

# Is Emotion Regulation Associated with Cancer-Related Psychological Symptoms?

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## INTRODUCTION

- Breast cancer patients frequently report a combination of psychological symptoms including anxiety, depression, fear of cancer recurrence (FCR), insomnia, fatigue, pain, and cognitive impairments.
- In the general population, emotion regulation (ER) is considered a central mechanism underlying the development of psychological disorders.
- However, the relationships between ER and cancer-related psychological symptoms have received little attention.

## OBJECTIVE

To examine the cross-sectional and prospective relationships between subjective (cognitive reappraisal, expressive suppression and experiential avoidance) and objective measures (high frequency heart rate variability [HF-HRV]) of ER and a set of psychological symptoms (anxiety, depression, FCR, insomnia, fatigue, pain, and cognitive impairments) among women receiving radiation therapy for breast cancer.

## METHODS

### Participants (N=81)

Participants were recruited at L'Hôtel-Dieu de Québec (CHU de Québec-Université Laval, Québec, Canada).

### Inclusion criteria:

- Diagnosis of non-metastatic breast cancer
- Be scheduled to receive adjuvant radiotherapy
- Be between 18 and 75 years of age

### Exclusion criteria:

- Have distant metastasis
- Have received neoadjuvant or adjuvant chemotherapy for breast cancer
- Present severe cognitive impairments (e.g., Alzheimer's disease) or score  $\leq 20$  on the Montreal Cognitive Assessment
- Have a severe psychiatric disorder (e.g., psychosis)

### Procedure and Measures

Participants completed a battery of self-report scales before (T1) and after (T2) radiotherapy:

- Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983)
  - Anxiety
  - Depression
- Fear of Cancer Recurrence Inventory (Simard & Savard, 2009)
- Insomnia Severity Index (Blais, Gendron, Mimeault, & Morin, 1997)
- Fatigue Symptom Inventory (Hann et al., 1998)
- Physical Symptoms Questionnaire (PSQ)
- Functional Assessment of Cancer Therapy—Cognitive Function (Wagner, Sweet, Butt, Lai, & Cella, 2009)
- Emotion Regulation Questionnaire (Gross & John, 2003)
  - Expressive suppression
  - Cognitive reappraisal
- Acceptance and Action Questionnaire-II (Bond et al., 2011)
  - Experiential avoidance

Resting HF-HRV was measured at T1 only with a digital inter-beat interval recorder (Polar RS800).

Table 1. Participants' Demographic and Medical Characteristics at T1 (N = 81)

	M (SD)	(%)
<b>Age (years; range: 31–75)</b>	59.4 (8.5)	
<b>Marital status</b>		
Married/Cohabiting		64.2
Other		35.8
<b>Education</b>		
College or university degree		65.4
Other		34.6
<b>Annual family income (Canadian dollars)</b>		
Less than \$60,000		65.7
\$60,000 and higher		34.3
<b>Current occupation</b>		
Full time work		23.5
Part-time work		8.6
Sick leave		25.9
Retired		39.5
Other		2.4
<b>Cancer stage (n = 80)</b>		
0 (in situ)		23.8
1		66.3
2		10.0

## RESULTS

### Between T1 and T2:

- Anxiety decreased significantly
- Insomnia, fatigue and pain increased significantly
- The other symptoms, as well as subjectively-assessed ER scores, did not change significantly

Table 2. Mean Scores Obtained on Subjectively- and Objectively-Measured Emotion Regulation and Psychological Symptoms at T1 and T2 and Change Scores ( $\Delta$ ) obtained Between T1 and T2

	T1 M (SD)	T2 M (SD)	p	$\Delta$ T2-T1 M (SD)
<b>Psychological symptoms</b>				
Anxiety	5.4 (4.0)	4.7 (3.5)	.004*	-0.8 (2.4)
Depression	2.9 (3.3)	3.0 (3.0)	.93	0.0 (2.2)
Fear of cancer recurrence	12.0 (4.8)	11.7 (4.4)	.39	-0.4 (3.7)
Insomnia	8.2 (6.3)	9.1 (6.3)	.05*	0.8 (3.7)
Fatigue	3.0 (2.0)	3.6 (1.9)	.001**	0.6 (1.5)
Pain	1.5 (1.6)	1.8 (1.6)	.03*	0.4 (1.6)
Perceived cognitive abilities	26.1 (7.9)	25.7 (7.3)	.55	-0.5 (6.6)
<b>Emotion regulation</b>				
<b>Subjectively-measured</b>				
Experiential avoidance	52.9 (11.4)	51.7 (9.9)	.15	-1.2 (7.2)
Suppression	2.9 (1.6)	3.0 (1.7)	.71	0.1 (1.2)
Cognitive reappraisal	5.2 (1.5)	5.0 (1.4)	.20	-0.2 (1.4)
<b>Objectively-measured</b>				
Resting HF-HRV (logarithm; ms2)	1.5 (0.3)	N/A	N/A	N/A

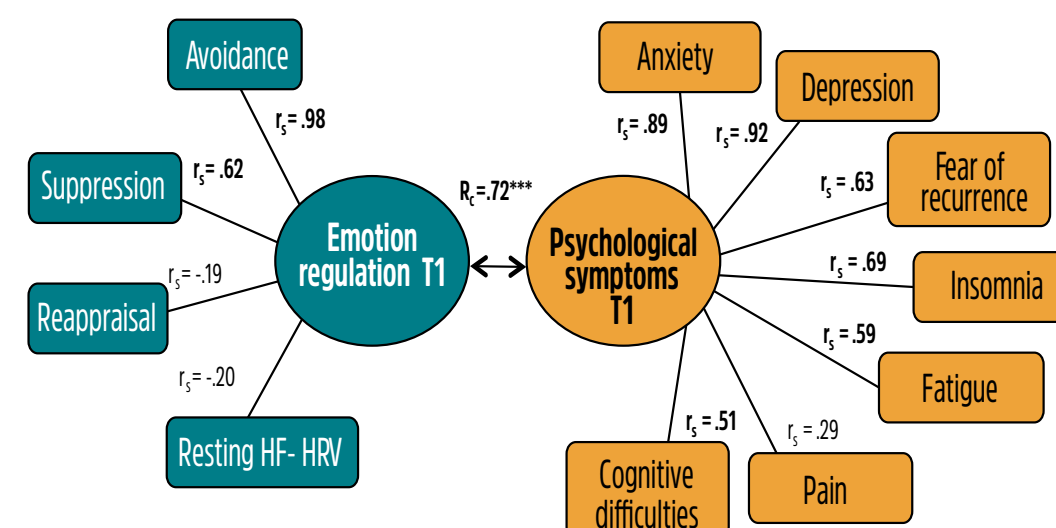
Note. \*  $p \leq .05$ ; \*\*  $p \leq .001$ ; \*\*\*  $p \leq .0001$ ; †  $p \leq .10$ . HF-HRV = high frequency heart rate variability; N/A = not applicable.

### Canonical correlation analyses revealed that:

- Higher levels of experiential avoidance and expressive suppression were cross-sectionally associated with higher levels of all symptoms except pain at T1 ( $R = .72, p < .0001, R^2 = .53$ ; Figure 1) and at T2 ( $R = .75, p < .0001, R^2 = .56$ ; Figure 2). ER variables explained 22% of the variance of symptoms at T1, and 25% at T2.
- Higher levels of suppression and reappraisal measured at T1 were marginally associated with reduced FCR and with increased depression and fatigue between T1 and T2 ( $R = .56, p = .07, R^2 = .32$ ; Figure 3). ER at T1 explained 4% of the variance in changes in symptoms between T1 and T2.

Figure 1. Canonical correlation between subjectively- and objectively-measured emotion regulation and psychological symptoms at T1. \*\*\*  $p \leq .0001$ .

$R_c$  = canonical correlation coefficient;  
 $R_s$  = canonical structure coefficient;  
AAQ-II = Acceptance and Action Questionnaire-II;  
ERQ = Emotion Regulation Questionnaire;  
HF-HRV = high frequency heart rate variability.



Note: A higher score indicates a higher level of psychological symptoms and of subjectively-measured ER.

Figure 2. Canonical correlation between emotion regulation strategies and psychological symptoms at T2. \*\*\*  $p \leq .0001$ .

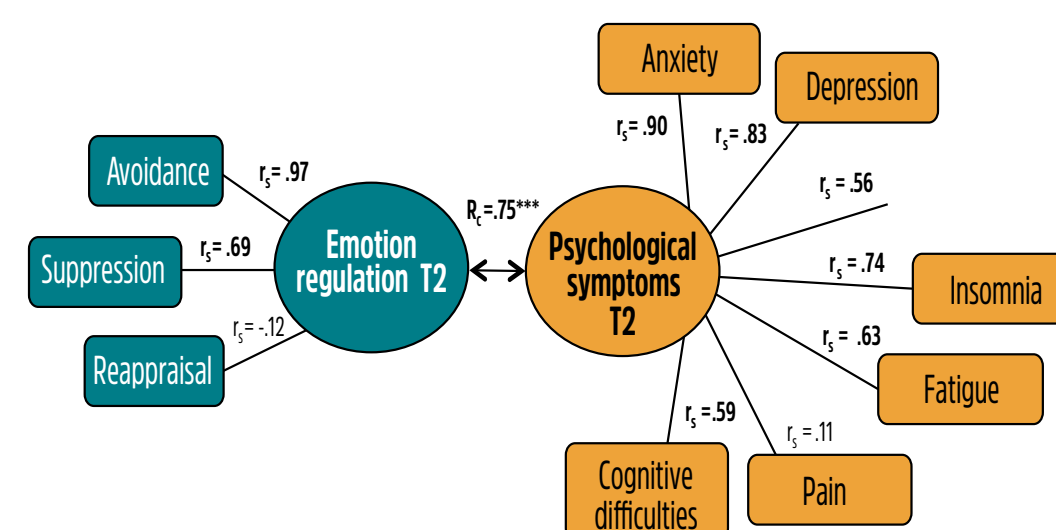
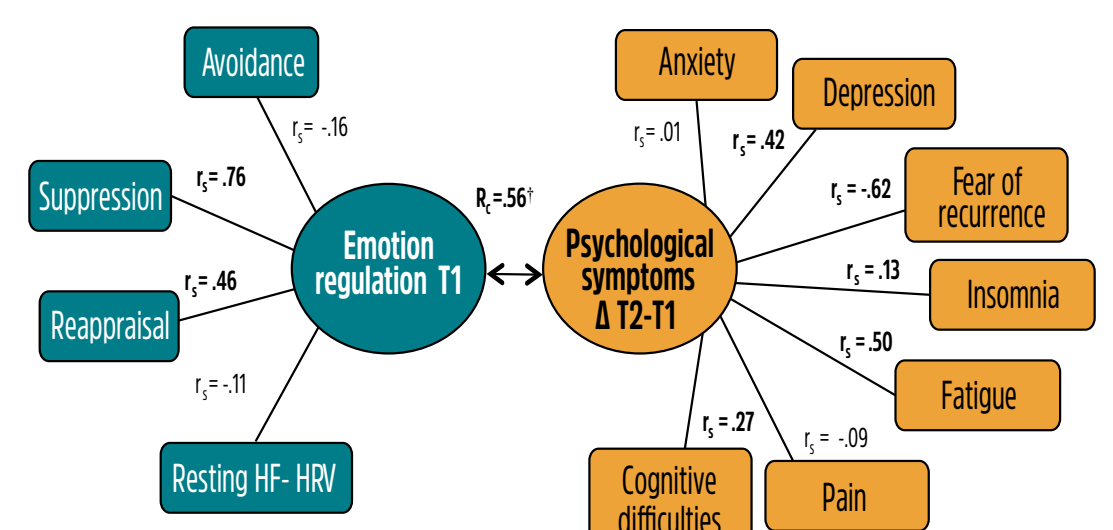


Figure 3. Canonical correlation between subjectively- and objectively-measured emotion regulation at T1 and changes ( $\Delta$ ) on psychological symptoms (between T1 and T2). †  $p \leq .10$ .



## CONCLUSION

- Maladaptive ER strategies (i.e., suppression and avoidance), assessed subjectively, may act as a transdiagnostic mechanism underlying several cancer-related psychological symptoms.
- The lower proportion of variance of changes in symptoms between T1 and T2 explained by ER at T1 suggests that the prospective change in symptoms is better explained by other variables not assessed in this study.
- Transdiagnostic treatments targeting emotion regulation may constitute a promising avenue for the development of an effective psychological treatment for cancer patients that experience multiple psychological symptoms.

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