Dispositional self-efficacy as a personal resource factor in coping after surgery

Ralf Schwarzer [a,*], Sonja Boehmer [a], Aleksandra Luszczynska [b],
Nihal E. Mohamed [c], Nina Knoll [d]

[a] *Freie Universität Berlin, Gesundheitpsychologie, Habelschwerdter Alle 45, 14195 Berlin, Germany*
[b] *Warsaw University, Faculty of Psychology, Stawki 5/7, 00-183 Warsaw, Poland*
[c] *The Cancer Institute of New Jersey, 195 Little Albany St., New Brunswick, NJ 08903, USA*
[d] *Institut für Medizinische Psychologie, Zentrum für Human- und Gesundheitswissenschaften der Berliner Hochschulmedizin, Luisenstrasse 57, 10117 Berlin, Germany*

Abstract

Perceived general self-efficacy may serve as a dispositional coping resource factor in times of stress. Over a time period of 11 months, self-efficacy was studied as a predictor of four coping strategies: planning, humour, acceptance, and accommodation. Participants were 130 men and women who had undergone tumour surgery. They provided data at 1, 6 and 12 months after surgery. In the context of this stress episode, coping turned out to vary in terms of general self-efficacy levels and in terms of time. Planning, humour, acceptance, and accommodation were substantially associated with general self-efficacy, and time-lagged correlations suggested an antecedent role of general self-efficacy as a personal resource factor. Cross-lagged panel correlations with latent variables confirmed the hypothesised sequence of the two sets of variables.
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* Corresponding author. Fax: +49 30 838 55634.
  E-mail address: health@zedat.fu-berlin.de (R. Schwarzer).

1. Introduction

Coping resources play an important role in the adjustment to illness. Self-efficacy represents a personal resource factor that may facilitate coping (Knoll, Rieckmann, & Schwarzer, 2005). However, resources and processes are seen as confounded, and successful coping processes may build up a self-efficacy resource while maladaptive coping may impair self-efficacy. The question is whether the hypothesised antecedent status of resources can be demonstrated within a non-experimental, longitudinal research design. Because of the multiple and diverse threats that cancer patients may be dealing with at any moment, and the difficulty in specifying when certain stressors start or cease to affect the patient (e.g., recurrence, social role changes), it is hypothesised that temporal variations in the course of coping with cancer will be found. To examine this hypothesis, different types of coping are selected to assess problem-focused/assimilative coping strategies (e.g., planning) and emotion-focused/accommodative coping strategies (e.g., humour, accommodation, and acceptance). In the context of uncontrollable stressors such as cancer, *planning* refers to thinking about gathering information regarding disease and available treatments, defining new goals (e.g., following regular cancer screenings) and modifying old ones (Carver et al., 1993). Coping modes such as *acceptance*, *accommodation*, and *humour* are directed at threat minimisation that enable individuals to manage their distress. Acceptance means compliance with the reality of a stressful situation, learning to live with it, accepting its implications, and its irreversible course (Carver et al., 1993). Although this definition implies that accommodation and acceptance refer to the same coping strategy, it is arguable that acceptance is an adaptive coping response, in that someone who accepts the reality of a stressor would come to terms with the situation. On the other hand, accommodation can be regarded as somewhat distinct from acceptance as it involves cognitive or behavioural efforts to adjust the self to stress e.g., ''I learned to live with my illness''. The use of humour, acceptance, and accommodation was found to be associated with lower distress among cancer patients (Carver et al., 1993).

2. Perceived general self-efficacy as a coping resource factor

Perceived self-efficacy is the belief in one's competence to tackle difficult or novel tasks and to cope with adversity in specific demanding situations. Self-efficacy makes a difference in how people feel, think, and act (see Bandura, 1997; Luszczynska & Schwarzer, 2005). People with high self-efficacy choose to perform more challenging tasks. They set themselves higher goals and stick to them. Actions are preshaped in thought, and once an action has been taken, highly self-efficacious people invest more effort and persist longer than those low in self-efficacy. When setbacks occur, they recover more quickly and remain committed to their goals. High self-efficacy also allows people to select challenging settings and explore their environment or create new ones. Thus, it represents a belief in one's competence in dealing with all kinds of demands. This implies an internal-stable attribution of successful action and a prospective view. These characteristics make it a unique theoretical construct different from related ones, such as self-esteem, locus of control, or self-concept of ability. Only self-efficacy (''I am certain that I can ambulate in the hospital ward even if I feel dizzy'') is of a *prospective* and *operative* nature, which furnishes this construct with additional explanatory and predictive power in a variety of research applications. In

sum, perceived self-efficacy can be characterised mainly as being competence-based, prospective, and action-related as opposed to similar constructs that share only part of this portrayal (Bandura, 1997).

Self-efficacy is commonly understood as being task-specific or domain-specific. But some researchers have also conceptualised a general sense of self-efficacy that refers to a global confidence in one's coping ability across a wide range of demanding or novel situations (Schwarzer & Jerusalem, 1995). General self-efficacy aims at a broad and stable sense of personal competence to deal effectively with a variety of stressful situations (Luszczynska, Gutiérrez-Doña, & Schwarzer, 2005). General self-efficacy allows for the possibility of explaining a broad pattern of successful coping with life.

Self-efficacy facilitates adjustment in cancer patients (Schulz & Mohamed, 2004). Among prostate cancer patients, an intervention aimed at the increase of self-efficacy, resulted in a decrease of depression within eight weeks after treatment (Weber et al., 2004). Among recurrent breast cancer patients, self-efficacy was found to be the strongest predictor of psychological aspects of women's quality of life (Northouse, Mood, Kershaw, Schafenacker, & Mellon, 2002). It was also indirectly related to physical aspects of quality of life. A meta-analysis of 38 studies that tested effects of psychological interventions, aiming at an increase of cancer patients' quality of life, revealed that social cognitive interventions affected patients' lives to a higher degree than interventions based on different theories. Interventions aimed at self-efficacy and outcome expectancies had a significantly stronger impact on global affect, depression, objective physical outcomes, and social quality of life (Graves, 2003).

3. Research questions

The general aim is to examine the predictive value of general self-efficacy as a resource factor in the stress and coping process. First, the correlation between general self-efficacy and the four coping variables will be studied, using general self-efficacy at the first measurement point in time and coping at all three points in time. If there is no substantial association between the two sets of variables, any further analysis would be meaningless. Second, mean levels of coping at three points in time are studied for groups of patients at different levels of general self-efficacy. It is expected that coping would change over time, and that patients with high general self-efficacy develop more adaptive coping behaviours. Third, to explore the potential direction of influence, a cross-lagged panel design with latent variables will be specified to see whether general self-efficacy can be regarded as an antecedent of coping or vice versa. Since these are non-experimental data, no better test of causality is feasible in such a research context.

4. Method

4.1. Research design and procedure

The present study is part of the Berlin Longitudinal Study on Quality of Life after Tumour Surgery. The project was conducted to further the knowledge of the interplay of personal,

environmental, and medical factors for adjustment after tumour surgery. In collaboration with four hospitals and tumour treatment centres in Berlin, questionnaires were mailed to patients 1 month, 6 months and 12 months after surgery. A stamped, addressed envelope was provided with each questionnaire.

4.2. Measures

General self-efficacy. Participants completed the General Self-Efficacy scale by Schwarzer and Jerusalem (1995). Responses to the 10 items range from *strongly disagree* (1) to *strongly agree* (4), e.g., "*I can always manage to solve difficult problems if I try hard enough.*" The high validity and reliability of the scale has been demonstrated in many studies across various research contexts and ethnically diverse populations (e.g., Luszczynska et al., 2005). In this sample, the internal consistency was Cronbach's alpha = .91.

Coping. Coping was assessed by four scales: Planning, Humour, Acceptance, and Accommodation. It was assumed that the use of coping strategies would be associated with successful adaptation and improvement of well-being (see Helgeson, 1993) although the effectiveness of coping was not the subject of the present analysis. Brief scales were chosen with the purpose of maximum parsimony based on items of the Brief Cope (Carver, 1997), the Coping with Surgical Stress Scale (COSS; Krohne et al., 2000), and the Mental Adjustment to Cancer Scales (MAC; Watson et al., 1988).

Planning was measured by two items selected from the Brief Cope such as "I thought hard about what steps to take" ($r = .54$, $p < .001$).

Humour. Two items were selected from the COSS and the MAC, for example "I have tried to keep my sense of humour" ($r = .33$, $p < .001$).

Acceptance. Two items were generated to assess patients' efforts in accepting the illness with a positive outlook rather than a sense of defeat such as "I have accepted what has happened" ($r = .47$, $p < .001$).

Accommodation. Two items were chosen to assess patients' efforts in acknowledging the illness with a positive rather than resigning accentuation: "I have learned to live with my illness" ($r = .44$, $p < .001$).

All sample items are translations from German. Responses ranged from *strongly disagree* (1) to *strongly agree* (4). Although these scales are very brief they appear to have sufficient validity (Schulz & Mohamed, 2004; Schulz & Schwarzer, 2004).

4.3. Participants

Patients underwent surgery to treat malignant tumours. Most frequent tumour sites were rectum (36%), colon (15%), stomach (11%), liver and gall bladder (11%), and oesophagus (7%). One month after surgery, 255 cancer patients completed the measures. They were on average 62 years old (SD = 11.4, range 19–86 years). Women were slightly underrepresented (43%). At the last assessment point in time 11 months later, 130 of these patients participated in the study. Attrition bias was examined by comparing participants who responded at all three waves of data collection with those who ceased to participate in one to two assessments, using all demographic (e.g., age, sex) and medical variables (e.g., type of surgery, comorbidity). Both age and gender composition

of this longitudinal sample ($n = 130$) corresponded with the initial sample ($M = 62$ years, SD = 10.8, range 27–86 years; 39% female patients). Of these patients, 75% were married or lived with a partner. The majority (84%) had children. The final longitudinal sample ($N = 130$) included 78 male and 52 female patients with a mean age of 63 years (SD = 10 years).

4.4. Data analyses

Data were analysed either as Pearson correlations or as repeated measures analyses of variance across three points in time with general self-efficacy as a between-subjects factor (three levels). To account for missing data, pairwise deletion procedures were used in correlations, and listwise deletion procedures in analyses of variance. The structural equation models were analysed with AMOS 4 (Arbuckle & Wothke, 1999), based on data of all 130 patients, using the full information maximum likelihood (FIML) estimation procedure.

5. Results

5.1. Associations of general self-efficacy (Time 1) with coping (Times 1, 2, and 3)

For all variables and all measurement points in time, the means and standard deviations are reported in Table 1. Means and variances of general self-efficacy remained at the same levels throughout the 11-month period, whereas the coping variables had an upward trend, possibly indicating recovery from the trauma of surgery.

The first research question aims at the possible predictive value of self-efficacy at 1 month after surgery for coping at all times. Table 2 reports these data. Self-efficacy was positively related to coping, and 11 out of 12 correlations were significant. Thus, further analyses were in order.

Table 1
Means and standard deviations for all variables at three points in time

Variable	M	SD
Self-efficacy (T1)	3.11	0.52
Self-efficacy (T2)	3.14	0.50
Self-efficacy (T3)	3.19	0.48
Planning (T1)	3.12	0.77
Planning (T2)	3.04	0.86
Planning (T3)	3.19	0.72
Humour (T1)	2.80	0.79
Humour (T2)	2.99	0.78
Humour (T3)	2.94	0.77
Acceptance (T1)	3.12	0.81
Acceptance (T2)	3.26	0.70
Acceptance (T3)	3.29	0.72
Accommodation (T1)	3.10	0.74
Accommodation (T2)	3.25	0.72
Accommodation (T3)	3.31	0.68

Table 2
Pearson correlations of perceived self-efficacy 1 month after surgery with coping variables at three points in time

Coping variable	1 month after surgery	6 months after	12 months after
Planning	.30**	.34**	.42**
Humour	.39**	.37**	.32**
Acceptance	.29**	.23**	.26**
Accommodation	.22*	.26**	.16

Note. * $p < .05$.
** $p < .01$.

For the coping strategy of planning there was a tendency of an increasing association with increasing time lag which indicates the possibility of a unidirectional effect. Commonly, one would expect a decline of the strength of relationship as the time gap between measures widens.

5.2. Changes in coping at three points in time depending on levels of general self-efficacy

The second research question dealt with changes in coping for patients who are more or less self-efficacious. Repeated measures analyses of variance with self-efficacy as a between-subjects factor were computed separately for each of the four coping strategies, namely planning, humour, acceptance, and accommodation. For the purpose of this analysis, general self-efficacy at Time 1 was trichotomised, according to the distribution of scores, to obtain three groups of similar sizes, yielding 43 low, 37 medium, and 48 high self-efficacious patients. Further subdivision by sex or age was not feasible since cell sizes would have become too small.

The first analysis was done for *planning* as a dependent variable. There was a main effect for self-efficacy, $F(2, 125) = 13.9$, $p < .001$, $\eta^2 = .18$, but not for Time, $F(2, 250) = 2.6$, $p < .08$, and not for the Time × Self-Efficacy interaction, $F(4, 250) = 1.06$, $p > .10$. Fig. 1 displays the longitudinal pattern of means for the coping strategy of planning.

The second analysis was done for *humour* as a dependent variable. There was a main effect for self-efficacy, $F(2, 125) = 17.6$, $p < .001$, $\eta^2 = .22$, for Time, $F(2, 250) = 4.2$, $p < .02$, $\eta^2 = .03$, and for the interaction of Time × Self-Efficacy, $F(4, 250) = 1.06$, $p < .03$, $\eta^2 = .04$. Fig. 2 displays the longitudinal pattern of means for humour. The low self-efficacious group appeared to be clearly distinct from the two others in terms of its low level of humour but also in terms of its increasing trend over the 11-month time period.

The third analysis was done for *acceptance* as a dependent variable. There was a main effect for self-efficacy, $F(2, 125) = 11.8$, $p < .001$, $\eta^2 = .16$, for Time, $F(2, 250) = 3.3$, $p < .05$, $\eta^2 = .03$, but not for the interaction of Time × Self-Efficacy, $F(4, 250) = .05$, $p > .10$. Fig. 3 displays the longitudinal pattern of means for acceptance. Patients generally exhibited an upward trend to cope by accepting their fate, but the low self-efficacious group stood out as being less accepting.

The fourth analysis was done for *accommodation* as a dependent variable. There was a main effect for self-efficacy, $F(2, 125) = 8.4$, $p < .001$, $\eta^2 = .12$, and for Time, $F(2, 250) = 4.9$, $p < .01$, $\eta^2 = .04$, but not for the interaction of Time × Self-Efficacy, $F(4, 250) = 2.02$, $p < .08$, $\eta^2 = .03$. Fig. 4 displays the longitudinal pattern of means for accommodation. In sum, initial general self-efficacy affected levels of all four coping strategies, that were assessed throughout the year after surgery.
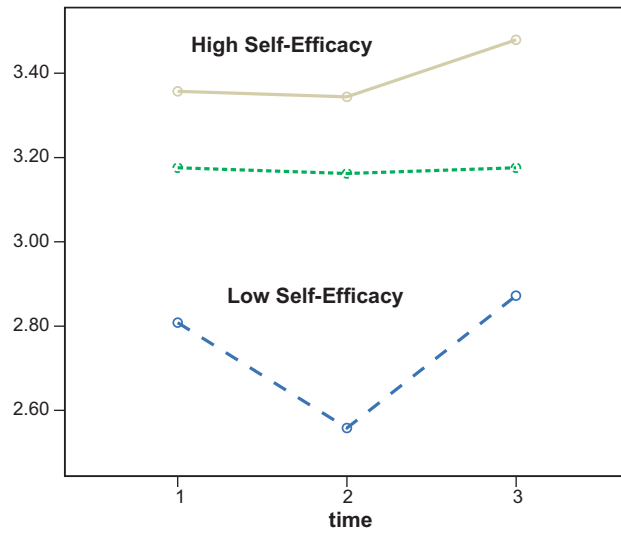
Fig. 1. Planning as a way of coping 1, 6, and 12 months after tumour surgery with self-efficacy as the between-subjects factor.
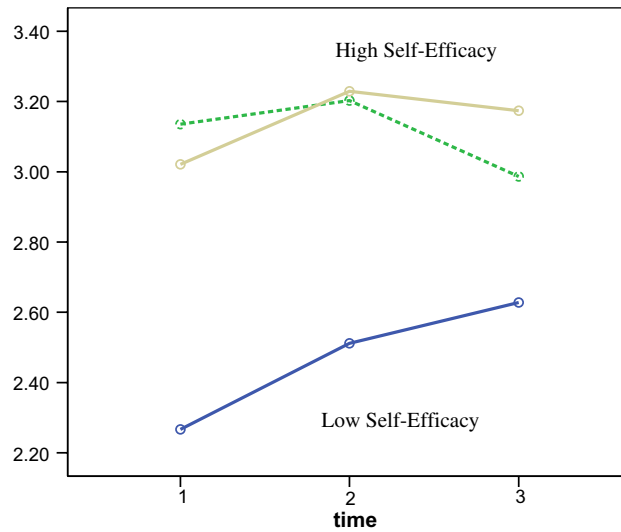

Fig. 2. Humour as a way of coping 1, 6, and 12 months after tumour surgery with self-efficacy as the between-subjects factor.

5.3. Examining the directionality of effects by cross-lagged panel correlations

The main research question aims at the "causal" predominance of either general self-efficacy or coping. The resource factor hypothesis claims that self-efficacy dominates over coping, i.e., time-lagged correlations should be stronger for self-efficacy as a predictor of coping than vice versa. In
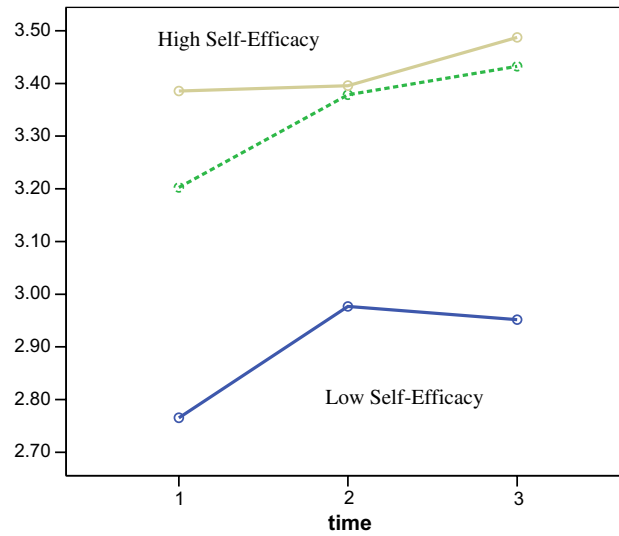
Fig. 3. Acceptance as a way of coping 1, 6, and 12 months after tumour surgery with self-efficacy as the between-subjects factor.
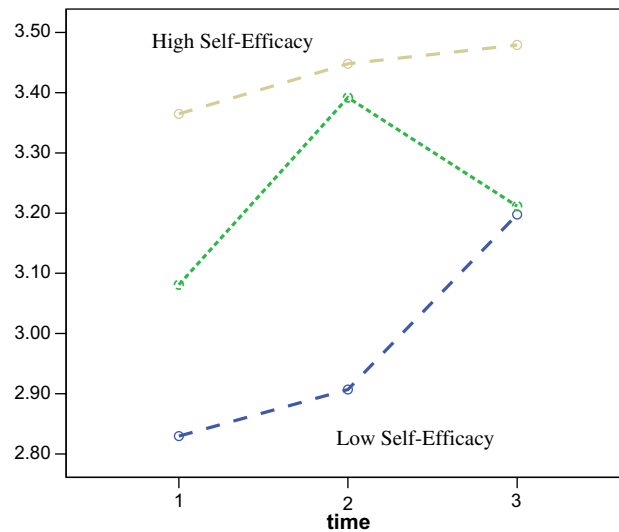

Fig. 4. Accommodation as a way of coping 1, 6, and 12 months after tumour surgery with self-efficacy as the between-subjects factor.

line with the 3-wave cross-lagged panel design, a structural equation model was specified that included six latent variables, each of them with multiple indicators. For self-efficacy, four items of the 10-item scale were chosen at random to supply the construct with indicators (see Fig. 5). For each of the four coping strategies (planning, humour, acceptance, accommodation), two-indicator items were available. Two pairs of crossover paths were tested.
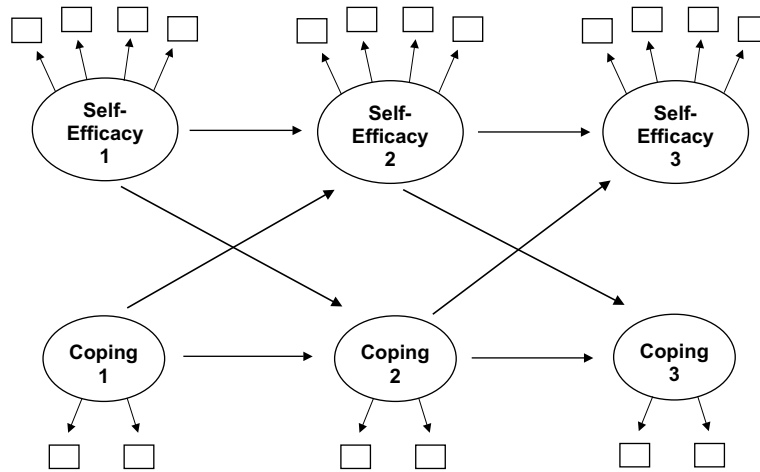
Fig. 5. Structural equation model with cross-lagged correlations between self-efficacy and coping.

The first structural equation analysis examined the possible mutual effects of self-efficacy and *planning* across three points in time. Fit indices were $\chi^2(127) = 180.6$, $\chi^2/\text{df} = 1.4$, TLI = .92, RMSEA = .057, p close = .26 (see Table 3). The two paths from self-efficacy to planning were .22 and .21, respectively, whereas the opposite direction paths were nonsignificant which underscores the resource factor hypothesis. Self-efficacy had a time-lagged effect on planning whereas planning did not have such an effect on self-efficacy.

The second structural equation analysis examined the possible mutual effects of self-efficacy and *humour* across three points in time. Fit indices were $\chi^2(127) = 201.9$, $\chi^2/\text{df} = 1.59$, TLI = .89, RMSEA = .068, p close = .06 (see Table 3). The path from self-efficacy (Time 1) to humour (Time 2) was .21 while all other paths were nonsignificant which provides partial support to the resource factor hypothesis. Self-efficacy had one time-lagged effect on humour coping.

The third structural equation analysis examined the possible mutual effects of self-efficacy and *acceptance* across three points in time. Fit indices were $\chi^2(127) = 191.2$, $\chi^2/\text{df} = 1.51$, TLI = .89, RMSEA = .063, p close = .13 (see Table 3). The path from self-efficacy (Time 1) to acceptance (Time 2) was .29 while all other paths were nonsignificant which provides partial support to the resource factor hypothesis. Self-efficacy had one time-lagged effect on acceptance coping.

The fourth structural equation analysis examined the possible mutual effects of self-efficacy and *accommodation* across three points in time. The fit between model and data was less satisfactory

Table 3
Cross-lagged correlations between self-efficacy and coping and fit indices for four SEM models

Coping variable	S1 → C2	C1 → S2	S2 → C3	C2 → S3	χ^2/df	RMSEA
Planning	.22*	.06	.21*	.09	1.4	.057
Humour	.21*	.16	.00	.05	1.59	.068
Acceptance	.29*	.09	.03	−.07	1.51	.063
Accommodation	.28*	.15	.08	.00	1.83	.080

Note. *p < .05; C—coping variable; S—self-efficacy.

here. Fit indices were $\chi^2(127) = 231.8$, $\chi^2/df = 1.83$, TLI = .84, RMSEA = .08, p close < .01 (see Table 3). The path from self-efficacy (Time 1) to accommodation (Time 2) was .28 while all other paths were nonsignificant which provides partial support to the resource factor hypothesis. Self-efficacy had one time-lagged effect on accommodation coping.

In sum, five out of eight time-lagged correlations leading from self-efficacy to coping were significant. In contrast, none of the eight correlations leading from coping to self-efficacy reached the significance level of .05. For the time period from 1 month to 6 months after surgery, the predominance of self-efficacy has been confirmed in all four cases, whereas, for the second half year, only one in four cases was in line with the assumptions, but no evidence emerged to support the opposite direction.

6. Discussion

The general aim was to examine the predictive value of general self-efficacy as a resource factor in the stress and coping process. First, there appeared to be a substantial correlation between self-efficacy and the four coping variables, using self-efficacy at the first measurement point in time and coping at all three points in time. Second, mean levels of coping (planning, humour, acceptance, accommodation) at three points in time were studied with respect to groups of patients at different levels of self-efficacy. Coping changed over time, and patients with low self-efficacy developed less active or less positive coping strategies than their highly self-efficacious counterparts. Third, cross-lagged panel correlations confirmed the assumption that self-efficacy can be regarded as an antecedent of coping. This holds only, however, for the first of the two time windows. During the period between 1 month and 6 months after surgery, a clear direction of effects is visible. For the second time window, there was only weak evidence for the same direction.

The strength of the present study lies in its longitudinal nature with three points in time over an 11-month time span. The fact that the pathway from coping to self-efficacy turned out to be nonsignificant at all times, provides strong evidence for the existence of the opposite pathway. Since these were non-experimental data, one has to rely on the cross-lagged correlational evidence for drawing conclusions about the direction of possible influence.

To understand the operative mechanisms that allow self-efficacious persons to cope better than others, one has to understand that self-efficacy is a competence-based, prospective and optimistic construct (Bandura, 1997; Luszczynska & Schwarzer, 2005). Self-efficacious cancer patients probably inferred from their successful coping with prior adversities that they can manage the present and future challenges. Self-efficacious individuals harbour positive perceptions for the self as the agent in various domains of functioning. Such a broad optimistic expectation can be regarded as a facilitator of accommodative flexibility. In a previous analysis on coping with tumour surgery, it was found that highly (generally) self-efficacious tumour patients develop also a tendency for personal growth in the year after surgery (Schulz & Mohamed, 2004). They cannot contribute much to their physical recovery themselves, but they tend to find some benefit in their fate, and they adapt better to the aftermath of tumour surgery than their less self-efficacious counterparts. Thus, general self-efficacy stimulates adaptive coping, probably due to the optimistic stance that is part of the construct. Coping is regarded as the mediator between personal resources and outcomes such as affect, well-being, and quality of life (Ben-Zur, 2002; Knoll et al., 2005; Terry, 1994).

Ben-Zur (2002) found that coping mediated the effects of resources (such as sense of mastery) on positive and negative affect.

Although the present study carries several strengths in its longitudinal design, limitations need to be discussed. The first limitation regards the sample representiveness and the small sample size. Patients with short survival time may have dropped out from the study. However, the sample is homogeneous since it was defined by the common experience of one major stress episode, namely surgery of a gastrointestinal tumour.

Second, self-reports fail to capture fully the actual coping behaviours. Future research should also include observational methods to better describe actual coping, and make use of various health outcomes, including objective medical parameters.

Third, general self-efficacy has been the only personal resource factor, and there may be other ones that should be studied. For example, optimism and the Big Five factors qualify as candidates that may affect coping (Terry, 1994). Moreover, the mediator status of coping is questionable, and it has been found that the stability of the coping measure employed might affect its suitability as a mediator or predictor of later health outcomes after surgery (Carver et al., 1993; Knoll et al., 2005). This raises also the question whether levels of generality or specificity of resources and coping need to be matched, i.e. using a general resource measure along with situation-specific coping measure, or rather keep both assessments at the same level of specificity.

Finally, it remains unclear which time window to choose when studying coping, since resources may change slowly while coping changes more rapidly, depending on the nature of the stressful context. Results of cross-lagged panel analyses are highly dependent on the time windows chosen, and they do not qualify as evidence of causality. They just provide the best possible hint for a causal direction, given the non-experimental research design. In any case, the present findings suggest that general self-efficacy operates as an antecedent resource within the first half year after tumour surgery. Further studies need to examine more detailed processes further.

Acknowledgements

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