structure of coping presented by it have also previously been criticized. The items have been claimed to be too empirically derived (Carver et al. 1989), and it has been proposed that the theoretical basis in the selection of the items should be stronger. In accordance with a critical paper by Endler & Parker (1990), it was now found that the division of coping into the eight scales of Folkman & Lazarus (1988) is too detailed, because it leads to weak psychometric properties, e.g., Cronbach's Alphas for internal consistency. In the present series, the only coping style identified by the Folkman & Lazarus manual (1988) was Seeking Social Support, and only this and the two main categories of coping – 'emotion-focused' and 'problem-focused' strategies – had reasonable internal consistencies. The rest of the seven coping styles were not detected. The division of coping into five patterns presented by Dunkel-Schetter et al. (1992) in their cancer patient material was almost identical to the structure of coping with cancer found in this study. One of these coping patterns was Seeking Social Support, with slightly different items than the coping style by Folkman & Lazarus

(1988). Only the Seeking Social Support style/pattern was tapped with reasonable Alpha by using both scoring procedures.

Cancer diagnosis can be considered as a more severe stressor than most of the stressful events faced by people. It is probable that when the stressful encounter is a recent cancer diagnosis, coping process will not 'succeed', so that "there were little or no reason to experience emotional distress since the harmful or threatening relationship has been made subjectively benign" as Lazarus (1990) describes the result of coping processes. The malignant disease also remains malignant after cognitive and behavioral efforts to manage it. This might be one reason why the structure of coping in the case of cancer does not correspond to that in the case of less severe stressors (Dunkel-Schetter et al. 1992, Stanton & Snider 1993). Furthermore, the division of coping into clearly separable entities may be difficult in the case of newly diagnosed cancer, because coping was quite a homogeneous entity, the amounts of nearly all coping patterns used being positively correlated with each other. To some extent, the *Ways of Coping Questioonaire* and the *Coping With Illness Scale (CILL)* (Julkunen 1996) were associated with each other, but there was no correspondence between the individual scales of the two measures.

There were hardly any gender differences in the coping patterns, except that Seeking Social Support was clearly more used among female patients. This concurs with earlier findings: studies have failed to detect gender differences in coping with cancer (Dunkel-Schetter et al. 1992), or in coping with a negative event (Thoits 1991). In any case, women sought more social support than men after cancer diagnosis. This was not the case when support was measured as experienced social support.

Age has been reported to affect coping, e.g., older breast cancer patients have been reported to manage to cope better than younger ones (Stanton & Snider 1993) and younger people to use proportionately more active problem-focused forms of coping while older people use more passive emotion-focused forms of coping (Folkman et al. 1987, Folkman & Lazarus 1988). Age differences were also detected in the present series. In melanoma, older patients were less active copers than younger ones: perhaps the young have to struggle more to psychologically manage their cancer. The differences detected between the use of emotion-focused *versus* problem-focused coping were constant with the earlier reports. In breast cancer, higher age increased emotion-focused coping. In melanoma men, increasing age decreased Seeking Social Support (included in problem-focused coping), and in melanoma women it decreased Behavioral Escape-Avoidance and the problem-focused strategies used.

Unexpectedly, the modality of breast cancer treatment (operation only *versus* operation plus adjuvant treatments) did not affect coping with the disease. However, as noted before, cancer treatment had an effect on the amount of experienced social support.

Coping with cancer was measured from the entire 3–4 months' period after the diagnosis, so the measured coping responses did not only describe coping immediately after the diagnosis, but described the coping patterns used over the period. On the other hand, only one single cross-sectional measurement was now performed and thus the process nature of coping could not be investigated.

Anger expression – the cancer prone Type C personality pattern

Type C personality was assessed by the *Anger Expression Scale* (Spielberger et al. 1985, Spielberger & Sydeman 1994, Spielberger et al. 1995a and 1995b), which in factor analysis was divided into anger-in, anger-out, and anger control traits (as reported in coronary heart disease populations). Emotional non-expression, particularly the suppression of anger, has been claimed to be typical for cancer patients and to be the key concept in the Type C personality suggested to affect the initiation and progression of cancer. Anger-in type was dominant in the present patient series, being clearly more prevalent than anger-out trait, which concurs with the idea of the model of Temoshok (Greer & Watson 1985, Temoshok 1987, Eysenck 1994) on cancer prone Type C personality.

In melanoma, anger-in trait decreased and anger-out trait increased the use of coping patterns; patients who possess more anger-in trait were less active in coping with cancer, while patients with more anger-out trait coped more actively. In breast cancer, the relationships were weaker, but remained similar in the two escape-avoidance patterns. Thus, the associations and regressions between the anger expression traits and coping patterns correspond with the idea of anger expression influencing in coping with cancer

Non-cancer stressors

The aim of the stressor measurement was to evaluate the additional, not cancer-related stressor burden experienced by the patients in the early phase of cancer. Most researchers have shown that when comparing the desirable (positive) and undesirable (negative) life events, only undesirable changes are important (Zimmerman 1983a). At the minimum, the desirable and undesirable events should be measured separately (Sarason et al. 1978, Zimmerman 1983a), which could be done in the present study, because the *Life Experience Survey (LES)* allowed the evaluation of both positive and negative stress. In the measurement of life events both weighted (the patients' opinion of the impact of the events) and unweighted (number of life events *per se*) life event scales were used, although these have been reported to perform equally; weights have been reported to have no effect in health research (Zimmerman 1983b). In the present series the weighted and unweighted scales also correlated strongly: the total change score highly positively to the number of positive events and highly negatively to the number of negative events. Both melanoma and breast cancer patients reported significantly more negative than positive events. This is consistent with what the developers of the scale have reported (Sarason et al. 1978). People may be more inclined to report negative changes as 'events' whereas positive changes may be perceived as parts of the normal course of life.

In addition to the cancer diagnosis, the patients had experienced several other stressors in the recent past. During the year before the interview, the patients had, on the average, experienced three other life events or changes, although one-fifth of the patients had experienced none. Some of the events were simultaneous with the cancer diagnosis, some may have occurred after the diagnosis was made, and some may be due to the cancer diagnosis. In addition, the patients had approximately two chronic strains in their lives. Chronic life strains were more prevalent than life events.

The developers of the *Life Experience Survey* reported no gender differences (Sarason et al. 1978) while other researchers have reported e.g., gender and age differences in the incidence and/or severity ratings of events (Cleary 1981). In the present cancer data, women seemed to suffer more from non-cancer stressors than men. Women reported more negative life events, and two of the chronic strains, 'financial difficulties' and 'burden in the work activities or circumstances', were more common among women. The higher prevalence of these strains in women may be due to the lower income and/or work status of women when compared to men. Furthermore, breast cancer patients more often reported a chronic disease of spouse than melanoma patients, which may be due to the higher average age of the breast cancer patients. Breast cancer patients were middle-aged women who often have middle-aged, or older, not-so-healthy spouses whom they take care of. Older melanoma patients had fewer positive and negative life events than the younger ones, possibly because the lives of older people are usually less eventful.

The non-cancer stressor burden seemed to concentrate on the same patients: those with more chronic strains seemed to experience more negative life events. Chronic stressful situations may tend to produce more stressful life events, e.g., financial or social difficulties may lead to more conflicts with the environment, which may result in greater amount of negatively experienced life events.

As many as one-fifth of the patients reported a serious illness or injury of a close family member/relative or the death of a family member/relative. Thus, there had been serious illness or death in their lives already before their own cancer diagnosis, or these were present simultaneously[18]. In addition, every tenth melanoma patient had experienced the diagnosis of another chronic disease in the past year. Furthermore, more than one-third of the patients reported having a chronic illness as a chronic strain (diagnosed more than a year ago) and more than one-fifth a chronic illness in a family member.

Cancer related stressors and psychological stress processes

The patients with adjuvant cancer treatment had wider cancer-specific social network and experienced more social support from several sources than the patients with operation only. This was practically the only factor in the psychological stress processes that differed by cancer type or treatment. The differences in experienced social support and/or in cancer treatment modality may explain the great differences observed in the

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[18] According to observations during the interviews these patients felt their own cancer diagnosis to be very burdensome but, on the other hand, they had already psychologically processed their thoughts and feelings concerning serious illness and death.

psychological stress processes between the two cancer types. The breast cancer patients with operation only had similarities in their psychological stress processes with melanoma patients (who all were only operated on). The breast cancer patients with adjuvant medical treatment had different kind of stress processes, e.g., social support affecting coping less and the stress mediating factors affecting symptoms less than in the patients with no adjuvant treatment. The hypothesized connections between factors in the stress processes were stronger within the patients with no adjuvant cancer treatment and/or without the increase in social support associated with these treatments.

Although there were clear differences in the amount of experienced social support between the treatment groups, treatment had minor if any associations with the coping patterns used. This was unexpected, because the psychologically and physically burdensome cancer treatments were assumed to affect coping with the disease. The modality of breast cancer treatment did not at all affect coping patterns used with breast cancer. When compared within the total sample, patients with adjuvant cancer treatments used more the coping pattern Seeking Social Support and 'problem-focused coping strategies' with their cancer than the patients with surgery only. In breast cancer, the patients who had undergone total mastectomy used more 'emotion-focused coping' than the patients with the breast-conserving alternative. As noted, the treatment modality was capable of changing the psychological stress processes on the whole, and the change seemed to occur rather through the effect of experienced social support than through coping.

Study hypotheses, and statements of association, direction of dependence, effect, and causality

According to previous research presented in the review of the literature in this work, it was assumed that social support and personality are moderators of coping, that non-cancer stressors affect or interfere in coping with cancer, and that stressors concerning cancer diagnosis and treatment are the factors which influence the health outcomes through the mediating processes, namely social support, coping, and personality. Because of the large amount of previous research in the area, hypotheses could be derived concerning the factors and their relationships within the psychological stress processes in cancer. On the basis of these hypotheses, a model of psychosocial factors in a chronic disease was constructed to guide the statistical analyses on the relationships between the factors (Figure 1).

The basic statistical method used, the Pearson correlation (r), gives information solely on the associations between the factors *per se*; it does not permit any further conclusions on the nature of the relationships, e.g., the direction of the dependence or causality between the factors. On the basis of the study hypotheses and the model, it was possible to make statements on the dependencies and their directions, and to use regression analysis to investigate these dependencies further. According to the study hypothesis, two regression analysis models were created, the first concerning factors that influence coping with cancer (coping patterns as dependent variables), and the second concerning psychological stress processes that influence the symptoms and well-being experienced by the patients (symptom and well-being scales as dependent variables). In the latter model, the measured psychosocial variables preceded the outcome measures also in the sense that the independent variables were measured from the preceding several months period and the dependent variables, the symptoms, from the previous week or month only.

Even if the regression analysis procedure does not permit statements about causality (the first factor as a definite cause of the latter), it does allow interpretation of the direction of dependence (Krzanowski 1988, Draper & Smith 1998). That is, the factors preceding the other one(s) in the regression analysis model may be stated 'to effect' the latter ones. In the present cross-sectional non-experimental design, it is not possible to make statements about the causality between the factors in the psychological stress processes. Furthermore, it should be noted that the direction of dependence between the factors was investigated according to the study hypotheses only, with the exception of the relationship between experienced social support and anger expression. Thus, the present study does not allow interpretations of dependence of the factors or directions of the dependence between them outside the model presented.

Social support, anger expression, and stressors predicting coping with cancer

In the regression analysis (RA) model, experienced social support, anger expression, and stressors each had an influence on coping with cancer. The experienced social support predicted coping with cancer, but the effect was different between melanoma and breast cancer, and also between men and women. In melanoma, social support predicted coping with the disease, whereas in breast cancer, the predicting power of social support was weaker. Among men with melanoma the effect was far stronger than among women. Furthermore, increasing age increased Focusing on the Positive, Distancing, and 'emotion-focused strategies' in breast cancer, whereas it decreased Seeking Social Support in men, and Behavioral Escape-Avoidance and 'problem-focused coping strategies' in women with melanoma. It should, however, be noted that the sample included only the patients under 72 years of age.

Which coping patterns are affected? All coping patterns were affected by social support. More support led to more use of other coping patterns in general, but decreased the two escape-avoidance patterns (Cognitive and Behavioral Escape-Avoidance). Among men, more support led to much greater use of problem-focused coping strategies, whereas in women with melanoma, there was no effect, and in breast cancer the effect was weak. 'Emotion-focused coping strategies' was not predicted by social support. This concurs with Lazarus (1990) who claims that the use of problem-focused coping strategies vary by the context, i.e., by situational factors (here social support), but that emotion-focused are quite stable. Overall, these relationships support the idea of social support being a modifier of coping.

Which sources of support are influential? The influential sources of social support differed between genders. In men, the most influential sources of social support were other patients and acquaintances, whereas in women, with a weaker effect, the most influential source of support was friends. It was interesting that support from spouse, family, or relatives had only a minor effect on coping with cancer. Coping was predicted neither by support from the closest relationships (spouse and family) nor by support from relatives. The support experienced from the closest relationships was not capable of changing the patient's coping behavior. Furthermore, the closest relations may often be in as a severe crisis caused by the cancer as the patient him/herself. It was the support from the more distant relationships that was capable of changing the coping patterns of a cancer patient. The sense of support from these more distant sources may have been different than the support from the closest relationships. Friends, acquaintances, and fellow patients may be both 'close enough' to produce effective support and 'far enough' to support the patient effectively. Other patients are a unique source of social support, because they know by their own experience what the patient is going through.

A large amount of support was experienced from the health-care professionals, physicians and nurses, both groups with an equally high amount of experienced support. Support from physicians predicted coping with cancer, but support from nurses did not. Furthermore, support from nurses was the only support group that did not predict coping. For some reason their support was not effective, in terms of affecting coping with cancer, at least in this early phase of the disease.

Men and women derived benefit from support from different sources. It has earlier been claimed that men and women structure their social lives differently and benefit from different types of social relational systems, e.g., men appear to benefit from having extensive casual involvements in contrast to women who prefer fewer, more intimate ties (Gore & Colten 1991). This is highly relevant when describing the results presented here: men did benefit mostly the support from acquaintances and other cancer patients while women had the most benefit from support from friends. Social support has often been measured as 'close-ties' support or friend support only. In these studies, it has been found that support mediated stress in women only. Thus, Gore and Colten (1991) emphasize that measures of social support should not fail to tap the essential relationships for men, which has been successfully accomplished in this study.

Social support with anger expression predicting coping. The combined influence of both moderators – experienced social support and Type C related anger expression – on coping was analysed by RA. Anger expression factors did not explain away the influence of experienced social support on coping, but had an additional effect on coping with cancer. The two moderators seemed to have independent effect on coping. As to the individual coping patterns, there were, again, differences between the two cancer types and between genders. Of the three anger expression traits used, anger-out and anger control traits affected coping, but the hypothesized cancer prone anger-in trait mostly did not, except in decreasing problem-focused coping strategies in men.

Anger expression was clearly related to coping, but it was only slightly related to the amounts of experienced social support by sources. The experiences of support seemed to be fairly independent of the personality traits investigated.

The effect of stressors on stress mediating factors. An increase in the reported non-cancer stressor burden increased coping efforts with cancer. The effect was strong in melanoma. Patients who in the recent past already had had, or still had, more stress in their lives, now coped more intensively with the cancer diagnosis; in the presence of more life stress the disease required stronger efforts to be coped with. It has been proposed that in measuring stress causing life events one should concentrate solely on the measurement of negative life events (Zimmerman 1983a). This concurs with our results: usually only negative events tended to have an effect on the stress processes. It was mostly the negative non-cancer life events and chronic stressor burden which increased coping with cancer. The already stressed patients may have to struggle more with the new stressor, the cancer diagnosis. The non-cancer stressor load is assumed to be independent of the current disease stressors, but to affect coping with cancer, as presented by Dolbeaut et al. (1999) in their 'Model for psychosocial cancer research'. It may be concluded that it is advisable to take into account that cancer patients often have other stressful events or strains in their lives that affect coping with cancer. It would thus be beneficial for the patients to be screened for non-cancer stress during the medical care.

An exception in the effect of non-cancer stressors on coping was the pattern Distancing in breast cancer. The weaker the experienced stress effect, the impact of the diagnosis had been, and the more positive life changes there had been in the recent past, the more the patients had been able to manage their cancer by using Distancing as a coping pattern. Distancing was the coping pattern of the non-stressed breast cancer patients.

The more negative the cancer diagnosis had been felt to be, the more energetically the patients had coped with it. As described above, the stressors associated with cancer treatment had hardly any connections with coping with cancer. Breast cancer treatment did not predict coping with breast cancer, but in the whole series of patients those with adjuvant treatment used more Seeking Social Support and 'problem-focused coping strategies' (which included the former) than patients with operation only.

Opposite to the treatment variable, the reported non-cancer stressors were only weakly associated with the social support experienced: more stress was associated with more optional support (the non-close, non-professional support). Fewer non-cancer stressors were associated with stronger anger-in trait and more non-cancer stressors with stronger anger-out and anger control traits. The patients with a tendency to avoid the expression of angry feelings reported fewer stressful events, whereas patients who express their anger or control their angry feelings reported more of these.

Gender differences. Coping with illness was differently predicted between men and women by other factors in the psychological stress processes. There were hardly any gender differences[19] in the amounts of the factors in the psychological stress processes

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[19] These differences were restricted in one of the eight categories of experienced social support: more support from physicians in men, in one of the five coping patterns: more Seeking Social Support in women, and there were none in anger expression traits. However, when regarding the stressors, the reported life events were remarkably more common among women than among men, and amount of negative events slightly higher.

per se. However, despite the relative similarity in the amounts of these factors, their effect on coping was clearly different between men and women. In earlier reports, men and women have been shown to experience different types of stressors, or to experience the same stressor differently (Cohen & Wills 1985, Thoits 1991). According to our results, men and women may experience different types of stressors or experience the same stressor differently, but in concurrence with the previous reports, there were no differences in the coping itself (Thoits 1991, Dunkel-Schetter et al. 1992). However, it is doubtful whether the observed difference in the amount of experienced non-cancer life events was enough to produce the great differences in the stress processes between genders. It is more probable that there are more comprehensive gender differences in the psychological stress processes themselves, i.e., these processes occur according to different rules in men than in women. Gender differences in psychological stress processes have been continuously indicated to exist (Gore & Colten 1991, Thoits 1991) and the issue needs to be studied further.

Psychological and physical symptoms, and well-being

The symptomatology of newly diagnosed cancer patients has been claimed to be primarily related to the psychological response to diagnosis and treatment, and to the physical morbidity associated with the medical treatment and/or its complications. Unexpectedly, there were no differences between melanoma and breast cancer in the amount of psychological or physical symptoms experienced. Furthermore, there were no differences according to the treatment modalities in breast cancer in psychological or physical symptom measures. There was only one difference in the breast cancer specific symptom measure: the patients with adjuvant treatment had more symptoms in the operated breast area when compared to patients with operation only (radiotherapy, for example, causes local adverse effects). Some melanoma patients received adjuvant interferon treatment and their cancer treatment was more active than that of other melanoma patient's. Interferon treatment may cause neuropsychological adverse effects (Jones & Itri 1986, Dorr 1993) and thus increase psychological and/or physical symptoms. However, the number of these patients was too small to create comparable subgroups according to melanoma treatment.

The *Rotterdam Symptom Checklist (RSCL)* was, in factor analysis, divided into several different physical symptoms and into a factor of psychological symptoms; this has also been reported earlier (de Haes et al. 1990). The reported amounts of these two symptom groups correlated highly positively with each other – psychological and physical well-being were not experienced as separate. Nearly all patients reported physical or psychological symptoms, the most common in both diagnoses being 'fatigue', 'lack of energy', and 'worrying', all these were experienced by over two-thirds of the patients. None of these symptoms may be considered very surprising in the case of recent cancer diagnosis. Nearly all patients reported to experience at least some psychological symptoms, and each of the eight psychological symptoms were reported by about half or more of the patients. Thus, experienced psychological symptoms were not rare, and their existence may not be seen as a sign of psychological morbidity. Women reported slightly more psychological symptoms than men, a commonly reported result, and younger melanoma patients more symptoms than the older ones.

The perceived quality of life was, on the average, ‘quite good’, which may be considered high in the case of newly diagnosed cancer patients. About one-tenth of the patients assessed their life quality as ‘excellent’, and none felt their life quality to be ‘very poor’. In conclusion, the patients did not perceive their quality of life to be poor; it was far from wretched.

In the *DEPS Depression Scale* there were no statistically significant differences between the two diagnoses. When the total sample (melanoma and breast cancer patients together) was divided into those with surgery only and those with operation plus adjuvant treatment, the patients with adjuvant treatment experienced more depressive symptoms. One-fifth of the melanoma and one-fourth of the breast cancer patients scored over the *DEPS* cut-off point indicating the need for additional examination for possible clinical depression (Salokangas et al. 1995 and 1996). However, in melanoma men, the score over the cut-point was rare (3 patients out of 36). As commonly reported, women reported more depressive symptoms than men (e.g., Gore & Colten 1991). Three-fourths of the patients reported having ‘felt blue’, followed by ‘felt low in energy or slowed down’, and ‘felt everything was an effort’, each by over half of the patients. One may wonder whether these items, in the case of newly diagnosed cancer, are actually indicators of ‘depression’ or rather a sign of normal psychological reactions to a recent cancer diagnosis.

Every breast cancer patient had at least some symptoms measured by EORTC QLQ breast cancer module. Nearly all patients still had symptoms in the breast area operated on. However, the reported effect of breast cancer on femininity and sexuality was not strong; one-third of the patients reported that breast cancer had not affected their feminine body-image at all, and only few patients reported greater effect. It was not unexpected that the patients with mastectomy reported significantly greater effect on body-image than the patients with breast conserving alternative. It was, however, somewhat unexpected, that only little more than every tenth patient indicated that the disease had affected their femininity, and only few that they found it difficult to see themselves naked. In conclusion, the influence of breast cancer and/or its treatment did not seem to have a major effect on most women’s body-image and femininity. In breast cancer, over half of the patients reported decreased sexual interest, but in melanoma the amount was nearly as high. Thus, this effect was not due to the organ operated, but more likely due to being ill and operated on *per se*. On the other hand, half of the patients did not report decreased sexual interest 3–4 months after cancer diagnosis.

Psychological stress processes predicting symptoms and well-being in the early phase of cancer

In regression analysis (RA), the predicting power of psychological stress processes on symptoms was strong, explaining as much as half or more of the variance of the symptoms. The effect was stronger in melanoma. Social support by source, coping patterns, anger expression traits, and stressors, each have their effect on experienced symptoms.

The amount of psychological symptoms experienced was strongly predicted by psychological stress processes. The two escape-avoidance coping patterns increased psychological symptoms. More anger-out trait increased psychological symptoms in men and anger control trait in breast cancer. The number of negative non-cancer life events increased experienced psychological symptoms in both female groups.

Physical symptoms were predicted by coping in melanoma, but, unexpectedly, not at all in breast cancer. Greater amount of non-cancer stress predicted more physical symptoms in both cancer types and genders.

Quality of life was totally differently predicted between genders and the two cancer types. In men, more positively experienced impact of the diagnosis decreased the quality of life, whereas in melanoma women, it increased it. Quality of life was, no wonder, worse after greater non-cancer stressor burden. In men, increasing age diminished the quality of life.

The amount of depressive symptoms was predicted by all the factor groups investigated, but, as in the case of quality of life, different factors affected in the two cancer groups and in gender groups. In melanoma, a greater degree of depression was strongly predicted by more use of coping Behavioral Escape-Avoidance in both sexes. In both groups of women, the score of 9 or more in DEPS was present when more of the both escape-avoidance coping patterns were used. Stanton and Snider (1993) have reported that cognitive avoidance coping predicted more distress in breast cancer. In the present series, more reported depression in breast cancer was, in RA, predicted by several variables. Furthermore, at least one variable from each of the measured factors in the stress processes (social support, coping, anger expression, and stressors) predicted the amount of depressive symptoms. This concurs with the findings of Stanton and Snider (1993) who reported that, consistent with the theory of Lazarus and Folkman, several kinds of psychosocial factors predict mood in breast cancer. The presence of adjuvant treatment associated with more depressive symptoms in the total sample, which is understandable on the basis of the psychological and physical burden caused by cancer treatments.

The breast cancer specific symptoms were only mildly predicted by factors in the stress processes. An exception was that experienced social support from acquaintances and family increased the experienced sexual well-being in sexually active patients.

Unexpectedly, differences in the amounts of reported symptoms were explained by psychological stress processes, not by the biological nature of the disease, melanoma or breast cancer. On the other hand, symptoms were predicted differently by psychosocial stress processes in the two cancer and/or treatment groups. As described, the only psychosocial factor that differed between these cancer groups was the amount of experienced social support, which was higher when there had been adjuvant treatments after operation. The higher amount of social support and/or adjuvant cancer treatment seemed to have led to changes in the psychological stress processes on the whole, and also further to differences in the effects of the processes on symptoms experienced. It may be concluded that adjuvant medical cancer treatment may have had an additional effect by producing more social support, which affects first the psychological stress processes and second, through the stress processes, the symptoms experienced. As a result, the patients without adjuvant medical treatment and the extra support produced by this, also receive something less in the psychosocial sense. Social support has been reported to be the means for changing coping, psychological stress processes, and well-being of cancer patients (House et al. 1988, Rowland 1989, Blanchard et al. 1995). The results concurred with the idea that deliberately induced increase in social support, that is, psychosocial intervention, may lead to changes in the psychological stress processes and in the symptoms experienced.

CONCLUSIONS

Based on the results obtained, following conclusions were reached:

1. Experience of cancer is, in the early phase of the disease, usually shared with others. When patients discuss their cancer, it is felt to be supportive, but an increase in the number of persons in a support source does not increase the amount of experienced support. Thus, even one good relationship in a source may be enough to produce an important amount of experienced support. The highest amount of support is experienced from the spouse. Physicians and nurses seem to be nearly as important as spouse when evaluated by the amount of experienced support.
2. A new method, *the Structural-Functional Social Support scale (SFSS)*, addressing social support experienced by patients with a chronic disease was developed within this study. Both the cancer-related social network (sources of support) and the functional social support derived from these sources can be evaluated by SFSS. In the early phase of cancer, functional social support can be sorted out into different categories according to the sources of support. Division according to the functions of social support (emotional and practical) seems, at least in the early phase of cancer, to be weaker and not present in every source. SFSS measures social support from a different viewpoint (actually experienced social support) and more widely (from more relationships) than the previously validated methods it was compared to. SFSS is applicable for research purposes and capable of producing interesting additional information on social support.
3. The results support the hypotheses about the factors involved or influencing in the psychological stress processes in cancer and the relationships between these factors: experienced social support, anger expression traits, and stressors have an influence on coping with cancer. More social support seems to lead into more use of other coping patterns in general, but decrease the escape-avoidance patterns; thus social support helps patients to cope with their cancer. Anger expression personality traits do not explain away the influence of experienced social support, but have an additional effect on coping with cancer. Non-cancer stressor load associated with increased coping effort with cancer: patients with more non-cancer stressor load have to struggle more to cope with their cancer.
4. Factors in the psychological stress processes predict symptoms in the early phase of cancer, differences in the investigated cancer types (melanoma, breast cancer) or treatment do not affect the amounts of symptoms experienced. Together with the other factors in the psychological stress processes coping seems to have an effect on the amount of symptoms experienced, well-being, and depression.
5. There are marked gender differences in the psychological stress processes. Experienced social support, anger expression, and stressors affect coping differently in men than in women. Also the outcome, the symptoms, is affected differently between the genders. Men benefit mostly support from acquaintances and other cancer patients (extensive casual relationships) while women have the greatest

benefit from support from friends (more intimate relationships). When patients are asked to report experienced support also from more distant relationships, we get information of the kind of support that is effective for men.

6. Because of the good or sufficient psychometric properties, the previously validated measures used are applicable in this kind of design for evaluating psychological stress processes of cancer patients and also seem to be applicable in follow-up studies. Only *MOS Social Support Survey* seemed to be less applicable, most patients perceived to have lot of social support if needed; the items were skewed heavily towards the positive end of the distribution.
7. In addition to health research, the results may be of application in clinical cancer treatment. The patients who receive adjuvant cancer treatment, in addition to surgery, experience more social support. Thus, adjuvant medical treatment results in discussions about the disease and/or its treatments with relatives, friends, acquaintances, and other patients, producing more experienced support for the patients. Patients without adjuvant medical treatment need adjuvant psychosocial treatment to achieve, in this respect, equality with the other patients. Psychosocial cancer care is not systematically arranged in Finland, which is different from the practice in most western countries.

FUTURE PERSPECTIVES

The results of the present study raise questions about the stability or lability of social support experienced in psychological crisis due to a severe chronic disease. Social support is a process and thus changing over time (Folkman et al. 1986a and 1986b, Thoits 1986, Stewart 1989). Thus, further studies should focus on longitudinal designs. Do the amounts of social support experienced from different sources change with time, and do different sources of support have different importance in the long run? Do the relationships between the structural and functional aspects of support remain unchanged, or will they alter? Does the functional support differentiate so that the functions can be recognized more clearly? The present study material permits follow-up approaches that can answer at least part of these questions.

Further, the potential changes in all the investigated factors in the psychological stress processes and in the symptoms experienced would be of interest. Because coping is claimed to vary between one stage of a sressful encounter to another (Lazarus 1990), it is likely that the coping patterns used do alter in quality or quantity during the time continuum of the cancer crisis. In a follow-up design, the process nature of coping with cancer could be clarified, along with the further effect of non-cancer stressor load on the processes of coping with cancer.

The effects between experienced social support and other factors would be especially interesting. Because social support has been reported to help coping, being its moderator (Cohen & Wills 1985, Thoits 1986), perhaps changes in social support lead to changes in coping and/or in the other factors in the psychological stress processes. Does experienced social support help in coping with cancer in the long run, and what other states or processes should be present in a favorable and successful process of coping with cancer? The effects between also the other factors would, however, not be without interest. Which of the factors would have predictive value on the others in a follow-up design? Type C personality has been proposed to affect progression of cancer (Temoshok 1987), thus the potential effect of the Type C personality related anger expression traits on the progression of cancer would be of interest. Anger expression may be seen as the most stable of the factors investigated, and, unlike the other factors, a single measurement of anger expression may be sufficient.

A further issue is, how the amounts or qualities of the symptoms experienced will alter, and, of great importance, how psychological stress processes will predict the physical and psychological symptoms experienced by the patients in the long run?

In addition to health research, the results of this study, and those of the on-going follow-up study, may have applicable value on evaluation of the need of adjuvant psychosocial cancer treatment. If social support is capable of adding experienced social support, which aspects or components of support are the most beneficial to be influenced? Should the intervention differ according to the treatment modality or gender? Furthermore, would there be differences in the psychosocial outcomes between the patients with different amount of experienced support and/or medical cancer treatment? Does adjuvant medical treatment result in different level of well-being in the long run than surgery only? Is psychosocial adjuvant treatment needed especially for the patients without adjuvant medical cancer treatment?

Social support has been suggested to affect even on the survival time of non-advanced cancer (House et al. 1988, Blanchard et al. 1995). The final target of the research project is to investigate the effect of the factors in the psychological stress processes on biological outcome measures (outcome of cure, disease-free survival, survival) of melanoma and breast cancer.

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The origins of this work are at the Department of Radiotherapy, Tampere University Hospital (then called Tampere University Central Hospital) in 1981. Then, as a young student of radiological nursing, I started to wonder why – as I was told – the effect and side-effects of cancer treatment seemed to be affected by psychosocial factors. These thoughts led, through studies in psychology with a master's thesis in psychosocial oncology, to ideas about investigating the psychosocial aspects affecting well-being of cancer patients. These ambitions were encouraged by the late Professor of Psychology, Tapio Nummenmaa, Ph.D.

In 1993 Tampere School of Public Health offered me a great opportunity to carry out studies leading to a doctor's degree in philosophy at the Medical Faculty of University of Tampere. This was made possible by the interest of my first supervisor, Assistant Professor Sakari Karjalainen, M.D., and by encouragement from Professor Matti Hakama, Ph.D.. At the same time, Professor Markku Ojanen, Ph.D., of the Department of Psychology, was kind enough to offer his expertise for the research project and to join the supervising group. The Department of Oncology in Tampere University Hospital offered me access to the patients, for which I thank Professor Kaija Holli, M.D., and especially the medical director of the Department of Oncology, Dr. Tapani Hakala, M.D., who had already supported my master's thesis.

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University of Tampere, September 2000

Ulla - S. Lehto

Ulla-Sisko Lehto-Järnstedt

Ville, 8 vuotta:
Äiti, milloin toi työ on valmis?
Sä olet kirjoittanut jo ainakin miljoona sivua.

Minä (hetken mietittyäni):
Niin olen.

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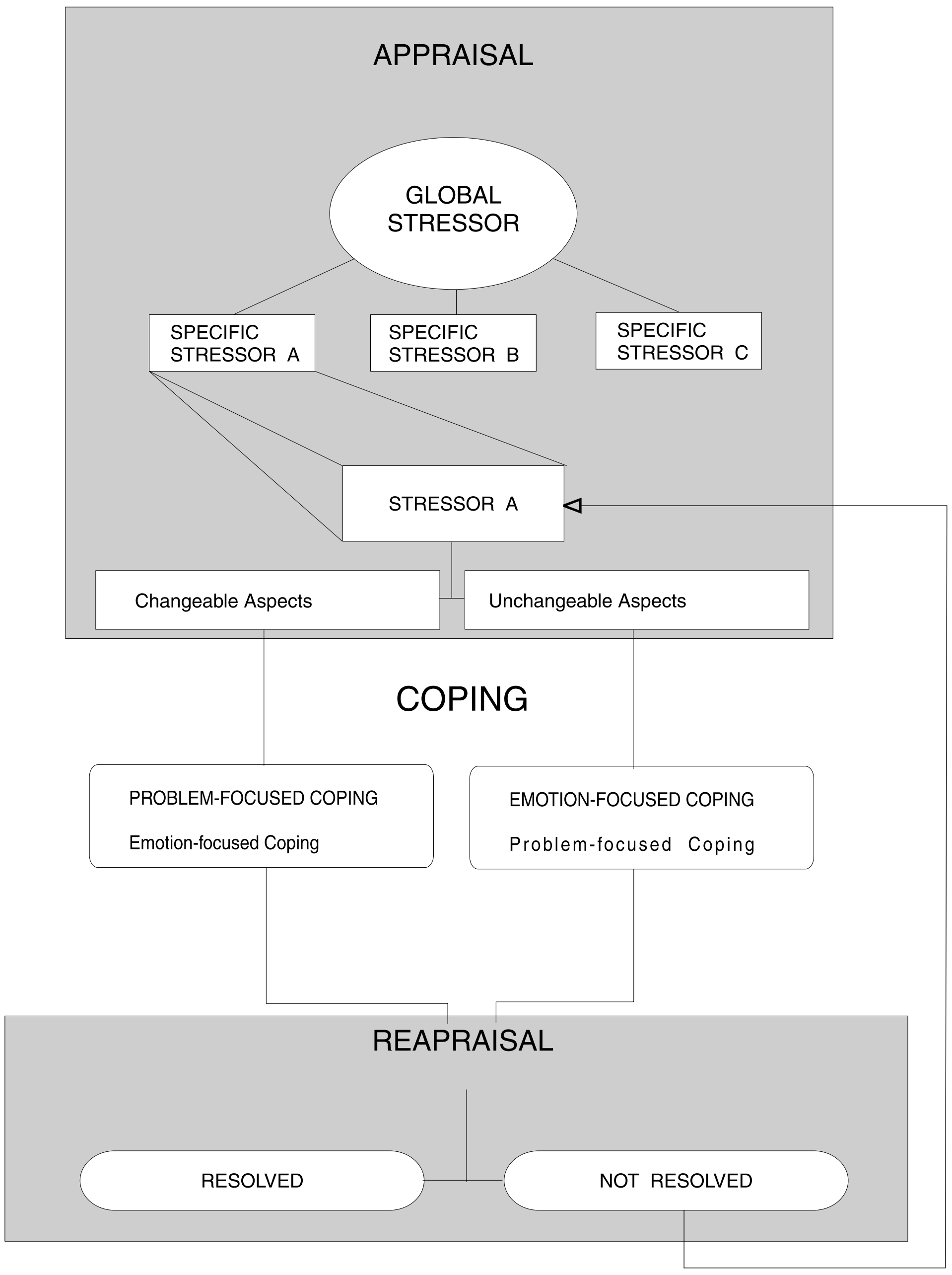
Appendix 1

Appraraisal and coping model by Folkman et al. (1991)



Appendix 2

Contents of structural items (sources of support) in Structural-Functional Social Support Scale (SFSS)

1. Are you married / cohabiting / dating regularly (and discussed about your cancer with your spouse or partner)?
2. Have you discussed about your cancer with your family members? No / Yes

   If so, with how many persons from the following groups: children under 13 years, children between 13 and 17 years, adult children (18 or over years), other adults (who?).
3. Have you discussed about your cancer with your relatives (own or spouse's)? No / Yes

   If so, with how many persons from the following groups: children and their families, parents, siblings and their families, aunts, uncles, cousins and their families, other relatives.
4. Have you discussed about your cancer with your friends? No / Yes

   If so, with how many persons from the following groups: close friends, other friends.
5. Have you discussed about your cancer with your acquaintances?

   Indicate the right group: none, 1 – 4 acquaintances, 5 – 10 acquaintances, 11 – 20 acquaintances, more than 20 acquaintances.
6. Have you discussed about your cancer with others who have, or have had, a cancer disease?

   Indicate the right group: none, 1 – 2 persons, 3 – 5 persons, more than 5 persons.
7. How many physicians have took part in the examinations or treatment of your cancer?
8. How many nurses have took part in the examinations or treatment of your cancer?

   Indicate the right group: less than 5 nurses, 5 – 10 nurses, more than 10 nurses.
9. Have you discussed about your cancer with other relationships that have not been mentioned here?

   No / Yes
   If so, indicate the group (maximum two groups) and number of members in it.

Appendix 3

Mean social support scores (with SD, range, and homogeneity of the subscales) of MOS Social Support Survey [1] items, all patients together

Items	M	SD	Range	Alpha
Structure of social support				
1. Number of close friends and relatives	9.59	8.87	1 - 70	
Perceived social support				
Emotional/ informational support (12 items)	49.41	8.01	25 - 60	.92
1. Listen to you when you need to talk	4.39	0.74	2 - 5	
2. Give you good advice about crisis	3.85	1.00	1 - 5	
3. Have a good time with	4.29	0.79	2 - 5	
4. Give you information to understand a situation	3.95	0.92	1 - 5	
5. Confide/ talk about yourself or problems	4.35	0.91	1 - 5	
6. Get together for relaxation	4.27	0.82	2 - 5	
7. Whose advice you really want	3.73	1.06	1 - 5	
8. Help you get your mind off things	3.97	0.91	1 - 5	
9. Share your most private worries	4.26	1.01	1 - 5	
10.Turn to for suggestions about a personal problem	3.91	1.00	1 - 5	
11.Do something enjoyable with	4.14	0.93	1 - 5	
12.Understand your problems	4.28	0.81	1 - 5	
Practical support (4 items)	17.06	3.06	7 - 20	.79
1. Help if you are confined to bed	4.42	0.82	1 - 5	
2. Take you to the doctor if you need it	4.50	0.86	1 - 5	
3. Prepare your meals if you are unable	4.00	1.13	1 - 5	
4. Help with daily chores	4.15	1.04	1 - 5	
Affectionate (love) support (4 items)	17.80	2.88	4 - 20	.89
1. Show you love and affection	4.60	0.74	1 - 5	
2. Offer you tenderness [2]	4.42	0.78	1 - 5	
3. Hug you [3]	4.20	0.98	1 - 5	
4. Love and make you feel wanted	4.57	0.80	1 - 5	
Perceived support, total	84.27	12.13	39 -100	.93

Note. Number scale from 1 (none of the time) to 5 (all of the time) in every item.

[1] Sherbourne & Stewart (1991).

[2] This item added by Aalto et al. (1995).

[3] This item excluded by Aalto et al. (1995).

Appendix 4

Contents of coping patterns by Ways of Coping Questionnaire (WCQ) items with homogeneity and factor loadings derived by explorative factor analysis, all patients together

Coping pattern	Alpha [1]		Loading
	Melanoma	Breast cancer	
Factor 1. Focusing on the positive	.68	.82	
1. I changed something about myself			.63
2. I thought about how a person I admire would handle this situation and used that as a model			.61
3. I changed or grew as a person			.61
4. I came out of the experience better than when I went in			.61
5. I changed something so things would turn out all right			.55
6. I criticized or lectured myself			.53
7. I found new faith			.48
8. I rediscovered what is important in life			.48
9. I came up with a couple of different solutions to the problem			.39
10. I got professional help			.38
Factor 2. Distancing	.64	.67	
1. I made a plan of action and followed it			.63
2. I tried not to act too hastily or follow my first hunch			.54
3. I tried to keep my feelings about the problem from interfering with other things			.53
4. I talked to someone who could do something concrete about the problem			.50
5. I looked for the siver lining, so to speak,; I tried to look on the bright side of things			.49
6. I slept more than usual			.46
7. I was inspired to do something creative about the problem			.38
8. I went on as if nothing had happened			.28
9. I drew on my past experiences; I was in a similar situation before			.21
Factor 3. Seeking Social Support	.83	.70	
1. I talked to someone about how I was feeling			.57
2. I talked to someone to find out more about the situation			.54
3. I let my feelings out somehow			.53
4. I accepted sympathy and understanding from someone			.52
5. I asked advice from a relative or frind I respected			.48
6. I prayed			.37
Factor 4. Cognitive Escape-Avoidance	.66	.68	
1. I hoped for a miracle			.62
2. I did something that I didn't think would work, but at least I was doing something			.58
3. I refused to believe that it had happened			.57
4. I wished that the situation would go away or somehow be over with			.54
5. I had wishes about how things might turn on			.48
6. I tried to get the person responsible to change his or her mind			.46
7. I promised myself that things would be different next time			.42
8. I apologized or did something to make up			.32
9. I tried to keep my feelings to myself			.26
Factor 5. Behavioral Escape-Avoidance	.62	.65	
1. I took it out on other people			.68
2. I generally avoided being with people			.56
3. I took a big chance or did something very risky to solve the problem			.53
4. I kept others from knowing how bad things were			.52
5. I realized that I had brought the problem on myself			.51
6. I tried to make myself feel better by eating, drinking, smoking, using drugs, or medications			.45
7. I expressed anger to the person(s) who caused the problem			.42
8. I tried not to burn my bridges, but leave things open somewhat			.38

Total 43 items, 7 items were excluded because of low or duplicate loadings.

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[1] Cronbach's Alpha for internal consistency (homogeneity of the scale).

Appendix 5

Anger expression traits [1] predicting experienced social support [2] in stepwise regression analysis

Social support by sources	Melanoma *Men (n = 36)*	*Women (n = 36)*	Breast cancer *(n = 103)*
	β [3]	β	β
Spouse or partner	–	–	–
Family			
Ager-in	- .38* R^2 *.14*	–	–
Anger control		.39* R^2 *.15*	–
Relatives			
Anger-out	–	–	- .22* R^2 *.05*
Friends			
Anger-out	–	.36* R^2 *.13*	–
Acquaintances			
Anger control	–	–	- .24* R^2 .06
Other patients			
Anger control	.43** R^2 *.18*	–	–
Nurses	–	–	–
Physicians	–	–	–

Note. – Not entered in the model in stepwise procedure. R^2 = R Square for the final model.

[1] By Anger Expression (AX) Scale by Spielberger et al. (1985, 1994 and 1995a).

[2] By Structural-Functional Social Support Scale (SFSS): experienced social support by sources.

[3] Standardized Beta coefficient.