



## From despair to hope: A longitudinal study of illness perceptions and coping in a psycho-educational group intervention for women with breast cancer

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**Objectives.** This study examined the cross-sectional and longitudinal relationships of illness perceptions, coping, and distress in women with breast cancer. Illness perceptions and coping at baseline and changes in these variables over time served as possible predictors of distress at two follow-up points.

**Design and methods.** Fifty-seven women with breast cancer who participated in a psychosocial aftercare programme completed a questionnaire before the start of the intervention, directly after the end of the intervention, and 1 year after the start of the intervention. Study variables were assessed with the Illness Perception Questionnaire-Revised (illness perceptions), the COPE (coping), and the Hopkins Symptom Check List (distress).

**Results.** Results showed that 43% of variance in distress at baseline was explained by participants' illness perceptions. Cyclical timeline perceptions were the strongest predictor of distress at baseline. Longitudinal data revealed that after the end of the intervention, the intensity of general distress and breast cancer-related emotions had decreased significantly. Partial correlations showed that baseline illness perceptions were unrelated to distress at follow-up. However, changes in illness perceptions (perceptions about the cyclical and chronic timeline and symptoms associated with breast cancer) showed significant associations with distress at both follow-up assessments. Associations of follow-up distress with coping styles were less consistent.

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**Conclusions.** Our results suggest that changes in illness perceptions are related to an improvement or worsening of patients' emotional well-being over time. These findings hold promise for the development of interventions that specifically target patients' representations of their illness.

### Statement of contribution

**What is already known on this subject?** Research has shown that 15%–30% of breast cancer survivors continue to experience elevated distress following treatment. Illness perceptions and coping have been found to contribute to distress in women with breast cancer.

**What does this study add?** Cyclical timeline beliefs affect distress in breast cancer both in cross-sectional and longitudinal analyses. Baseline illness perceptions are less predictive of distress at follow-up than changes in illness perceptions.

Breast cancer is the most prevalent type of cancer in women, affecting one in every nine women. It is currently accounting for roughly one fourth of all new cancer cases in women (Jemal, Siegel, Xu, & Ward, 2010). As a result of increased survival rates, more women will need to adapt to life after breast cancer. Although most survivors manage to adjust well, 15%–30% of women are estimated to experience elevated distress in the year following breast cancer treatment (Mehnert & Koch, 2008; Millar, Purushotham, McLatchie, George, & Murray, 2005; Nosarti, Roberts, Crayford, McKenzie, & David, 2002). Recent studies have shown that approximately 15%–25% of the women with high distress express a wish for professional support after treatment (Envold Bidstrup *et al.*, 2011; Mehnert & Koch, 2008).

To support the development of psychosocial services for women with breast cancer, it is important to identify factors that affect distress in this patient population and to investigate whether changes within these factors over time are related to changes in patient distress. The Common Sense Model (CSM) (Leventhal, Meyer, & Nerenz, 1980; Leventhal *et al.*, 1997) provides a framework for the understanding of individual differences in adjustment to illness. According to the CSM, self-regulation of health and illness can be regarded as a cyclical process that involves the stages: interpretation, coping, and evaluation. A central assumption within the CSM is that when confronted with an illness, acquired mental representations about the particular illness within the individual will become activated. Research has suggested that patients' cognitive illness model consists of specific illness beliefs about the symptoms attributed to the illness (illness identity), the expected timeline and course of the illness, the perceived consequences, the probable cause of the illness, and the degree to which the illness can be cured or controlled. In parallel with this cognitive process, individuals will have an emotional response to the illness. This emotional response is proposed to have a bidirectional association with the cognitive representation of the illness. Based on the cognitive and the emotional representation of the health threat, individuals plan and execute a coping response. Coping efforts in turn will result in specific illness outcomes. Evaluation of these outcomes are proposed to feed back to the stages of interpretation and coping. Following the assumptions from the CSM, distress and mental health can be regarded as one of the illness outcomes influenced by patients' perceptions of the illness and coping (Hagger & Orbell, 2003).

Several previous studies have investigated the association between illness perceptions, coping, and distress in breast cancer, mainly in cross-sectional designs. These studies have shown that the experience of more symptoms attributed to breast cancer

(Millar *et al.*, 2005), more negative consequences (Jørgensen, Frederiksen, Boesen, Elsass, & Johansen, 2009; McGinty, Goldenberg, & Jacobsen, 2010; Silva, Moreira, & Canavarró, 2011), less confidence in the effectiveness of treatment (Jørgensen *et al.*, 2009; Rozema, Völlink, & Lechner, 2009), longer perceived duration of the illness (Millar *et al.*, 2005; Rabin, Leventhal, & Goodin, 2004), and more intense emotional representations (Jørgensen *et al.*, 2009; Rozema *et al.*, 2009) were related to worse mental health or greater emotional distress. With regard to coping and distress in women with breast cancer, cross-sectional studies consistently have shown that women who respond with denial, avoidance, disengagement, and venting of emotions report greater distress, whereas acceptance, positive reinterpretation, and problem-focused coping appear to be associated with better mental health (Carver *et al.*, 1993; McCaul *et al.*, 1999; Rozema *et al.*, 2009; Vos, Garssen, Visser, Duivenvoorden, & de Haes, 2004).

In contrast to the wealth of cross-sectional studies there is a paucity of longitudinal research investigating the association between illness perceptions, coping, and distress in breast cancer. The few studies that have been performed have used two distinct methodological approaches. A first line of longitudinal studies investigated whether baseline illness perceptions and coping style explain variance in distress at a later stage. One study previously investigated how illness perceptions following surgery for breast cancer are related to distress 1 year later (Millar *et al.*, 2005). This study found that women with breast cancer who attributed more symptoms to breast cancer (Illness Identity) at baseline were more distressed 1 year later. Other illness perceptions at baseline did not appear to contribute to distress at follow-up. Another study among women with breast cancer (McCorry *et al.*, 2012) used a cluster analysis to investigate the relation between baseline illness perceptions on distress 6 months later. Although patients with a more optimistic illness schema (cluster 1) showed less distress after 6 months than patients with a less optimistic illness representation (cluster 2), the influence of the separate illness perceptions on distress was unknown. Prospective studies in breast cancer investigating the time-lagged association of baseline coping style with distress largely confirm results from cross-sectional analyses, showing that greater use of denial, avoidance, disengagement, and venting of emotions are associated with distress at follow-up, whereas acceptance, positive reinterpretation, and spiritual coping are predictive of better mental health (Carver *et al.*, 1993; Low, Stanton, Thompson, Kwan, & Ganz, 2006; McCaul *et al.*, 1999; Stanton, Danoff-Burg, & Huggins, 2002; Stanton *et al.*, 2000).

A second line of longitudinal research has investigated whether changes over time in illness perceptions and coping are related to future distress. In accordance with assumptions of the CSM, illness representations and coping are dynamic and may vary over time as new information and experiences are incorporated into patients' continuous process of self-regulation. Therefore, an increase or decrease in distress might be more closely related to changes in illness perceptions and coping than to values of these variables assessed at an earlier stage (Llewellyn, McGurk, & Weinman, 2007; Scharloo *et al.*, 2010). A recent study among oesophageal cancer survivors found that if illness perceptions had changed in a pessimistic direction over the course of 1 year (an increase in perceived consequences, a reduction in perceived control, and an increase in the expected chronicity of oesophageal cancer), patients had higher chances to become more anxious and depressed (Dempster *et al.*, 2011). These results are consistent with findings from other longitudinal studies in non-cancer patient samples, indicating that the adoption of more pessimistic illness perceptions over time is associated with worse psychological and physical health at follow-up (Bijsterbosch *et al.*, 2009; Foster *et al.*, 2008; Furze, Lewin, Murberg, Bull, & Thompson, 2005; Kaptein *et al.*, 2010; Skinner

*et al.*, 2006). With regard to coping, one study among breast cancer patients found that those women who showed an increase in avoidance coping reported higher scores for depression, fatigue, and confusion 4 months later (McCaul *et al.*, 1999).

If changes in illness perceptions and coping can be related to variations in distress, this not only lends support to the theoretical assumptions of the CSM regarding the dynamic interrelations of illness perceptions, coping, and illness outcomes but it would also hold practical value for the development of interventions aiming to reduce psychological distress in women with breast cancer. To date, changes in illness perceptions and coping in relation to distress in women with breast cancer have not yet been the topic of investigation. Furthermore, the two approaches of longitudinal research within the context of the Common Sense Model have not been compared in a single study. Therefore, the objectives of this study are threefold. Firstly, we will investigate in a cross-sectional analysis to what degree illness perceptions and coping are associated with psychological distress in women who wish to participate in a psycho-educational group intervention for breast cancer survivors. Secondly, it will be examined how participants' illness perceptions, coping style, and distress change after participating in the intervention. Finally, we will investigate to what extent distress at follow-up is related to baseline values and changes in illness perceptions and coping style. We expect the cross-sectional and longitudinal associations of distress with coping and illness perceptions to be largely consistent with findings from previous studies. More specifically, we expect that adaptive coping strategies and optimistic illness perceptions are related to lower values of emotional distress. We also expect that women who adopt more optimistic views about breast cancer and show an increase in adaptive coping strategies over time will experience less distress at follow-up. However, as the present study is the first to compare the relationship of follow-up distress with baseline values and change scores in illness perceptions and coping, we have no specific hypothesis about which of the two would be more strongly related to follow-up distress.

## **Method**

### **Patients**

Approval for this study was obtained from our hospital Ethics Committee. This study included women who took part in a psychosocial group programme that has been offered since 2005 by the LUMC to all women with a first diagnosis of breast cancer who had completed their curative medical treatment (with the exception of hormonal therapy and immunotherapy). Patients who indicated during the intake to have recurrent or metastatic breast cancer were offered individual counselling. Women were recruited through several channels (posters, direct mailing, and ads on a local patient organization website).

### **Intervention**

The programme consisted of nine 2–2½ hrs meetings. Sessions were supervised by a social worker (MEWB) and a nurse practitioner (ADdH). The first four sessions were held weekly, the next four sessions were held every other week. One final follow-up meeting was organized 2 months after the last session. In the intervention, the following topics were discussed: (1) what is breast cancer, (2) being diagnosed with breast cancer, (3) coping with and adapting to breast cancer, (4) coping with anxiety and depression, (5) social support, (6) stress management, (7) breast cancer as a turning point in life, and (8) the need for support in the future. Each session broadly had the following agenda:

participants' remarks about the previous session, discussion of homework assignments, sharing experiences with regard to a certain breast cancer-related topic, instruction and practising new skills, and finally, discussion of new homework assignments. Exercises throughout the programme focused on three major areas: physical exercises (e.g., breathing exercises, and relaxation), rational-emotive exercises (e.g., keeping a diary, challenging, and changing maladaptive cognitions), and behavioural exercises (e.g., social skills acquisition, assertiveness, and expression of emotions).

### **Design**

Study variables were assessed by questionnaires before the start of the group intervention (T1), directly after the eighth session (T2), and 12 months after T1 (T3). Participants completed a questionnaire booklet which contained questions about sociodemographic variables (age, marital status, and education) and treatment details about surgery (mastectomy vs. breast conserving treatment) and adjuvant treatment patients had received. Psychological distress was assessed by the 25-item Hopkins Symptom Check List (HSCL-25) (Tinghög & Carstensen, 2010). The questionnaire assesses anxiety and depression symptoms on a 4-point Likert scale. The HSCL-25 has shown adequate validity in screening for emotional disorders (Veijola *et al.*, 2003), and has been used to predict need for additional support in (breast) cancer patients (van Scheppingen *et al.*, 2011). Items are summed to provide one single index of psychological distress. A cut-off score of 39 was used to identify patients with elevated distress (van Scheppingen *et al.*, 2011).

The Illness Perception Questionnaire-Revised (IPQ-R) (Moss-Morris *et al.*, 2002) is a validated and reliable instrument used to assess representations of illness among diverse patient groups, including patients with breast cancer (Costanzo, Lutgendorf, & Roeder, 2011; Jörgensen *et al.*, 2009; Rozema *et al.*, 2009). For this study eight subscales were used: Illness identity (the number of symptoms that patients attribute to breast cancer), Consequences (the negative consequences of the illness for patients' lives), Illness coherence (the degree to which patients feel they can make sense of their illness), Personal control (the belief in personal efficacy to control the illness and/or symptoms), Treatment control (the effectiveness of medical treatment in curing or controlling the disease), Timeline chronic (the expected duration of the illness), Timeline cyclical (the variability and predictability of symptoms), and Emotional representations (the negative emotions associated with the illness). The Illness identity subscale is calculated by summing the symptoms (range 0–14) that patients attribute to breast cancer. For the other subscales items are rated on a 5-point Likert scale ('strongly disagree'–'strongly agree'). To facilitate interpretation of these subscales, mean scores are presented. Therefore, all subscales (with the exception of the Identity scale) have a possible range of 1–5. Consistent with several previous psycho-oncological studies (Gould, Brown, & Bramwell, 2010; Llewellyn *et al.*, 2007; Millar *et al.*, 2005) the cause items were not included in this study as the items relating to causes of breast cancer are not considered to represent a single dimension (Moss-Morris *et al.*, 2002). Given the modest patient sample in this study, we did not perform a Principal Component Analysis, which would result in creating extra variables for the analyses.

Coping was assessed with the Dutch translation of the COPE (Kleijn, van Heck, & Van Waning, 2000). As the coping scales used in the COPE tend to correlate in conceptually meaningful ways (Carver, Scheier, & Weintraub, 1989), coping strategies can be clustered together as coping dimensions. To minimize the number of individual variables, we have used the second-order structure of the coping scales as has been described by the

developers of the COPE (Carver *et al.*, 1989). Separate coping styles were combined into four higher order dimensions, each consisting of three individual strategies (Gould *et al.*, 2010; Lowe, Norman, & Bennett, 2000). A first factor is problem-focused coping which includes the strategies of active coping, planning, and suppressing competing activities. The second dimension is social/emotion-focused coping, including instrumental and emotional social support seeking and the expression of emotions. A third factor is avoidant-focused coping which includes the subscales mental and behavioural disengagement and denial. The fourth factor is acceptance-focused coping, which includes the strategies of acceptance, restraint coping, and positive reinterpretation. The COPE uses a 4-point Likert scale assessing the extent to which individuals have used a specific coping response in dealing with difficulties related to breast cancer ('never'–'a lot').

### **Statistical analyses**

Descriptive statistics were used to present details about patients' sociodemographic and medical characteristics. Pearson correlations were calculated to investigate the association of distress with sociodemographic and medical variables, illness perceptions, and coping at baseline (*t*-tests were used for categorical variables). By means of a hierarchical regression analysis, the relative contribution of sociodemographic and medical variables, illness perceptions, and coping to patients' distress was investigated. Variables that showed a significant univariate relationship ( $p \leq .1$ ) with the outcome were entered (method: ENTER) into the regression analyses. Relevant sociodemographic and medical variables were entered in the first step, illness perceptions and coping in the second and third steps, respectively. Repeated measures analyses of variance (ANOVA) were used to investigate changes in psychological variables over time. Planned contrasts (Helmert) were used to test whether baseline scores were different from the mean value of both follow-up measurement points. To investigate to what degree distress after the intervention is related to baseline values and change scores in illness perceptions and coping, partial correlations were calculated, controlling for baseline levels of distress. After inspection of the partial correlations, variables showing the strongest correlation with follow-up distress (baseline or change scores in illness perceptions and coping) would be subjected to an additional multivariate regression analysis. Separate hierarchical linear regression analyses for distress at T2 and T3 were conducted including predictors (method: ENTER) that had shown a partial correlation of  $p \leq .1$  with distress at follow-up. Baseline levels of distress were entered in the first step, relevant sociodemographic and medical variables were entered in the second step. Illness perceptions and coping potentially would be added in the third and fourth steps, respectively.

### **Results**

A total of 74 women with breast cancer took part in one of nine intervention groups. Eight women dropped out before the end of the course. Complete datasets (T1–T3) were returned by 57 of the 66 (86%) women who finished the course. No significant differences were observed between patients who had returned all questionnaires and those who had dropped out or had incomplete datasets with respect to age, education, marital status, or treatment characteristics. Also, no differences were found in baseline distress ( $t(72) = 0.48, p > .1$ ), illness perceptions (MANOVA  $F(8, 60) = 0.40, p > .1$ ), or coping styles (MANOVA  $F(4, 67) = 1.19, p > .1$ ). Participants' age varied between 37 and



**Table 1.** Patient characteristics at baseline ( $N = 57$ )

	<i>M</i>	<i>(SD)</i>	<i>N</i>	<i>%</i>
Age	50.7	(6.9)		
Education				
Elementary school			1	1.8
Lower vocational training			36	63.1
Secondary educational training			12	21.0
Higher vocational training/university			8	14.0
Living arrangement				
Living alone			3	5.3
Living w/partner			21	36.8
Living w/partner & children			28	49.1
Living w/children			5	8.8
Working status				
Active			28	50.9
Retired/no paid work/unemployed			12	21.8
Disability insurance			15	27.2
Surgery				
Breast conserving			31	54.4
Mastectomy			26	45.6
Adjuvant therapy				
None			7	12.5
HT only			2	3.6
RT only			7	12.5
HT + RT			3	5.4
HT + CT			9	16.1
HT + CT + RT			23	41.1
HT + CT + RT + IT			1	1.8
CT + RT			4	7.1

HT = Hormone therapy; CT = Chemotherapy; RT = Radiotherapy; IT = Immunotherapy.

72 years (See also Table 1). Eighty-eight per cent of the women had undergone at least one adjuvant treatment modality.

### **Illness perceptions at baseline**

Baseline data indicated that patients were moderately optimistic about the effectiveness of treatment in controlling the illness or providing a cure for breast cancer (Treatment control, see also Table 2). By contrast, patients did not have much confidence in their own abilities to manage their condition (Personal control).

Interrelations between the IPQ-R subscales showed a coherent pattern (Table 3). Perceptions about the seriousness of the illness (identity, consequences, chronic, and cyclical timeline perceptions) showed positive interrelations, as did optimistic cognitions (illness coherence and perceptions about controllability). Consistent with assumptions from the CSM, there was a strong correlation between cognitive representations and illness-specific emotions.

### **Coping strategies at baseline**

At baseline, seeking social support/venting of emotions was the most frequently used coping strategy, whereas avoidant coping was used least often (Table 2). Correlation

**Table 2.** Baseline and follow-up statistics for distress (HSCL-25), illness perceptions (IPQ-R), and coping (COPE)

	Alpha	T1		T2		T3		Within subjects		Helmert Contrast <sup>a</sup>	
		M	(SD)	M	(SD)	M	(SD)	F	F	F	F
HSCL-25	.90	39.73	(9.65)	34.50	(7.05)	33.50	(6.70)	36.72***	49.95***		
N with HSCL ≥ 39		28	49%	13	23%	12	21%				
IPQ-R											
Identity	n.a.	5.04	(2.84)	4.24	(2.43)	3.78	(2.41)	6.45**	9.99**		
Consequences	.78	3.41	(.70)	3.27	(.59)	3.11	(.70)	10.04***	13.70***		
Illness coherence	.73	3.53	(.69)	3.64	(.61)	3.75	(.54)	3.67*	4.22*		
Personal control	.71	2.72	(.62)	2.65	(.75)	2.73	(.63)	.42	.10		
Treatment control	.73	3.62	(.52)	3.59	(.51)	3.57	(.52)	.41	.95		
Timeline chronic	.88	2.95	(.80)	2.78	(.65)	2.78	(.75)	2.34	5.33*		
Timeline cyclical	.71	2.85	(.81)	2.88	(.77)	2.82	(.91)	.20	.00		
Emotional representations	.91	3.27	(.89)	2.91	(.85)	2.85	(.95)	17.10***	37.23***		
COPE											
Problem focus	.86	2.18	(.77)	2.39	(.75)	2.29	(.89)	1.40	2.22		
Emotional support	.86	2.83	(.74)	2.76	(.68)	2.48	(.79)	4.82*	5.37*		
Avoidance	.67	1.62	(.56)	1.72	(.50)	1.53	(.56)	3.73*	.01		
Acceptance	.67	2.26	(.63)	2.43	(.73)	2.15	(.73)	3.96*	.15		

<sup>a</sup>Helmert contrasts test whether baseline scores differ from the mean value of both follow-up measurement points.  
\* $p \leq 0.05$ ; \*\* $p \leq 0.01$ ; \*\*\* $p \leq 0.001$ .



**Table 3.** Zero-order correlations among study variables at T1

	2	3	4	5	6	7	8	9	10	11	12	13
1. COPE Problem focus	.34*	.08	.27*	.05	.16	-.04	.10	-.35**	.18	.02	-.06	-.03
2. COPE Emotional		.11	-.02	.02	.10	-.15	-.27*	-.09	.04	-.06	.17	.13
3. COPE Avoidance			.09	.05	.29*	-.21	.16	.06	.23	.50***	.42***	.47***
4. COPE Acceptance				-.24	-.29*	.22	.33*	-.05	-.32*	.00	-.39**	-.28*
5. IPQ-R Identity					.32*	-.13	.01	.16	.24	.25	.32*	.23
6. IPQ-R Consequences						-.34**	-.04	-.10	.55***	.32*	.57***	.50***
7. IPQ-R Coherence							.07	.15	-.26	-.30*	-.48***	-.42***
8. IPQ-R Personal control								.26*	-.17	.17	-.29*	-.01
9. IPQ-R Treatment control									-.32*	.08	.02	.12
10. IPQ-R Timeline chronic										.33*	.56***	.40**
11. IPQ-R Timeline cyclical											.43***	.54***
12. IPQ-R Emotional representations												.66***
13. HSCL-25												

\* $p \leq .05$ ; \*\* $p \leq .01$ ; \*\*\* $p \leq .001$ .

analyses show that problem-focused coping was related to higher scores for support seeking/venting of emotions ( $r = .34$ ,  $p = .01$ ) and acceptance ( $r = .27$ ,  $p = .05$ ) (Table 3).

### Correlates of baseline distress

Age, marital status, and treatment characteristics (type of surgery, chemotherapy, radiotherapy, and hormonal therapy) were unrelated to HSCL-25 scores (all  $p > .1$ ; data not shown). Correlation analysis suggested that distress was somewhat lower for women with higher education ( $r = -.23$ ,  $p = .09$ ). Several dimensions of the IPQ-R showed a significant relationship with distress (Table 3). Distress was positively related to beliefs about the consequences of breast cancer, chronic timeline, cyclical timeline, and emotional representations. An inverse association was observed between distress and illness coherence. Interestingly, there was only a very weak association between distress and perceptions about personal and treatment control. With regard to coping, results showed that greater use of avoidance as a coping strategy was strongly related to higher distress scores, whereas acceptance was inversely related to distress (Table 3).

A hierarchical linear regression analysis was performed to examine the relative contribution of patients' illness perceptions and coping to psychological distress. Variables that showed a significant univariate relation with distress ( $p \leq .1$ ) were entered into the regression equation (the IPQ-R Emotional Representations subscale was not included in the regression analysis because of the thematic overlap with the outcome variable (Gould *et al.*, 2010)). Education was entered in the first step. Illness perceptions (cyclical and chronic timeline, consequences, and coherence) were entered in the second step. Coping variables (avoidance and acceptance) were added in the third step (Table 4). Education, illness perceptions, and coping variables together explained 57% of variance in baseline distress. In the final model, the IPQ-R cyclical timeline subscale was the strongest and only significant predictor of baseline distress.

**Table 4.** Multiple regression analysis (method enter, using three steps) predicting distress at baseline (T1)

	Step 1		Step 2		Step 3	
	Standardized $\beta$	t-value	Standardized $\beta$	t-value	Standardized $\beta$	t-value
Education	-.31	-2.36*	-.24	-2.33*	-.20	-1.92
IPQ-R Consequences			.29	2.28*	.28	1.77
IPQ-R Coherence			-.12	-1.08	-.10	-.89
IPQ-R Timeline chronic			.13	1.00	.10	.75
IPQ-R Timeline cyclic			.35	3.05**	.30	2.42*
COPE Acceptance					-.17	-1.51
COPE Avoidance					.20	1.68
Variance explained	$R^2 = .10$		$\Delta R^2 = .43$		$\Delta R^2 = .04$	
F-change	5.58*		10.86***		2.19	

Final model:  $R^2 = 0.57$ ; adjusted  $R^2 = 0.51$ ;  $F(7, 45) = 8.63$ \*\*\*.

\* $p \leq .05$ ; \*\* $p \leq .01$ ; \*\*\* $p \leq .001$ .

**Changes over time in distress, illness perceptions, and coping**

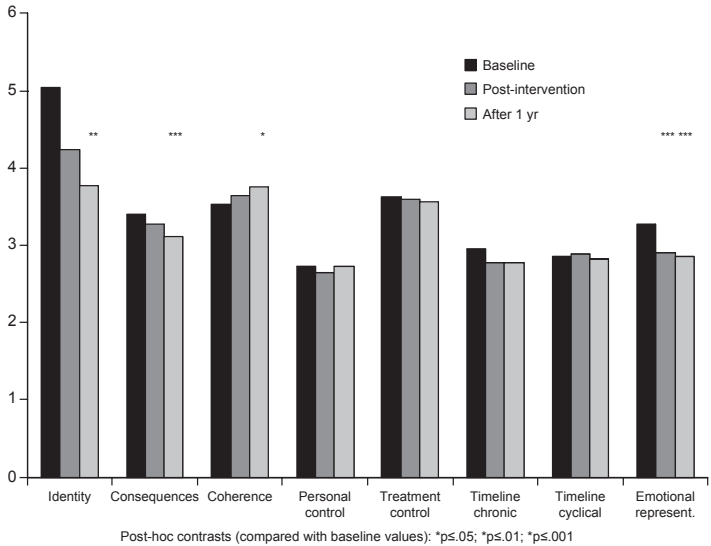
Participants’ distress decreased significantly over time (Table 2). Repeated measures analyses showed that HSCL-25 scores declined immediately after the course and then remained stable over the next year (Helmert contrast  $F(1, 56) = 49.95, p < .001$ ). The proportion of participants with elevated distress ( $HSCL \geq 39$ ) dropped from 49% at baseline to 23% and 21% at T2 and T3, respectively.

With regard to patients’ illness representations, on average, patients were less emotionally affected by their illness immediately after the course (Table 2). Changes in other IPQ-R subscales were observed, but these were not statistically significant until 1 year after the beginning of the programme (See Figure 1). These changes pertain to a reduction in symptoms attributed to breast cancer (illness identity), a decline in perceived negative consequences, and improved illness coherence. Other perceptions did not change.

Changes in coping style over time were less coherent than those in distress or illness perceptions (Table 2). A linear trend was observed for social support seeking/venting of emotions for which mean scores declined steadily over time. Avoidance and acceptance showed a quadratic trend in that they were used more often directly after the programme, but less frequently after 1 year. Problem-focused coping scores did not change between the three assessment points.

**Correlates of follow-up distress**

Education showed a marginally significant correlation with distress at T2 (partial  $r = -.26, p = .06$ ) but not with distress assessed at T3. Other sociodemographic variables and treatment characteristics were not significantly related to distress at both follow-up points (data not shown). To investigate how distress at the two follow-up assessments was associated with baseline values and change scores for illness perceptions and coping, partial correlations were calculated, correcting for baseline levels of distress (Tables 5 and 6). These analyses indicated that none of the



**Figure 1.** Illness perceptions at baseline and follow-up.

**Table 5.** Partial correlations of distress at T2 with baseline (T1) and change scores (T2–T1) of coping and illness perceptions

	COPE		IPQ-R Pers. control	IPQ-R Coherence	IPQ-R Consequences	IPQ-R Identity	COPE Accept.	COPE Avoid.	COPE Emotion/ support	IPQ-R Treat. control	IPQ-R Timeline chronic	IPQ-R Timeline cyclical	IPQ-R Emotional represent.
	Problem focus	Emotion/ support											
Baseline (T1)	.03	-.14	-.06	.02	.06	-.06	.10	.28*		-.20	.02	.02	.01
Change (T2–T1)	-.14	.22	.29*	-.20	.15	.29*	-.14	-.14		-.06	.29*	.37**	.37**

Partial correlations adjusted for baseline HSCL-25 scores.

\* $p \leq .05$ ; \*\* $p \leq .01$ .

**Table 6.** Partial correlations of distress at T3 with baseline (T1) and change scores (T3–T1) of coping and illness perceptions

	COPE		IPQ-R Pers. control	IPQ-R Coherence	IPQ-R Consequences	IPQ-R Identity	COPE Accept.	COPE Avoid.	COPE Emotion/ support	IPQ-R Treat. control	IPQ-R Timeline chronic	IPQ-R Timeline cyclical	IPQ-R Emotional represent.
	Problem focus	Emotion/ support											
Baseline (T1)	-.17	-.19	-.14	.04	.00	-.14	-.29*	.05		-.17	-.00	-.10	.00
Change (T3–T1)	.16	.14	.45***	-.16	.25#	.45***	.34*	.09		.16	.00	.52***	.30*

Partial correlations adjusted for baseline HSCL-25 scores.

# $p \leq .10$ ; \* $p \leq .05$ ; \*\* $p \leq .01$ ; \*\*\* $p \leq .001$ .

baseline illness perceptions was significantly related to follow-up distress scores. By contrast, change scores of some of the IPQ-R subscales were related to both assessments of follow-up distress. More specifically, an increase in breast cancer-related symptoms (Illness identity), stronger perceptions about the cyclical and unpredictable nature of the symptoms (Timeline cyclical), and increased emotional responses to breast cancer were associated with higher distress scores immediately after the intervention (T2) and 1 year after the start of the course (T3). In addition, an increase in perceptions about the chronicity of breast cancer was related to higher distress at T2.

With regard to coping (Tables 4 and 5), correlation analyses showed that greater use of avoidance at baseline was associated with higher distress at T2. Interestingly, whereas the use of acceptance as coping strategy at baseline was related to lower distress 1 year after the start of the course (T3), an increase in the use of acceptance over time (change score) was related to greater distress at T3.

The results from these correlation analyses indicate that, on the whole, distress values at both follow-up points have comparable or stronger associations with changes in illness perceptions and coping than with baseline values of these variables. Therefore, two additional hierarchical linear regression analyses were performed to examine the relative contribution of changes in patients' illness perceptions and coping to psychological distress at the two follow-up points. Variables that have shown a significant univariate correlation with follow-up distress ( $p \leq .1$ ) were entered into the regression equation (excluding the IPQ-R Emotional Representation subscale) in several steps. Baseline distress was forced into the regression equation in the first step, relevant sociodemographic or medical variables were entered in the second step. Changes in illness perceptions and coping were added in the third step and fourth step.

### **Predictors of distress post-intervention (T2)**

With regard to the prediction of distress at T2, 58% of the variance was explained by baseline distress (Table 7). Education, entered in the second step of the regression

**Table 7.** Multiple regression analysis (method enter, using three steps), predicting distress at post-intervention (T2)

	Step 1		Step 2		Step 3	
	Standardized $\beta$	t-value	Standardized $\beta$	t-value	Standardized $\beta$	t-value
Baseline distress	.76	8.19***	.71	7.66***	.80	9.09***
Education			-.19	-2.07*	-.15	-1.73
$\Delta$ IPQ-R Identity					.11	1.29
$\Delta$ IPQ-R Timeline chronic					.11	1.29
$\Delta$ IPQ-R Timeline cyclic					.21	2.33*
Variance explained	$R^2 = .58$		$\Delta R^2 = .04$		$\Delta R^2 = .09$	
F-change	67.11***		4.29*		4.49**	

Final model:  $R^2 = 0.70$ ; adjusted  $R^2 = 0.67$ ;  $F(5, 45) = 21.19$ \*\*\*.

\* $p \leq .05$ ; \*\* $p \leq .01$ ; \*\*\* $p \leq .001$ .

**Table 8.** Multiple regression analysis (method enter, using three steps) predicting distress 1 year after the start of the intervention (T3)

	Step 1		Step 2		Step 3	
	Standardized $\beta$	t-value	Standardized $\beta$	t-value	Standardized $\beta$	t-value
Baseline distress	.73	6.81***	.75	8.89***	.74	8.56***
$\Delta$ IPQ-R Identity			.24	2.76**	.22	2.46*
$\Delta$ IPQ-R Consequences			.02	.25	.03	.32
$\Delta$ IPQ-R Timeline cyclic			.33	3.76***	.31	3.44***
$\Delta$ COPE Acceptance					.08	.84
Variance explained	$R^2 = .53$		$\Delta R^2 = .20$		$\Delta R^2 = .01$	
F-change	46.46***		9.53***		.71	

Final model:  $R^2 = 0.74$ ; adjusted  $R^2 = 0.70$ ;  $F(5, 37) = 20.78$ \*\*\*.

\* $p \leq .05$ ; \*\* $p \leq .01$ ; \*\*\* $p \leq .001$ .

analysis, added 4% ( $p = .044$ ) to the proportion of explained variance. Change scores of illness identity, cyclical timeline, and chronic timeline together explained an additional 9% ( $p = .008$ ) of the variance in distress at T2. After correction for baseline distress, changes in patients' cyclical timeline perceptions were the strongest predictor of distress at T2.

### **Predictors of distress 1 year after the start of the intervention (T3)**

Regarding distress at 1 year follow-up (T3), 53% of the variance was explained by baseline distress (Table 8). No sociodemographic or treatment characteristics were associated with distress at T3. Change scores of illness identity, consequences, and cyclical timeline together explained an additional 20% ( $p < .001$ ) of the variance in distress at T3. Again, changes in patients' cyclical timeline perceptions were the strongest predictor of distress. Change in acceptance coping did not add significantly to the variance explained in patients' distress at T3.

## **Discussion**

Previous research has demonstrated that a substantial proportion of breast cancer patients will experience distress after the end of medical treatment. Understanding the factors and processes that influence distress in these patients is essential in the development of interventions aiming to reduce distress. According to the Common Sense Model (Leventhal *et al.*, 1980, 1997), the way patients perceive and cope with their illness is predictive of emotional and physical health outcomes. The aim of this study was to investigate the cross-sectional and longitudinal relationships of illness perceptions and coping with psychological distress in a sample of women with breast cancer who participate in a psycho-educational aftercare programme. Our main results were that stronger perceptions about a cyclical timeline and experiencing more negative consequences from breast cancer were the most important predictors of general distress in cross-sectional analyses. Due to their strong correlations with the IPQ-R timeline

subscales (See Table 3), avoidance and acceptance coping did not significantly add to the explanation of variance in baseline distress in the multivariate analysis.

Longitudinal analyses revealed that distress and illness-related emotions had decreased in intensity immediately after the intervention and then remained stable until 12 months follow-up. Longitudinal analyses also showed that distress at follow-up was associated with changes in some of the IPQ-R subscales. Specifically, distress at follow-up had worsened for participants who had experienced an increase in symptoms which they attributed to breast cancer (Illness identity), and for those who reported an increase in chronic and cyclical timeline perceptions. When comparing these two timeline perceptions, it was noted that the association with distress at follow-up was more strongly related to cyclical timeline perceptions than to chronic timeline perception. The finding that patients' timeline perceptions are important for the level of psychological distress is consistent with previous studies by Millar (Millar *et al.*, 2005) and Rabin (Rabin *et al.*, 2004). However, in these studies no distinction was made between chronic and cyclical timeline perceptions. Our results suggest that it may be the unpredictable and changing nature of the illness, more than its chronicity per se, that influences patients' distress.

Although our results concerning the association of illness perceptions with distress among patients with breast cancer are largely consistent with previous research (Jørgensen *et al.*, 2009; McGinty *et al.*, 2010; Millar *et al.*, 2005; Rozema *et al.*, 2009; Silva *et al.*, 2011), perceptions about personal and treatment control in this study were unrelated to distress, for which several factors may be responsible. Regarding the lack of association of personal control and distress, an explanation for this unexpected result may relate to the operationalization of personal control in the IPQ-R. This subscale contains items that concern the ability to cure or control the course of the disease, together with items that refer to the controllability of symptoms. Previous research has shown that for patients with active symptoms, stronger perceptions of personal control over daily symptoms were associated with less emotional distress, whereas perceptions about personal control over the course of the illness were related to greater distress, suggesting that these perceptions should be distinguished to investigate its effect on distress. (Affleck, Tennen, Pfeiffer, & Fifield, 1987). The non-significant relation between treatment control and distress may partly be explained by the fact that patients in our study were in the aftermath of diagnosis and (curative) treatment and were faced with the challenge of adjusting to life after cancer. Although participants gave highest scores on the IPQ-R for treatment control, indicating they have much confidence that their treatment will cure or control the disease, treatment for many patients has come with side effects, which at this stage may exert a stronger impact on patients' distress than the question of whether their breast cancer has been cured.

With regard to coping, results from the present study showed that avoidance and acceptance as coping style were related to patients' concurrent level of distress. Consistent with previous studies (Carver *et al.*, 1993; Low *et al.*, 2006; Stanton *et al.*, 2000, 2002), our data suggest that an avoidant coping style was associated with higher distress, both in cross-sectional analyses and in prospective designs with a short-term follow-up. Patients who reacted in a more accepting manner at baseline reported less emotional distress. In addition, these patients showed lower distress 1 year after the intervention. A paradoxical result is the finding that an increase in acceptance over the course of 1 year was associated with an increase in distress. Possibly, an increase in acceptance and distress co-occur when the individual is experiencing more, or increasingly demanding, health challenges which are perceived as difficult to solve or



change (Folkman, 1984; Lowe *et al.*, 2000). By contrast, a decrease in acceptance may reflect an improvement in patients' health or functioning, reducing the need to accept the situation (Llewellyn *et al.*, 2007). Some support for this hypothesis was found in an additional correlation analysis that showed that an increase in breast cancer-related symptoms (IPQ-R Identity) from T1 to T3 paralleled an increase in acceptance coping in that same time interval ( $r = .26, p = .09$ ), as well as an increase in distress (Table 6). This corresponds to assumptions from the Common Sense Model, which states that self-regulation with a (chronic) illness is a cyclical process in which the individual progresses through stages of interpretation, coping, and evaluation continuously. Future studies with a larger study sample should further investigate the mediational pathway of illness perceptions symptoms, coping, and adjustment in relation to objective disease characteristics. An alternative explanation is that disease progression and its associated inflammatory processes may have had a direct effect on mood and cognitive functioning (Reichenberg *et al.*, 2001).

Whereas the relations between illness perceptions and distress were quite consistent at all three time points, associations between coping and distress varied across the time points, which was also observed in earlier studies. Stanton and colleagues investigated the predictive role of avoidance and acceptance coping on distress in women with breast cancer (Stanton *et al.*, 2000, 2002). These studies obtained contradictory results regarding the influence of avoidant coping on patients' distress at 3 months follow-up, and like in our study, found no significant influence of avoidance on distress at 12 months. With regard to acceptance coping, both studies support our findings that baseline acceptance is not predictive of distress after 3 months, but appears to be related to lower distress at 12 months. Carver and co-workers followed breast cancer patients during four time intervals until 12 months after surgery (Carver *et al.*, 1993). Although higher levels of acceptance pre-surgery were associated with lower levels of distress immediately after surgery, acceptance did not predict distress at other intervals. These findings are consistent with the Goodness-of-Fit hypothesis (Forsythe & Compas, 1987), suggesting that the choice of coping styles depends on the subjective appraisal of the illness by the individual. A certain coping style may therefore be adaptive in one stage of the disease but not at another stage (cf. Levine *et al.*, 1987).

This study has had several limitations. Firstly, the sample size was modest and replication with a larger sample is required. Secondly, the respondents in our study were women with breast cancer who participated in a psychosocial aftercare programme, which form a specific subgroup of patients with breast cancer. Nevertheless, our results about the associations between illness perceptions, coping, and emotional distress to a large extent confirm previous studies in this patient population. A third limitation is that this study relied on self-report for the assessment of medical variables and no information was available from medical files on tumour stage or signs of disease recurrence. As stated above, these disease variables may have affected follow-up distress through their influence on patients' illness perceptions and coping.

Notwithstanding these limitations we believe this study has several implications for future research and practice. Firstly, studies are needed to further investigate what factors influence patients' perceptions of their illness and lead to changes in these perceptions. According to the CSM, two factors affect illness representations: personal experiences (e.g., symptoms) and information available about the illness, either in the form of shared cultural beliefs or information that is exchanged in direct contact with other people. This assumption could be supported by investigating to what degree illness perceptions vary with changes in symptoms and other disease characteristics over time. Secondly, it would

be interesting to examine the effects of an intervention that would specifically be designed to target patients' perceptions of breast cancer. Two recent studies found that illness perceptions of breast cancer survivors remained stable over the course of 6 months, even after participation in a psychosocial rehabilitation programme (Jørgensen *et al.*, 2009; McCorry *et al.*, 2012). McCorry and colleagues concluded that illness perceptions within the population of breast cancer are resistant to change without directed intervention aimed specifically at modifying them. They also questioned whether changes in illness perceptions would have an effect on psychological distress at a later stage. Findings from the present study are clearly at odds with this statement by showing that changes in illness perceptions do influence distress at follow-up. Results from the present study suggest that designing an intervention that specifically targets patients' illness perceptions might yield positive results for patients' emotional well-being. Our results in particular have demonstrated the importance of patients' perceived timeline perceptions, emphasizing the relevance of preparing patients for possible long-term symptoms, and teaching practical and emotional strategies to cope with symptoms which may appear and disappear at an irregular interval.

Furthermore, although distress was more strongly related with illness perceptions than coping variables, the role of acceptance coping on distress should also be further clarified. Future research should unravel the mechanisms that cause some patients to increase their level of acceptance over time and examine its relation to mental health outcomes. This can have important implications for the discussion about whether or not it is beneficial to promote acceptance during a psycho-educational intervention.

To conclude, this study is one of the few longitudinal investigations regarding the relationship between illness perceptions, coping, and distress in women with breast cancer. Results from this study showed that illness perceptions are strongly related to the experience of general distress in women with breast cancer both in cross-sectional and longitudinal analyses. In accordance with the assumptions from the Common Sense Model our data suggest that illness representations, coping, and distress vary over time as new information and experiences are incorporated into patients' continuous process of self-regulation. Our analyses have suggested that the development of distress over time can best be understood by taking into account how patients' representation of their illness and coping strategies have changed, rather than predicting future distress from these factors assessed at an earlier stage (Llewellyn *et al.*, 2007; Scharloo *et al.*, 2010). As distress in all our analyses showed a stronger relationship to patients' illness perceptions than to coping styles, our findings lend support to the development of psychosocial interventions that target patients' perceptions of their illness to improve emotional adjustment (Broadbent, Ellis, Thomas, Gamble, & Petrie, 2009; Lee, Cameron, Wünsche, & Stevens, 2011; Petrie, Buick, Weinman, Cameron, & Ellis, 2002; Wearden & Peters, 2008).

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## References

- Affleck, G., Tennen, H., Pfeiffer, C., & Fifield, J. (1987). Appraisals of control and predictability in adapting to a chronic disease. *Journal of Personality and Social Psychology*, *53*, 273–279. doi:10.1037/0022-3514.53.2.273
- Bijsterbosch, J., Scharloo, M., Visser, A. W., Watt, I., Meulenbelt, I., Huizinga, T. W. J., ... Kloppenburg, M. (2009). Illness perceptions in patients with osteoarthritis: Change over time and association with disability. *Arthritis & Rheumatism*, *61*, 1054–1061. doi:10.1002/art.24674
- Broadbent, E., Ellis, C. J., Thomas, J., Gamble, G., & Petrie, K. J. (2009). Further development of an illness perception intervention for myocardial infarction patients: A randomized controlled trial. *Journal of Psychosomatic Research*, *67*, 17–23. doi:10.1016/j.jpsychores.2008.12.001
- Carver, C. S., Pozo, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., ... Clark, K. C. (1993). How coping mediates the effect of optimism on distress: A study of women with early stage breast cancer. *Journal of Personality and Social Psychology*, *65*, 375–390.
- Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, *56*, 267–283.
- Costanzo, E. S., Lutendorf, S. K., & Roeder, S. L. (2011). Common-sense beliefs about cancer and health practices among women completing treatment for breast cancer. *Psycho-Oncology*, *20*, 53–61. doi:10.1002/pon.1707
- Dempster, M., McCorry, N. K., Brennan, E., Donnelly, M., Murray, L. J., & Johnston, B. T. (2011). Do changes in illness perceptions predict changes in psychological distress among oesophageal cancer survivors? *Journal of Health Psychology*, *16*, 500–509. doi:10.1177/1359105310386633
- Envold Bidstrup, P. E., Mertz, B. G., Dalton, S. O., Deltour, I., Kroman, N., & Kehlet, H. *et al.* (2011). Accuracy of the Danish version of the 'distress thermometer'. *Psycho-Oncology*. Advance online publication. doi:10.1002/pon.1917
- Folkman, S. (1984). Personal control and stress and coping processes: A theoretical analysis. *Journal of Personality and Social Psychology*, *46*, 839–852.
- Forsythe, C. J., & Compas, B. E. (1987). Interaction of cognitive appraisals of stressful events and coping: Testing the goodness of fit hypothesis. *Cognitive Therapy and Research*, *11*, 473–485.
- Foster, N. E., Bishop, A., Thomas, E., Main, C., Horne, R., Weinman, J., & Hay, E. (2008). Illness perceptions of low back pain patients in primary care: What are they, do they change and are they associated with outcome? *Pain*, *136*, 177–187. doi:10.1016/j.pain.2007.12.007
- Furze, G., Lewin, R. J. P., Murberg, T., Bull, P., & Thompson, D. R. (2005). Does it matter what patients think? The relationship between changes in patients' beliefs about angina and their psychological and functional status. *Journal of Psychosomatic Research*, *59*, 323–329. doi:10.1016/j.jpsychores.2005.06.071
- Gould, R. V., Brown, S. L., & Bramwell, R. (2010). Psychological adjustment to gynaecological cancer: Patients' illness representations, coping strategies and mood disturbance. *Psychology & Health*, *25*, 633–646. doi:10.1080/08870440902811163
- Hagger, M. S., & Orbell, S. (2003). A meta-analytic review of the common-sense model of illness representations. *Psychology & Health*, *18*, 141–184. doi:10.1080/088704403100081321
- Jemal, A., Siegel, R., Xu, J., & Ward, E. (2010). Cancer statistics, 2010. *CA: A Cancer Journal for Clinicians*, *60*, 277–300. doi:10.3322/caac.20006
- Jørgensen, I. L., Frederiksen, K., Boesen, E., Elsass, P., & Johansen, C. (2009). An exploratory study of associations between illness perceptions and adjustment and changes after psychosocial rehabilitation in survivors of breast cancer. *Acta Oncologica*, *48*, 1119–1127. doi:10.3109/02841860903033922
- Kaptein, A. A., Bijsterbosch, J., Scharloo, M., Hampson, S. E., Kroon, H. M., & Kloppenburg, M. (2010). Using the common sense model of illness perceptions to examine osteoarthritis change: A 6-year longitudinal study. *Health Psychology*, *29*, 56–64. doi:10.1037/a0017787
- Kleijn, W. C., van Heck, G. L., & Van Waning, A. (2000). Ervaringen met een Nederlandse bewerking van de COPE vragenlijst [Experiences with a Dutch version of the COPE questionnaire]. *Gedrag en Gezondheid*, *28*, 213–226.

- Lee, T. J., Cameron, L. D., Wünsche, B., & Stevens, C. (2011). A randomized trial of computer-based communications using imagery and text information to alter representations of heart disease risk and motivate protective behaviour. *British Journal of Health Psychology*, *16*, 72–91. doi:10.1348/135910710X511709
- Leventhal, H., Benyamini, Y., Brownlee, S., Diefenbach, M., Leventhal, E. A., Patrick-Miller, L., ... Robitaille, C. (1997). Illness representations: Theoretical foundations. In K. J. Petrie & J. Weinman (Eds.), *Perceptions of health and illness* (pp. 19–45). London, UK: Harwood Academic Publishers.
- Leventhal, H., Meyer, D., & Nerenz, D. (1980). The common sense representation of illness danger. In S. Rachman (Ed.), *Contributions to medical psychology*. (Vol. 2, pp. 7–30). New York: Pergamon.
- Levine, J., Warrenburg, S., Kerns, R., Schwartz, G., Delaney, R., Fontana, A., ... Cascione, R. (1987). The role of denial in recovery from coronary heart disease. *Psychosomatic Medicine*, *49*, 109–117.
- Llewellyn, C. D., McGurk, M., & Weinman, J. (2007). Illness and treatment beliefs in head and neck cancer: Is Leventhal's common sense model a useful framework for determining changes in outcomes over time? *Journal of Psychosomatic Research*, *63*, 17–26. doi:10.1016/j.jpsychores.2007.01.013
- Low, C., Stanton, A., Thompson, N., Kwan, L., & Ganz, P. (2006). Contextual life stress and coping strategies as predictors of adjustment to breast cancer survivorship. *Annals of Behavioral Medicine*, *32*, 235–244. doi:10.1207/s15324796abm3203\_10
- Lowe, R., Norman, P., & Bennett, P. (2000). Coping, emotion and perceived health following myocardial infarction: Concurrent and predictive associations. *British Journal of Health Psychology*, *5*, 337–350. doi:10.1348/135910700168964
- McCaul, K. D., Sandgren, A. K., King, B., O'Donnell, S., Branstetter, A., & Foreman, G. (1999). Coping and adjustment to breast cancer. *Psycho-Oncology*, *8*, 230–236.
- McCorry, N. K., Dempster, M., Quinn, J., Hogg, A., Newell, J., Moore, M., ... Kirk, S. J. (2012). Illness perception clusters at diagnosis predict psychological distress among women with breast cancer at 6 months post diagnosis. *Psycho-Oncology*. Advance online publication. doi:10.1002/pon.3054
- McGinty, H. L., Goldenberg, J. L., & Jacobsen, P. B. (2010). Relationship of threat appraisal with coping appraisal to fear of cancer recurrence in breast cancer survivors. *Psycho-Oncology*, *21*, 203–210. doi:10.1002/pon.1883
- Mehnert, A., & Koch, U. (2008). Psychological comorbidity and health-related quality of life and its association with awareness, utilization, and need for psychosocial support in a cancer register-based sample of long-term breast cancer survivors. *Journal of Psychosomatic Research*, *64*, 383–391. doi:10.1016/j.jpsychores.2007.12.005
- Millar, K., Purushotham, A. D., McLatchie, E., George, W. D., & Murray, G. D. (2005). A 1-year prospective study of individual variation in distress, and illness perceptions, after treatment for breast cancer. *Journal of Psychosomatic Research*, *58*, 335–342. doi:10.1016/j.jpsychores.2004.10.005
- Moss-Morris, R., Weinman, J., Petrie, K. J., Horne, R., Cameron, L. D., & Buick, D. (2002). The revised Illness Perception Questionnaire (IPQ-R). *Psychology & Health*, *17*, 1–16. doi:10.1080/08870440290001494
- Nosarti, C., Roberts, J. V., Crayford, T., McKenzie, K., & David, A. S. (2002). Early psychological adjustment in breast cancer patients: A prospective study. *Journal of Psychosomatic Research*, *53*, 1123–1130.
- Petrie, K. J., Buick, D., Weinman, J., Cameron, L. D., & Ellis, C. J. (2002). Changing illness perceptions after myocardial infarction: An early intervention randomized controlled trial. *Psychosomatic Medicine*, *64*, 580–586.
- Rabin, C., Leventhal, H., & Goodin, S. (2004). Conceptualization of disease timeline predicts posttreatment distress in breast cancer patients. *Health Psychology*, *23*, 407–412. doi:10.1037/0278-6133.23.4.407

- Reichenberg, A., Yirmiya, R., Schuld, A., Kraus, T., Haack, M., Morag, A., & Pollmächer, T. (2001). Cytokine-associated emotional and cognitive disturbances in humans. *Archives of General Psychiatry*, *58*, 445–452.
- Rozema, H., Völlink, T., & Lechner, L. (2009). The role of illness representations in coping and health of patients treated for breast cancer. *Psycho-Oncology*, *18*, 849–857. doi:10.1002/pon.1488
- Scharloo, M., de Jong, R. J., Langeveld, T. P., van Velzen-Verkaik, E., den Akker, M. M., & Kaptein, A. A. (2010). Illness cognitions in head and neck squamous cell carcinoma: Predicting quality of life outcome. *Supportive Care in Cancer*, *18*, 1137–1145. doi:10.1007/s00520-009-0728-x
- Silva, S. M., Moreira, H. C., & Canavarro, M. C. (2011). Examining the links between perceived impact of breast cancer and psychosocial adjustment: the buffering role of posttraumatic growth. *Psycho-Oncology*. Advance Online Publication. doi:10.1002/pon.1913
- Skinner, T. C., Carey, M. E., Craddock, S., Daly, H., Davies, M. J., Doherty, Y., ... Oliver, L. (2006). Diabetes education and self-management for ongoing and newly diagnosed (DESMOND): Process modelling of pilot study. *Patient Education and Counseling*, *64*, 369–377. doi:10.1016/j.pec.2006.04.007
- Stanton, A. L., Danoff-Burg, S., Cameron, C. L., Bishop, M., Collins, C. A., Kirk, S. B., ... Twillman, R. (2000). Emotionally expressive coping predicts psychological and physical adjustment to breast cancer. *Journal of Consulting and Clinical Psychology*, *68*, 875–882. doi:10.1037/0022-006X.68.5.875
- Stanton, A. L., Danoff-Burg, S., & Huggins, M. E. (2002). The first year after breast cancer diagnosis: Hope and coping strategies as predictors of adjustment. *Psycho-Oncology*, *11*, 93–102. doi:10.1002/pon.574
- Tinghög, P., & Carstensen, J. (2010). Cross-cultural equivalence of HSCL-25 and WHO (ten) wellbeing Index: Findings from a population-based survey of immigrants and non-immigrants in Sweden. *Community Mental Health Journal*, *46*, 65–76. doi:10.1007/s10597-009-9227-2
- van Scheppingen, C., Schroevers, M. J., Smink, A., van der Linden, Y. M., Mul, V. E., Langendijk, J. A., ... Sanderman, R. (2011). Does screening for distress efficiently uncover meetable unmet needs in cancer patients? *Psycho-Oncology*, *20*, 655–663. doi:10.1002/pon.1939
- Veijola, J., Jokelainen, J., Läsky, K., Kantojärvi, L., Kokkonen, P., Järvelin, M. R., et al. (2003). The hopkins symptom checklist-25 in screening DSM-III-R axis-I disorders. *Nordic Journal of Psychiatry*, *57*, 119–123.
- Vos, P. J., Garssen, B., Visser, A. P., Duivenvoorden, H. J., & de Haes, H. C. J. M. (2004). Early stage breast cancer: Explaining level of psychosocial adjustment using structural equation modeling. *Journal of Behavioral Medicine*, *27*, 557–580. doi:10.1007/s10865-004-0003-z
- Wearden, A., & Peters, S. (2008). Therapeutic techniques for interventions based on Leventhal's common sense model. *British Journal of Health Psychology*, *13*, 189–193. doi:10.1348/135910708X295613

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