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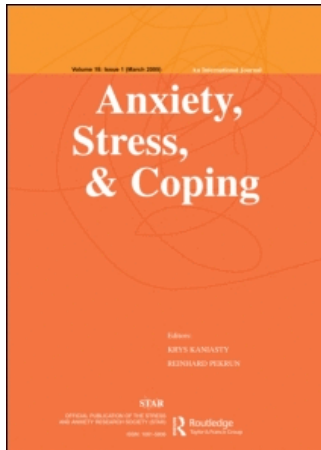
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Coping and quality of life after tumor surgery: Personal and social resources promote different domains of quality of life

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Abstract

Personal and social resources facilitate the adaptation to critical life events. The present study investigates whether general self-efficacy beliefs and received social support elevate cancer patients' physical, emotional, and social well-being directly, or whether these effects are rather mediated by active or meaning-focused coping. Gastrointestinal, colorectal, and lung cancer patients were approached at 1 month and at 6 months after surgery ($N = 175$). Structural equation models indicate that self-efficacy at 1 month after surgery exerted a positive direct effect on all three domains of health-related quality of life at 6 months after surgery, but indirect effects through active and meaning-focused coping were also observed. Initial received support elevated later emotional well-being, but not the other two quality of life domains. This effect was not mediated by coping. Results suggest the development of interventions to increase optimistic self-beliefs and coping skills in tumor-surgery patients.

Keywords: *Quality of life, well-being, cancer surgery, self-efficacy, social support, coping*

Despite improvements in treatment, cancer is a critical life event that has consequences within many life domains. Adaptation to cancer continues long after surgery (Spencer, Carver, & Price, 1998). Even successful curative surgery, considerable improvement in pharmacological treatment, and a good prognosis leave the patient and his or her family with uncertainty due to the permanent threat of cancer recurrence at the same or different tumor sites. Research indicates that psychosocial and behavioral variables such as self-efficacy beliefs, social support, and coping have an impact on patients' adjustment to cancer and related treatments.

Perceived self-efficacy

In a stressful encounter, coping competence – that is, the competence to deal with difficulties in an attempt to overcome them – has to match the demands of the situation.

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However, actual competence is not a sufficient prerequisite for action. If individuals underestimate their potential for successful action, they are less likely to attempt adaptive strategies. Thus, perceived competence or perceived self-efficacy is crucial (Bandura, 1997; Jerusalem & Schwarzer, 1992).

Perceived general self-efficacy refers to the optimistic self-belief in one's competence to exercise control over a wide range of difficult or novel tasks and to cope with adverse events (Bandura, 1997; Maddux, 2003; Schwarzer & Jerusalem, 1995b). High self-efficacious individuals choose more challenging tasks. Once they take action, they invest more effort and persist longer than those lower in self-efficacy. Self-efficacy can enhance the success in establishing supportive relationships (Holahan & Holahan, 1987). Perceived general self-efficacy makes not only a difference in how people think and act, but also in how they feel.

Research indicates that optimistic self-beliefs are important for cancer patients' recovery from surgery or for their adaptation to this chronic disease. In a heterogeneous sample of cancer patients, Cunningham, Lockwood, and Cunningham (1991) found strong positive correlations between self-efficacy for coping strategies and quality of life and between self-efficacy and mood. Among prostate cancer patients, Weber and colleagues (2004) found that an intervention for enhancing self-efficacy beliefs reduced depression. Among recurrent breast-cancer patients, self-efficacy was the most powerful predictor of psychological aspects of quality of life (Northouse et al., 2002). High self-efficacious patients reported less hopelessness, less negative appraisal of the illness, and better quality of life than did patients with more concurrent concerns. In a meta-analysis of 38 randomized studies, Graves (2003) tested effects of interventions based on social cognitive theory and aimed at improving cancer patients' quality of life. Interventions that included more social cognitive components targeting self-efficacy and outcome expectancies improved cancer patients' global affect, depression, objective physical outcomes, and social quality of life more than did interventions that included fewer social cognitive components or that were based on other theories.

Social support

Social support can strongly affect how people deal with challenges and threats. It may offer feedback that enables individuals to alter the way they view and experience the world and to undertake a process of cognitive restructuring (Sarason & Sarason, 1995).

Social support can come from different sources, such as the partner, family, friends, physicians, nurses, and other patients, and it may take different forms, such as emotional or instrumental support. Furthermore, it can be either perceived or received support. Perceived support refers to support expected to be available in a stressful situation, whereas received support pertains to whether someone actually did receive support in a stressful situation. The assessment of perceived support is most common. In contrast to actually received support, some authors (e.g., Sarason, Pierce, & Sarason, 1990) consider perceived support to be a personality trait, a sense of attachment, and do not only understand it as "resources provided by others." Both types of support need not necessarily be closely associated with each other (Dunkel-Schetter & Bennett, 1990), and they may have different effects on well-being (Komproe, Rijken, Ros, Winnubst, & 't Hart, 1997).

Social support is seen as alleviating the management of disease and the recovery from medical treatments (Schwarzer, Knoll, & Rieckmann, 2004). Social support is associated with psychosocial well-being among cancer patients. Social support can reduce or buffer the negative impact of the diagnosis and treatment of cancer (Cohen & Wills, 1985) and may have a positive influence on quality of life (Northouse et al., 2002). De Leeuw et al. (2000)

found among head and neck cancer patients that perceived support was associated with a decrease of depressive symptoms regardless of the situation, whereas the effect of received support was ambiguous. Support provision that is not tailored to the needs of the individual patient may result in poorer adjustment. For example, Reynolds and Perrin (2004) studied the effects of mismatches in social support among breast cancer patients and found that a misalignment of support between the provider and the receiver was associated with poor psychosocial adjustment.

Usually, the beneficial effects of social support on stress, well-being, and health are attributed to a buffering function that reflects support as a moderator. However, evidence suggests that there is also a mediator effect. Supporters also shape coping attitudes and skills, provide incentives for engagement in beneficial activities, and motivate others by showing that it is possible to overcome difficulties by persistent effort. Therefore, social support also has an enabling function by enhancing self-efficacy (a mediator) that, in turn, facilitates favorable health outcomes (Benight & Bandura, 2004).

Coping

Coping has two main functions: altering the troubled person–environment relationship (problem-focused coping) and regulating emotional distress (emotion-focused or cognitive coping). Both functions of coping are used by individuals in stressful situations. In the context of life-threatening diseases, researchers identified meaning-focused coping as a different type of coping. In meaning-focused coping, cognitive strategies such as positive reinterpretation or acceptance are used to reinterpret the meaning of a situation (Folkman & Moskowitz, 2004).

Cancer patients report a variety of coping responses, such as accepting the diagnosis as real, accepting impending death, trying to forget about the diagnosis, trying to find some benefit in the situation, seeking information, seeking social support, and confronting or tackling the problem directly (Spencer et al., 1998). Distinct kinds of coping seem to be employed together. For example, problem- and meaning-focused coping usually operate in conjunction. It seems that these two forms of coping even facilitate each other (Folkman & Moskowitz, 2004).

However, not all coping strategies are appropriate and useful across all situations. According to Lazarus and Folkman (1987), whether a coping process may have favorable or unfavorable results depends on who uses a coping strategy, when it is used, under which circumstances, and with regard to which types of adaptational outcomes. Active coping strategies are beneficial mainly in situations that provide ample scope for action. Reinterpretation or acceptance may be more useful in situations that offer little possibility for change (Carver, Scheier, & Weintraub, 1989; Updegraff & Taylor, 2000). Presumably, choosing coping strategies that fit the appraised controllability of a situation will produce better outcomes than choosing unfitting strategies (goodness-of-fit hypothesis; Folkman & Moskowitz, 2004).

Relations between social support, self-efficacy, and coping

Lazarus and Folkman's (1987) Transactional Stress Theory may be a useful backdrop in studying how patients adjust to cancer and related treatments. According to this theory, the stress process comprises antecedent, mediating, and outcome variables. Person and environmental variables, such as self-efficacy beliefs and social support, which are causal antecedents of the adaptation to stress, promote the recovery from critical life events.

Coping, that is, behavioral and cognitive activity aimed at responding to and overcoming adversity to place the person back into an active life, is a mediating process. Outcome variables of the stress process are, for example, psychological well-being, somatic health/illness, and social functioning.

There is established evidence for the effects of social support, self-efficacy, and coping on the well-being of patients with cancer, but previous research usually focused on direct effects of all three groups of variables (cf. Bisschop, Kriegsman, Beekman, Dorly, & Deeg, 2004). There is also some evidence that social support may affect the well-being of cancer patients both directly and indirectly, mediated by coping efforts (Manne, Ostroff, Winkel, Grana, & Fox, 2005). It has also been suggested that effects of self-efficacy on well-being may be mediated by coping strategies (Saltzman & Holahan, 2002).

Objectives

The purpose of the present study was to examine whether general self-efficacy beliefs and received social support facilitate the adjustment to cancer after surgery directly, or whether the effects of these personal and social variables are rather mediated by active and/or meaning focused coping. Adjustment was considered in terms of subjective health-related quality of life (HRQOL) that comprises the domains of emotional, physical, and social well-being (Power, Bullinger, Harper, & The World Health Organization Quality of Life Group, 1999).

Despite improvements in cancer therapy, even successful surgery and a good prognosis leave the patient with the permanent threat of cancer recurrence at the same or different tumor sites. Cancer is a chronic disease, and hence patients may feel that they face an uncontrollable situation. Active coping strategies may reveal their beneficial potential mainly in situations that provide ample scope for action, whereas unchangeable situations may rather call for reinterpretation or acceptance (Carver et al., 1989; Updegraff & Taylor, 2000). Therefore, a positive association between meaning-focused coping and HRQOL, but a negative association between active coping and HRQOL were expected among cancer patients. Furthermore, because meaning-focused coping is directed at threat minimization that enables individuals to manage their distress, it was expected to be positively associated in particular with emotional well-being.

Method

Research design and procedure

The present study is part of the Berlin Longitudinal Study on Quality of Life after Tumor Surgery. In collaboration with four hospitals and tumor treatment centers in Berlin, Germany, patients were approached at surgical wards by trained interviewers 3 to 5 days prior to a scheduled cancer surgery. Participants who had actually undergone surgery and whose cancer diagnosis had been either histopathologically confirmed or had not yet been falsified received standardized questionnaires at 1 month (time 1) and 6 months (time 2) after surgery. A stamped, addressed envelope was provided with each questionnaire.

Measures

Self-efficacy. Participants completed the General Self-Efficacy Scale by Schwarzer and Jerusalem (1995a), which comprises ten items, such as “*I can always manage to solve difficult*

problems if I try hard enough.” The response scale ranges from *not at all true* (1) to *exactly true* (4). The scale has demonstrated its high validity and reliability in many studies across various research contexts and ethnically diverse populations (e.g., Luszczynska, Gutiérrez-Doña, & Schwarzer, 2005). The internal consistency of this scale and all other measures in the present sample are displayed in Table I.

Social support. Received social support was assessed by subscales of the Berlin Social Support Scales (BSSS; Schulz & Schwarzer, 2003) that were developed for studying cancer patients. Patients were asked to think about the person who is closest to them and to evaluate how this person reacted to them during the past week. Ten items distinguish emotional (e.g., “*This person comforted me when I was feeling bad*”; six items) and instrumental support (e.g., “*This person took care of many things for me*”; three items) as well as satisfaction with support (“*In general, I am very satisfied with the way this person behaved*”; one item). The answering format ranges from *strongly disagree* (1) to *strongly agree* (4).

Coping. *Active coping* and *meaning-focused coping* were assessed by five and four items, respectively. All items aimed at coping strategies during the past week, and they were endorsed on a four-point scale ranging from *strongly disagree* (1) to *strongly agree* (4). Items were developed on the basis of the Brief Coping (Carver, 1997) and the Mental Adjustment to Cancer Scale (MAC; Watson, Greer, Young, Inayat, Burgess, & Robertson, 1988). *Active coping* comprises the two-item scale Active Coping of the Brief Coping (e.g., “*I’ve been taking action to try to make the situation better*”), one item of the scale Fighting Spirit of the MAC (“*I have tried to fight my illness*”), and two items on information seeking (e.g., “*I have tried to collect information about my illness*”) that were generated in this study. The Brief Coping scales Positive Reframing (e.g., “*I’ve been looking for something good in what is happening*”) and Acceptance (e.g., “*I’ve been accepting the reality of the fact that it has happened*”) with two items each were combined into *meaning-focused coping*. Confirmatory factor analysis (AMOS 4; Arbuckle & Wothke, 1999) supported the two-factor structure of the coping scales; $\chi^2(4) = 8.48$, $p = .75$, $\chi^2/df = 2.12$, normed fit index (NFI) = .95, Tucker Lewis Index (TLI) = .97, root-mean-square error of approximation (RMSEA) = .08.

Domains of health-related quality of life. Patients completed the scales physical functioning (e.g., “*Do you have any trouble taking a long walk?*”; five items), emotional functioning (e.g., “*Did you feel depressed?*”; four items), social functioning (e.g., “*Has your physical condition or medical treatment interfered with your family life?*”; two items), and role functioning (e.g.,

Table I. Means, standard deviations (SD) and Cronbach’s α for all scales ($N = 175$).

	<i>M</i>	<i>SD</i>	<i>Range</i>	α
Self-efficacy: time 1	3.08	0.53	1.5–4.0	.92
Received social support: time 1	3.80	0.37	2.0–4.0	.89
Active coping: time 1	2.91	0.71	1.0–4.0	.78
Meaning-focused coping: time 1	2.87	0.73	1.0–4.0	.73
Physical well-being: time 2	70.62	22.26	0.0–100.0	.82
Emotional well-being: time 2	65.67	26.54	0.0–100.0	.87
Social well-being: time 2	59.07	30.32	0.0–100.0	.89

Note. Time 1 = 1 month postoperation, time 2 = 6 months postoperation.

“Were you limited in doing either your work or other daily activities?”; two items) of the Quality of Life Questionnaire by the European Organization for Research and Treatment of Cancer (EORTC QLQ-C30; Aaronson et al., 1993) while referring to the past month. The QLQ-C30, the product of more than a decade of collaborative research, has been used in a wide range of cancer clinical trials and in various other, non-trial studies. It has proven to be psychometrically robust (i.e., reliable and valid), applicable, and valid across a range of cultural settings (Aaronson et al., 1993). The functioning scales have been demonstrated to be domains that represent the latent construct of HRQOL (Boehmer & Luszczynska, 2006). The items are coded with response categories ranging from *not at all* (1) to *very much* (4). Scale scores are transformed onto a range from 0 to 100 with a high score for a functional scale representing a high/healthy level of functioning. In the present study, the social and role functioning scales correlated with $r = .74$ ($p < .01$), which allowed for combining them into one four-item scale representing overall social well-being.

Participants

One month after surgery, 240 patients with malignant tumors completed the measures. The patients were on average 63 ($SD = 10.3$, range 22–86) years old. Women were slightly underrepresented (42%). Six months after surgery, 175 (72.9%) of these patients continued to participate in the study (age: $M = 63$, $SD = 9.6$, range 24–86 years; 41% female patients). Respondents who continued and the 65 persons who dropped out did not differ in terms of age, gender, marital status, cancer relapse, and tumor site. Patients who had undergone palliative surgery and patients with more than 3 months of time elapsed since initial cancer diagnosis discontinued their participation more often. Death records were not accessible.

Of the 175 patients of the longitudinal sample, 77% were married or had a partner, and the majority (82%) had children. The most frequent sites of cancer included colon (29%), rectum (25%), stomach (12%), liver and gall bladder (10%), lung and bronchi (9%), pancreas (7%), and esophagus (6%). Based on medical records, patients were classified as 25% being in cancer Stage I, 23% in Stage II, 23% in Stage III, and 29% in Stage IV. At the time of the surgery, 87% knew about their cancer diagnosis for a maximum of 3 months, and 74% were diagnosed with cancer for the first time in their lives. According to medical records, the surgical therapy had been curative for 92% of the patients. Asked for the type of treatment they had received in the month prior to the second wave, 27% indicated chemotherapy, 1% radiotherapy, 30% a different treatment, and 37% did not receive any medical treatment. Different treatments included regular checkups, aftercare, ultrasound, or treatment for non-cancer-related health problems. Two per cent of patients received chemo- and radiotherapy, and 1% indicated a combination of chemotherapy and a different therapy. Information on the treatment type was missing for two patients.

Data analyses of direct and indirect effects

Mediation, that is, an indirect effect, is said to occur when an effect of a predictor on the outcome is explained by some intervening variable (Shrout & Bolger, 2002). Mediation requires that the predictor significantly affects the outcome as well as the mediator, that the mediator significantly affects the outcome, and that the effect of the predictor on the outcome vanishes (full mediation) or decreases (partial mediation) when the mediator is included (Baron & Kenny, 1986).

The direct effects of self-efficacy beliefs and social support 1 month after surgery on physical, emotional, and social well-being 6 months after surgery as well as the possible mediation of these effects by active and meaning-focused coping, respectively, were analyzed by means of structural equation modeling with AMOS 4 (Arbuckle & Wothke, 1999) using the maximum likelihood estimation procedure. The mediation model comprised two predictors, two hypothesized mediators, and three outcome variables (all latent) (cf. Figure 1). All paths were left unconstrained. The direct effects model was specified as a nested subset of the mediation model by constraining all indirect paths in the mediation model to zero.

The three indicators of the latent variable of *social support* were received emotional support, received instrumental support, and satisfaction with the behavior of the support provider. Each set of items of the scales measuring general self-efficacy, physical functioning, or emotional functioning was first divided into two halves by odd–even split, then these two halves were scored separately, and finally these two scores served as indicators of the latent construct *self-efficacy*, *physical well-being*, or *emotional well-being*, respectively. The scores of the QLQ-C30 scales Social Functioning and Role Functioning served as the two indicators of the latent variable *social well-being*. The two predictors (self-efficacy, social support) and the three outcomes (physical, emotional, and social well-being), respectively, were specified as being intercorrelated.

Active coping and meaning-focused coping were used as mediators and were specified as being intercorrelated. The scores on the scales Active Coping and Information Seeking as well as those on the item measuring Fighting Spirit served as indicators for the latent variable *active coping*; the scores on the scales Positive Reframing and Acceptance served as indicators of the latent variable *meaning-focused coping*.

The χ^2/df ratio is suggested to be a useful criterion for model-data fit. According to a rule of thumb, a χ^2/df ratio less than 2 is a criterion for good fit (Tabachnick & Fidell, 2001). Additionally, the model–data fit was assessed by examining the NFI, the comparative fit

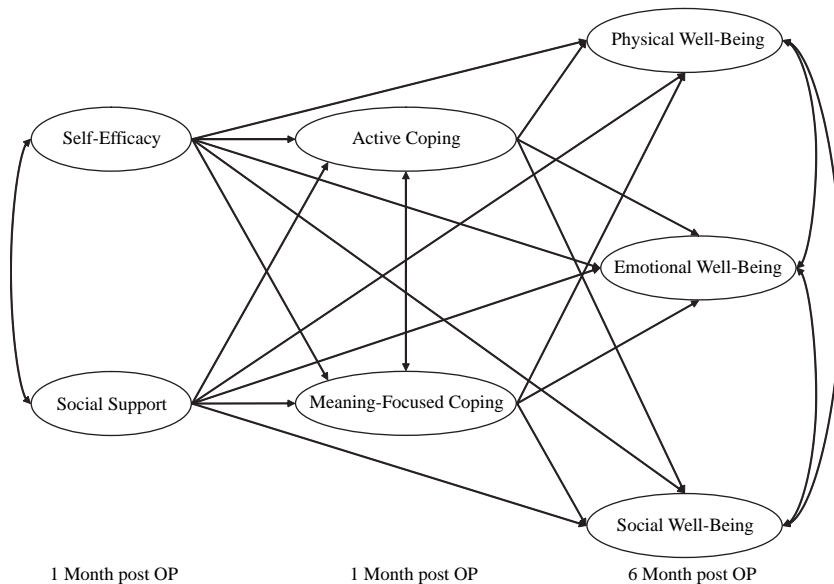


Figure 1. Structural equation model testing direct and indirect effects of personal (self-efficacy) and social (social support) resources on different domains of health-related quality of life. post OP =postoperative.

index (CFI), and the RMSEA. Values of the NFI and CFI higher than .90 are indicative of a good model-data fit (Tabachnick & Fidell, 2001). A value of the RMSEA of about .05 or less indicates a close fit of the model in relation to the degrees of freedom, and a value of about .08 indicates a reasonable model-data fit (Browne & Cudeck, 1993).

Comparison of the two nested models, that is, hierarchical analysis, was done by employing the chi-square difference statistic. The Sobel test was applied to calculate the significance of each observed indirect effect of a predictor on an outcome through a mediator (Sobel, 1982).

Results

Table I displays the means, standard deviations, and score ranges of the predictor variables, the hypothesized mediators, and the three domains of HRQOL at 1 month and 6 months after surgery. Patients reported moderate levels of perceived general self-efficacy, active coping, and meaning-focused coping (possible maximum score in each case 4.0). A mean value of 3.80 ($SD = 0.37$; maximum possible 4.0) for received social support signifies a high level of support experience. Mean scores for physical, emotional, and social well-being at 6 months after surgery ranged between 59.07 and 70.62, indicating minor to moderate problems. The correlations between the predictor and the outcome variables are presented in Table II.

Direct effect model

Analysis of the direct effect model returned a satisfactory fit between model and data, $\chi^2(93) = 173.20$, $p < .01$, $\chi^2/df = 1.86$, NFI = .89, CFI = .94, RMSEA = .07, $p = .02$. Figure 2 displays the results for the model.

General self-efficacy and received social support 1 month after surgery accounted jointly for 3% of the variance of physical well-being, for 14% of the variance of emotional well-being, and for 8% of the variance of social well-being 6 months after surgery. The two predictors were found to be slightly associated, $r = .16$, $p = .08$, and the three domains of HRQOL were moderately to strongly interrelated. Self-efficacy beliefs were observed to be predictive for cancer patients' physical, $\beta = .16$, $p = .06$, emotional, $\beta = .29$, $p < .01$, and social well-being, $\beta = .29$, $p < .01$, whereas received support merely had a significant effect on emotional well-being, $\beta = .19$, $p < .05$. The more self-efficacious the patients were

Table II. Correlations between self-efficacy, received social support, coping and well-being at 1 month (time 1 [t1]) and 6 months (time 2 [t2]) after surgery.

	SE T1	RS T1	AC T1	MC T1	PWB T2	EWB T2	SWB T2
Self-efficacy T1 (SE)							
Received social support T1 (RS)	.14 [†]						
Active coping T1 (AC)	.29**	.09					
Meaning-focused coping T1 (MC)	.38**	.15 [†]	.29**				
Physical well-being T2 (PWB)	.17*	.05	-.08	.04			
Emotional well-being T2 (EWB)	.29**	.19*	-.15*	.20**	.48**		
Social well-being T2 (SWB)	.26**	.03	-.19**	.20**	.64**	.70**	

Note. [†] $p \leq .10$, * $p \leq .05$, ** $p \leq .01$. SE = Self-efficacy; RS = Received social support; AC = Active coping; MC = Meaning-focused coping; PWB = Physical well-being; EWB = Emotional well-being; SWB = Social well-being.

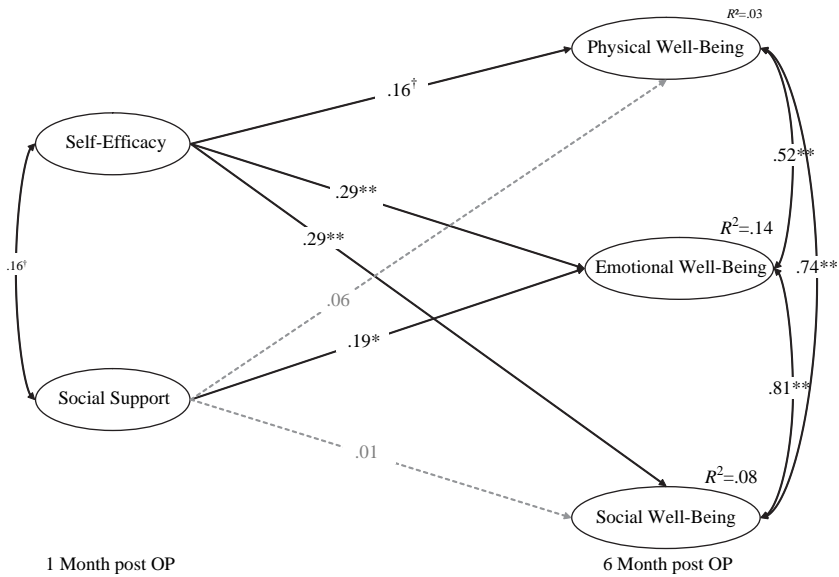


Figure 2. Structural equation model testing direct effects of self-efficacy beliefs and received social support at 1 month after surgery on different domains of health-related quality of life 6 months after surgery (nonsignificant paths dashed line; standardized regression coefficients; [†] $p \leq .10$, * $p \leq .05$, ** $p \leq .01$). post OP = postoperative.

1 month after surgery, the better they felt physically, emotionally, and socially 5 months later. Also, the more support they received 1 month after surgery, the better their emotional well-being was 5 months later.

Mediation model

Inclusion of the two coping variables as mediators into the model resulted in a substantial increase of variance explained in the three HRQOL domains (Figure 3). Altogether, general self-efficacy, received social support, and coping accounted for 6% of the variance in physical, for 25% of the variance in emotional, and for 29% of the variance in social well-being. Analysis of the mediation model also yielded a more satisfactory model-data fit than the direct effect model, $\chi^2(83) = 115.03$, $p = .01$, $\chi^2/df = 1.39$, NFI = .93, CFI = .98, RMSEA = .05, $p = .57$. The chi-square difference between both models was $\chi^2(10) = 58.17$, $p < .001$.

In the mediation model, general self-efficacy continued to affect all three domains of HRQOL directly, and received social support continued to affect emotional well-being directly. However, results also imply the existence of indirect pathways from general self-efficacy to physical, emotional, and social well-being through active and meaning-focused coping. Statistical significance of these indirect paths was supported by the Sobel test, except for the indirect path from self-efficacy to physical well-being through active coping; $z = -1.55$, $p = .12$ for the path from self-efficacy to physical well-being through active coping, $z = -2.45$, $p = .01$ for the path from self-efficacy to emotional well-being through active coping, $z = -2.71$, $p = .01$ for the path from self-efficacy to social well-being through active coping, $z = 1.67$, $p = .10$ for the path from self-efficacy to emotional well-being through meaning-focused coping, and $z = 2.27$, $p = .02$ for the path from self-efficacy to social well-being through meaning-focused coping.

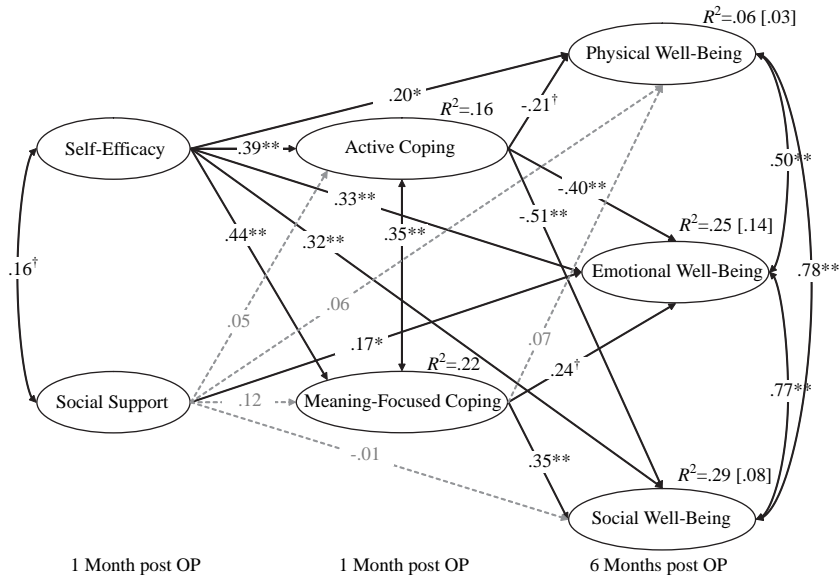


Figure 3. Structural equation model testing direct and indirect effects of self-efficacy beliefs and received social support at 1 month after surgery on different domains of health-related quality of life 6 months after surgery. Active coping partially mediates between general self-efficacy and emotional as well as social well-being (nonsignificant paths dashed line; standardized regression coefficients; † $p \leq .10$, * $p \leq .05$, ** $p \leq .01$). post OP = postoperative.

The stronger patients believed in their ability to cope with difficult demands in life, the more they engaged in an active and in meaning-focused coping, $\beta = .39$, $p < .01$ for active coping and $\beta = .44$, $p < .01$ for meaning-focused coping. Active and meaning-focused coping at one month after surgery were positively correlated, $r = .35$, $p < .01$, that is, patients who engaged highly in active coping also reported being highly engaged in meaning-focused coping. Active coping affected physical, emotional, and social well-being negatively, that is, the stronger patients engaged in active coping at one month after surgery, the lower their physical, emotional, and social well-being were five months later, $\beta = -.21$, $p = .09$, $-.40$, and $-.51$, $p < .01$, respectively. In contrast, meaning-focused coping had a positive influence on emotional and social well-being. The more meaning patients found in cancer one month after surgery, the better they felt emotionally, $\beta = .24$, $p = .06$, and socially, $\beta = .35$, $p < .01$, 5 months later.

Discussion

The aim of the present study was to examine whether general self-efficacy beliefs and social support facilitate the postsurgical adjustment to cancer directly or indirectly, that is, whether the adjustment is mediated by active and/or meaning-focused coping. Hypotheses and data analyses were based on Lazarus and Folkman's Transactional Stress Theory, in which antecedent, mediating, and outcome variables compose the stress process. As antecedent variables, resource factors were chosen that many authors argue to be among the most important resources (for an overview, cf. Taylor, 1999): competence for action (here: self-efficacy beliefs) and being embedded in a social system (here: social support).

As hypothesized, general self-efficacy beliefs facilitated cancer patients' long-term physical, emotional, and social well-being (cf. Figure 2). In line with Bandura (1997),

self-efficacy beliefs also affected how individuals coped with their illness and their postsurgical situation. The more self-efficacious patients were, the more they engaged in active and meaning-focused coping (cf. Figure 3). General self-efficacy stimulates active and adaptive coping because optimistic individuals harbor positive perceptions for the self as an agent in various domains of functioning. People with high assurance in their capabilities approach threatening situations with the confidence that they can exercise control over them, and this outlook reduces stress and lowers vulnerability to depression (Bandura, 1997).

Whereas self-efficacy promoted all domains of HRQOL, received support merely facilitated its emotional domain (cf. Figure 2). Additional analysis of relations between aspects of received social support (i.e., emotional and instrumental support), satisfaction with the behavior of the support provider at 1 month after surgery with the three HRQOL domains at 6 months after surgery replicated this finding. Whereas emotional and instrumental support as well as satisfaction with behavior of the support provider were significantly associated with emotional well-being, correlations of support variables with physical and social well-being were nonsignificant and close to zero. Patients scoring high on received social support and satisfaction with support might profit particularly in terms of their emotional well-being because receiving support does not necessarily alter their actual levels of physical and social functioning, but it might rather alter their emotional reactions towards their functioning and improve the support receiver's mood.

Received support did not have an impact on participants' active or meaning-focused coping. Specifically, the lack of an association between support and meaning-focused coping might be surprising in the light of recent studies among seriously ill persons recording effects of support on benefit finding (e.g., Cadell, Regehr, & Hemsworth, 2003; Park, Cohen, & Murch, 1996; Schulz & Mohamed, 2004). However, the measure of meaning-focused coping used in the present study does not capture the full concept of benefit finding, and it was not intended to do so. It rather aims at measuring a coping strategy similar to Brandstädter's (1989) accommodative mode, that is, a strategy of adjusting to constraints by accepting and reinterpreting them. It may be expected that this type of coping depends rather on situational circumstances, such as restrictions caused by disease and age, and to a lesser degree on interpersonal factors. Additionally, although meaning-focused coping often addresses social dimensions such as improvement of family relations, the measure used in the present study did not refer to this aspect, which might explain the lack of connection between received social support and meaning-focused coping. Finally, Saltzman and Holahan (2002) suggested that in prediction of negative affect, effects of social support on coping strategies are mediated by self-efficacy, and no direct effects of support on coping may appear.

Although Transactional Stress Theory proposed coping to mediate between the effects of the antecedents on the long-term effects, substantial direct effects from general self-efficacy beliefs and received support on HRQOL were observed in addition (cf. Figure 3). Models in which there is only partial mediation rather than complete mediation are acceptable and more realistic in most social sciences research (Baron & Kenny, 1986). At least four situations might produce observations of partial mediation (Shrout & Bolger, 2002): (1) the mediator is measured with error; (2) the predictor affects the outcome both directly and indirectly through the mediator; (3) only a subset of the processes that completely mediate the predictor-outcome relation was specified explicitly in the mediation analysis; and (4) different mediation mechanisms apply to different persons (moderated mediation) and cannot be anticipated when designing the study. The present study might well reflect any

one of these situations. For example, the number of possible individual responses towards a recent life-event exposure is endless. Due to pragmatic reasons and similar to many other coping studies, only a limited number of coping behaviors could be assessed and included in the model of the present study. Yet, we focused on coping behaviors frequently used by cancer patients (Livneh, 2000) and associated with cancer patients' adjustment. It is a task for future research to investigate if and which further coping strategies may mediate the direct resource effects and to investigate the possibility of interactions between group and mediation processes.

In line with our expectations and with previous studies supporting the goodness-of-fit hypothesis of coping effectiveness for problem-focused coping (Park, Folkman, & Bostrom, 2001; Terry & Hynes, 1998), active coping strategies were negatively associated with HRQOL, whereas meaning-focused coping strategies were positively associated with HRQOL (cf. Figure 3). Active coping could include behaviors such as undergoing postsurgical treatments, performing life-style changes, and spending time for seeking information. These behaviors may be time- and energy-consuming, may have side effects, may reduce feelings of control over the situation, and might be motivated by unwillingness to accept the present situation. In contrast, meaning-focused coping strategies, such as acceptance and positive reframing, are directed at threat minimization and, thus, may help individuals manage their distress. Previous research shows that patients' active coping may be related to poorer quality of life under certain circumstances, for example, when awaiting lung transplant surgery (Myaskovsky et al., 2005), or related to negative mental health outcomes directly after severe injury (Hepp, Moergeli, Buechi, Wittmann, & Schnyder, 2005). Hepp et al. (2005) suggested that active coping may be a poor predictor of adjustment in a short time before severe stress, whereas it may be related to better quality of life if employed in later stages. However, future research should explore the negative effects of active coping on physical, emotional, and social well-being among cancer patients to determine whether this effect is also negative in the long run, or in later phases of the adjustment process.

The usefulness of specific coping strategies has been questioned because most information comes from cross-sectional studies (Spencer et al., 1998). Thus, one strength of the present study lies in its longitudinal nature. Temporal sequence is essential for defining antecedent and outcome variables and is a necessary prerequisite for inferring causality, even though temporal sequence per se does not guarantee causal inference. As we have analyzed nonexperimental data, one has to rely on the lagged evidence that self-efficacy, received social support, and coping may have influenced cancer patients' HRQOL.

Research by both De Leeuw and colleagues (2000) and by Reynolds and Perrin (2004) emphasizes the importance of measuring the congruence between support wanted and support received. Poorer adjustment of patients with cancer may result if the provision of support which does not match the needs of the patient. The present study made allowance for these findings by using both the quantity of received support as well as the satisfaction with the behavior of the support provider as indicators for received support.

A further strength of the present study lies in employing structural equation modeling. Paths between multiple antecedent, mediating, and outcome variables were tested simultaneously, concurrently accounting for associations within the antecedent, mediating, and outcome variables, respectively.

Although the present study carries several strengths in its longitudinal design and methods, limitations need to be discussed. The first limitation regards the sample formation, that is, the lack of information about the refusal rate on the one hand, and

the heterogeneity of the sample in terms of cancer diagnoses, cancer recurrence, and tumor stages on the other. Yet, the majority of the sample had gastrointestinal cancer and was newly diagnosed with cancer. Moreover, Transactional Stress Theory is meant to be a self-consistent meta-theory that should be valid for any kind of stress process. Therefore, it should apply to the process of adapting to cancer regardless of the particular tumor site. Future research might benefit from including the cognitive appraisals of the illness as potential mediator or moderator variables in their analyses.

Previous research suggests that, for example, age and gender might be associated with cancer patients' physical, emotional, and social well-being (e.g., Hagedoorn, Buunk, Kuijer, Wobbes, & Sanderman, 2000; Wenzel et al., 1999). In our study, structural equation analyses controlling for the effects of age and gender on the three domains of HRQOL replicated the results reported in this paper. Past levels of HRQOL were not included in the present analyses as baseline variables because correlations between past and future HRQOL do not reflect causal relations, but rather the influence of common determinants. HRQOL cannot cause itself, but rather it is endogenous to other variables, such as stress and personal and social resources.

Even though effects of self-efficacy and received support on coping were discussed, which is the common language of structural equation modeling, causality cannot be assumed *per se* from this study as these specific measures were obtained at the same point in time. Therefore, a possibility of reverse causality cannot be identified. The interpretation of the findings has been guided by Transactional Stress Theory. A stronger evidence of causality would be obtained if data on self-efficacy, received social support, and coping would be time-lagged.

Despite these limitations, the results of the present study could be used for the development of intervention programs that increase the likelihood of personal effectiveness under challenging circumstances. Results suggest that interventions should promote patients' perceived self-efficacy and meaning-focused coping strategies to increase physical, emotional, and social well-being. Strategies for enhancing self-efficacy could be based on the knowledge about the four sources of self-efficacy (Bandura, 1997), that is, mastery experiences, vicarious experiences provided by social models, social persuasion, and reduction of people's emotional arousal (in particular anxiety). While designing interventions aiming at meaning-focused coping strategies, researchers should bear in mind that distress levels experienced by cancer patients possibly change over time. What might be an effective coping strategy at one time may be less so at another time during treatment (Spencer et al., 1998). Furthermore, interventions that aim at influencing coping behavior are designed under the assumption that newly acquired coping responses will work the same way as when they come more naturally.

Finally, interventions could also aim at educating relevant support providers. If they know how to suit the patients' needs for social support in terms of quantity and quality, an additional promoting effect should be achieved, at least on patients' emotional functioning.

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