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The Mediating Role of Avoidant Coping in the Relationships between Physical, Psychological, and Social Wellbeing and Distress in Breast Cancer Survivors

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Abstract

Objective: Many breast cancer survivors (BCS) recover from the negative sequelae of cancer treatment. However, some report persistent and disruptive distress well into disease-free survivorship. More information is needed on the predictors of distress in this growing population of BCS, including the role of avoidant coping, or attempts to avoid thoughts, feelings, and reminders of cancer, in mediating the relationship between distress and psychological, physical, and social domains of well-being.

Methods: In a large cross-sectional study, BCS ($n = 1,127$), who were 3 to 8 years post-diagnosis, completed a survey assessing demographic characteristics, medical history, distress (anxiety and depressive symptoms), avoidant coping, and physical (fatigue), psychological (fear of recurrence, attention, body image), and social (social support from a partner, social constraints from a partner) well-being. Multiple mediation analyses were conducted to determine if avoidant coping mediated the relationship between each distress variable (anxiety and depressive symptoms) and each well-being (fear of recurrence, attention, body image, fatigue, social support, and social constraints) variable.

Results: In all 6 mediation models, avoidant coping significantly ($p < .001$) mediated the relationship between each well-being variable (fear of recurrence, attention, body image, fatigue, social support, and social constraints) and each distress indicator (depression and anxiety).

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Avoidant coping mediated 19-54% of the effects of the contributing factors on the distress variables.

Conclusions: Avoidant coping may indicate risk for, or presence of, distress among BCS. Interventions to reduce distress may benefit from addressing avoidant coping styles.

Keywords

breast cancer; cancer; distress; coping; avoidant coping; fear of recurrence; oncology

Many of the 3.8 million breast cancer survivors (BCS) currently living in the United States¹ will endure long-term treatment-related side effects (e.g., fatigue, lymphedema, cognitive impairment) as well as distress,² given the profound existential uncertainty of cancer recurrence.³ Distress is a broad term for “unpleasant experiences of a psychological, social, spiritual, and/or physical nature,” as defined by the National Comprehensive Cancer Network (NCCN).⁴ Depression and anxiety are two of the most common psychological indicators of distress. Approximately 30% of BCS experience distress, with as many as 52% of those reporting high distress.⁵ Distress has been linked to physical, psychological, and social disturbances in well-being. Yet, despite its prevalence and impact, managing distress remains one of the most frequent unmet needs of BCS.⁶

Although some BCS use adaptive coping strategies to manage distress, others rely upon less-adaptive coping strategies, such as avoidant coping.⁷ Notably, avoidant coping, attempting to not think about cancer, may offer a brief reprieve from anxiety-provoking thoughts, but over time, these thoughts may become more obsessive and intrusive.⁵ Given the need for ongoing cancer surveillance, BCS often experience distressing reminders of their cancer experience. Avoidant coping can adversely affect survivors’ ability to focus on solutions and necessary actions, such as adhering to surveillance guidelines.

The protracted nature of the cancer experience, with its continued surveillance, lingering side effects of treatment, and uncertainty about future prognosis, highlights the importance of vigilant monitoring, identification, and treatment of distress among BCS. A better understanding of distress, avoidant coping, and physical, psychological, and social characteristics of BCS is needed to develop targeted interventions. Using models to predict BCS at risk of distress will allow clinicians to deliver these targeted interventions to reduce the devastating effects of distress. Using a large national cohort of BCS, we examined whether avoidant coping mediated the relationship between distress and physical, psychological, and social well-being.

Methods

Study Sample

This study is a secondary analysis of cross-sectional data from a study examining differences in quality of life (QoL) outcomes among BCS.⁸ The parent study was based on the City of Hope Quality of Life Model, which posits four domains of wellbeing - physical, psychological, social, and spiritual - contribute to QoL.⁸ All domains of wellbeing were assessed in the parent study as contributing to overall QoL.

Participants ($n = 1,127$) included 2 cohorts: women 18-45 years of age (“younger survivors”) who were assumed to be pre-menopausal at diagnosis and women 55-70 years of age (“older survivors”) who were assumed to be post-menopausal at diagnosis. Eligibility criteria included stage I-III breast cancer at diagnosis, history of treatment with chemotherapy, disease-free status at enrollment, and 3 to 8 years post-diagnosis at the time of consent. For these analyses, survivor groups were combined to test relationships between distress, avoidant coping, and physical, psychological, and social well-being. Spiritual wellbeing was not assessed in these analyses.

Procedure

The sample for the present study was identified through the Eastern Cooperative Oncology Group-American College of Radiology Imaging Network (ECOG-ACRIN) and its Community Clinical Oncology Programs. The study was approved by the Indiana University IRB (#1009001681). Health care providers asked eligible BCS for permission to share patients’ contact information with the research team. If patients agreed, the research team mailed a study brochure to patients. One week later, patients were called to determine interest and address questions about the study. Informed consent and authorization were mailed to interested patients along with pre-paid return envelopes. Participants who returned signed consent were mailed questionnaires assessing demographic characteristics, medical history (i.e., time since diagnosis, type of breast cancer surgery, cancer stage at diagnosis, use of hormonal therapy, number of medical comorbidities, current use of medications for depression and anxiety), distress, coping style, and psychological, physical, and social well-being. A total of 744 younger and 937 older eligible survivors were contacted, and of these, 505 (68%) younger and 622 (66%) older survivors participated in the study. Additional details about the parent study are reported elsewhere.⁸ This study was registered with [ClinicalTrials.gov](https://clinicaltrials.gov/ct2/show/study/NCT00309933) (NCT00309933).

Measures

Distress—According to the literature, the most common indicators of distress are symptoms of depression and anxiety.⁹ Therefore, two measures were used to assess different dimensions of psychological distress.

Depressive Symptoms.: The 20-item Center for Epidemiological Studies–Depression scale (CES-D)¹⁰ was used to assess depressive symptoms. On a 4-point (0 to 3) Likert-type scale, participants rated how often they experienced depressive symptoms over the past week. Total scores range from 0 to 60, with higher scores indicating greater symptoms. A cut-off score of 16 suggests that individuals are at risk for clinical depression. The CES-D has undergone extensive testing and demonstrated good concurrent and construct validity.¹⁰ Cronbach’s alpha for the present study was 0.89.

Anxiety.: The 20-item State-Trait Anxiety Inventory-State subscale (STAI-S)¹¹ was used to measure respondents’ current level of anxiety. Responses were rated on a 4-point Likert-type scale, with higher scores indicating greater state anxiety. A cutoff score of 40 is commonly used to indicate probable clinical anxiety.¹² The STAI-S subscale has demonstrated strong discriminant and convergent validity.¹¹ Cronbach’s alpha for the present study was 0.93.

Avoidant Coping—Avoidant coping was measured using 8 avoidance items from the Brief COPE.¹³ The items were modified to reflect coping with breast cancer. On a 4-point Likert-type scale, participants indicated how frequently they used avoidant coping strategies (e.g. “I’ve been doing something to think about breast cancer less, such as going to movies, watching TV, reading, daydreaming, sleeping or shopping”) to manage the stress associated with breast cancer. Total possible scores range from 0-24, with higher scores suggesting greater use of the strategy. (Cronbach’s alpha coefficient = 0.69).

Predictor Variables—The predictor variables used in this study were six indices of psychological, physical, and social well-being. Fatigue was measured as a component of **Physical well-being**, using the 13-item Functional Assessment of Cancer Therapy – Fatigue (FACT-F; alpha coefficient = 0.94.¹⁴ **Psychological well-being** included fear of recurrence (4-item Index from the Concerns About Recurrence Scale, CARS; alpha coefficient = 0.90),¹⁵ perceived attention function (original 16-item Attentional Function Index, AFI; alpha coefficient = 0.93),¹⁶ and body image (7 items; alpha coefficient = 0.88).¹⁷ Lastly, **social well-being** included social support of partner (7-item Northouse Social Support Scale – Spouse/Partner; alpha coefficient = 0.87)¹⁸ and social constraints (14-item Social Constraints Scale – Partner; alpha coefficient = 0.91).¹⁹

Data Analysis

Descriptive statistics were calculated for all demographic, health, and distress variables. Two dependent variables defining distress (depression and anxiety) and six independent variables representing physical (fatigue), psychological (fear of recurrence, attention, body image), and social (social support from partner, social constraints from partner) well-being were considered in mediation analyses, performed using Mplus software.²⁰ Six separate multivariate structural equation models were estimated in which each model included two dependent variables measuring distress (depression and state anxiety) and one of six independent variables (fear of recurrence, fatigue, attention, social support of partner, social constraint of partner, and body image). Avoidant coping was used as a single mediator in all models. These were path models because they included only observed, not latent, variables. Several independent variables were highly correlated, requiring six separate mediation analyses to avoid multicollinearity problems and to assess each variable’s direct and indirect effect on distress.

Figure 1 illustrates the details of the hypothesized generic path model. The total effect represents the effect from the independent variable to each outcome ignoring avoidant coping (c_1 and c_2 ; Figure 1a). The direct effect (c_1' and c_2' ; Figure 1b) is the effect of the independent variable on each outcome adjusted for avoidant coping. The indirect effect ($a*b_1$ and $a*b_2$; Figure 1b) is the effect of each independent variable on each outcome operating through avoidant coping. The product of coefficients approach was used in Mplus to estimate the indirect effects. The total effect in Figure 1a is equivalent to the sum of direct and indirect effects in Figure 1b.

Coefficients and p-values for indirect, direct, and total effects were reported. Additionally, the “proportion mediated” (PM), defined by the ratio of the indirect to total effect, was

reported as an effect size of the magnitude of mediation.²¹ The maximum likelihood estimation was used to estimate coefficients. Full-information maximum likelihood was used to handle the small number of missing values in the dependent variables (1.8% to 1.9% for each model). A bootstrap procedure, with 5000 resamples, was used to generate 95% confidence intervals surrounding the coefficients and PM effect size. The data that support the findings of this study are available from the corresponding author upon reasonable request.

Results

Table 1 shows the descriptive statistics for demographic characteristics and medical history. On average, participants were 5.9 years post-diagnosis and 57 years old. All levels of income were well-represented. Participants reported an average of two comorbidities, and 25% reported using medication for depression or anxiety.

Table 2 shows descriptive statistics for measures used in the model, along with bivariate correlations. Given that 16 represents the threshold of clinical depression and 0 represents the absence of depression, the CESD mean of 9.8 indicates mild to moderate depressive symptomatology in the sample. Similarly, the STAI-S mean of 32.4 represents mild to moderate anxiety symptoms. Bivariate correlations between the predictors and outcomes ranged from -0.63 to 0.35 , with the strongest correlates of depression and anxiety being fatigue and attention function (-0.47 to -0.63). Avoidant coping also displayed a moderate correlation with depression (0.52) and anxiety (0.47). The correlation between predictors and the mediator (avoidant coping) ranged from -0.32 to 0.43 .

Standardized coefficients, PM effect size, and bootstrapped confidence intervals from each of the six path models are shown in Table 3. The proportion of variance explained (R^2) in each outcome by the predictor and mediator in the six models ranged from 0.29 to 0.51 for depression and 0.28 to 0.38 for state anxiety. The R^2 values for avoidant coping, explained by the predictor, ranged from 0.10 to 0.19 . Confidence intervals showed that all effects for each model were significant at the 0.05 alpha level, including direct and indirect effects. The PM effect size ranged from 0.18 to 0.54 for depression and 0.21 to 0.43 for state anxiety, indicating that $1/5$ to $1/2$ of the total effect from each predictor was accounted for by mediation through avoidant coping. For example, the indirect effect through avoidant coping accounted for about half of the total effect between fear of recurrence and depression (PM = 0.54) and between social constraints and depression (PM = 0.48). The indirect effect through avoidant coping also accounted for a little less than half of the total effect between social constraints and state anxiety (PM = 0.43).

Discussion

Our study yielded several important findings. First, the women in this study were still experiencing significant cancer-related distress, with the majority reporting depressive and/or anxiety symptoms. Findings from the current study are consistent with others that showed distress lingers among 14% to 52% of BCS (9-11). Similar to previous studies, we defined distress in terms of anxiety and depression,⁵ two symptoms that have prominent relationships with decision making, low optimism, low sense of mastery, and lost sleep.²²

Second, we found that psychological, physical, and social symptoms predicted distress years after diagnosis and treatment. Our results highlight the diversity of symptoms contributing to distress. Using the City of Hope Quality of Life Model, upon which the parent study was based,⁸ we identified multiple symptoms from the physical (fatigue), psychological (fear of recurrence, attention, body image), and social (social support and social constraints) domains of quality of life that contributed to distress. Given that we used cross-sectional analyses, it is important to note that the relationships between distress and quality of life could be reciprocal, wherein distress might also predict quality of life outcomes.

Third, physical, psychological, and social well-being were associated with avoidant coping. Previous studies have found significant relationships between heightened fear of recurrence,²³ poor body image,²⁴ greater fatigue,²⁵ lack of social support,²⁶ high social constraints,²⁷ and avoidance or avoidant coping. These relationships are cyclical, with some studies showing reciprocal relationships. For example, experiencing social constraints (e.g. denial, minimizing concerns, avoiding conversations about cancer) from a spouse might encourage the use of avoidant coping. Conversely, using avoidant coping may result in attempts to limit discussions of cancer.

Fourth, avoidant coping was associated with distress. Our findings are consistent with other reports showing the relationship between avoidance and distress.²⁶ Specifically, avoidant coping, in comparison to other coping techniques, has been associated with depression, anxiety, cancer-related worries, and generalized distress.²⁸

While other studies have shown the prevalence of distress and its correlates,²⁹ this study goes further to identify the mediating role of avoidant coping among BCS. For instance, we found that a little less than half of the relationship between social constraints and state anxiety was accounted for by avoidant coping. According to the social cognitive processing theory, not discussing fears about cancer with a partner due to social constraints (i.e., avoiding conversations, minimizing concerns) can increase avoidance and negative long-term outcomes such as distress.³⁰ While this particular relationship (the mediating role of avoidant coping in the relationship between social constraints and distress) has been examined within the context of social cognitive processing theory, the mediating role of avoidant coping in relationships between distress and various aspects of well-being have not been previously thoroughly assessed.

Clinical Implications

Our findings emphasize the need to identify survivors who are distressed and may benefit from behavioral treatment specifically targeting coping strategies. An emerging evidence base supports the importance of distress screening and triage to improve psychosocial outcomes among cancer patients.⁹ Updated guidelines from the National Comprehensive Cancer Network suggest screening patients for distress, using valid and reliable measures, at the initial visit and appropriate intervals thereafter, as clinically indicated.⁴ If patients screen positive, clinicians can consider a multi-modal approach for treating distress, including pharmacologic, physical, and psychological therapy. Given its association with distress, avoidant coping should be assessed and targeted.

Accessible and effective interventions for distressed survivors need to be developed, tested, and disseminated. Mindfulness- and acceptance-based interventions may be ideally suited to meet the unmet needs of distressed BCS who use avoidant coping. Mindfulness-based stress reduction (MBSR) is one such intervention that teaches mindfulness meditation focused on present-moment awareness, acceptance, non-judgment of experience, and cultivating a non-reactive response to stress.³¹ Additionally, Acceptance and Commitment Therapy (ACT) aims to increase psychological flexibility – the capacity to focus on present-moment experience and to pursue personally valued life directions, even in the presence of internal discomfort (e.g., unwanted thoughts, emotions, physical sensations).³² Approaches such as MBSR and ACT may decrease avoidant coping by encouraging a less reactive stress response and providing adaptive alternatives to avoidant coping.

Study Limitations

Despite the many strengths, our study also had limitations. First, structured clinical interviews, the gold standard for assessing psychiatric morbidity, were not used. Cancer survivors have been found to under-report symptoms, such as post-traumatic stress, on patient-reported outcome measures compared to qualitative interviews.³³ There may be more BCS who are suffering from distress than indicated in this study. Second, our sample was a highly educated, middle-class group of mostly Caucasian women, and in this regard, it was consistent with other BCS studies. However, our findings might not be generalizable to the larger breast cancer population, given the sample characteristics. Third, this was a secondary analysis from a cross-sectional study, which limited our ability to determine the temporal association between distress and avoidant coping. In addition, the non-randomized design limits conclusions regarding causality and directionality between the predictors, mediator, and outcomes. Additional longitudinal studies are needed to determine how distress and avoidant coping change as the time between diagnosis, treatment, and survival without recurrence increases. Fourth and finally, the sample was composed of BCS who were ages 18-45 and 55-70 years old and potentially not representative of survivors who are diagnosed at ages 46-54 years.

Future Research

Experts have identified the need for more evidence-based psychosocial interventions for BCS.³⁴ Given the strong connection between distress and avoidant coping found in the present study, interventions targeting avoidant coping are most promising. Rigorous randomized controlled trials are needed to determine the efficacy of interventions such as MBSR and ACT on distress and avoidant coping among BCS.

Conclusions

Our results support prior work that found avoiding thoughts, feelings, and memories of a cancer experience plays an important role in depression, anxiety, and general distress.³⁵ Deliberate attempts to avoid or suppress private events (e.g., intrusive thoughts about cancer) can increase their occurrence and behavioral impact.³⁶ While avoidant coping may be a useful tool early in the treatment process to deal with the stress of cancer, prolonged use can have detrimental effects on physical,³⁷ and psychological,³⁸ and social³⁹ well-being.

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Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Abbreviations:

BCS	breast cancer survivors
FCR	fear of recurrence
NCCN	National Comprehensive Cancer Network
ECOG-ACRIN	Eastern Cooperative Oncology Group- American College of Radiology Imaging Network
CCOP	Community Clinical Oncology Programs
CES-D	Center for Epidemiological Studies–Depression scale
STAI-T	State-Trait Anxiety Inventory-Trait subscale
CARS	Concerns about Recurrence Scale
FACT-F	Functional Assessment of Cancer Therapy – Fatigue
AFI	Attentional Function Index
IWB	Index of Well-Being
MBSR	Mindfulness-Based Stress Reduction

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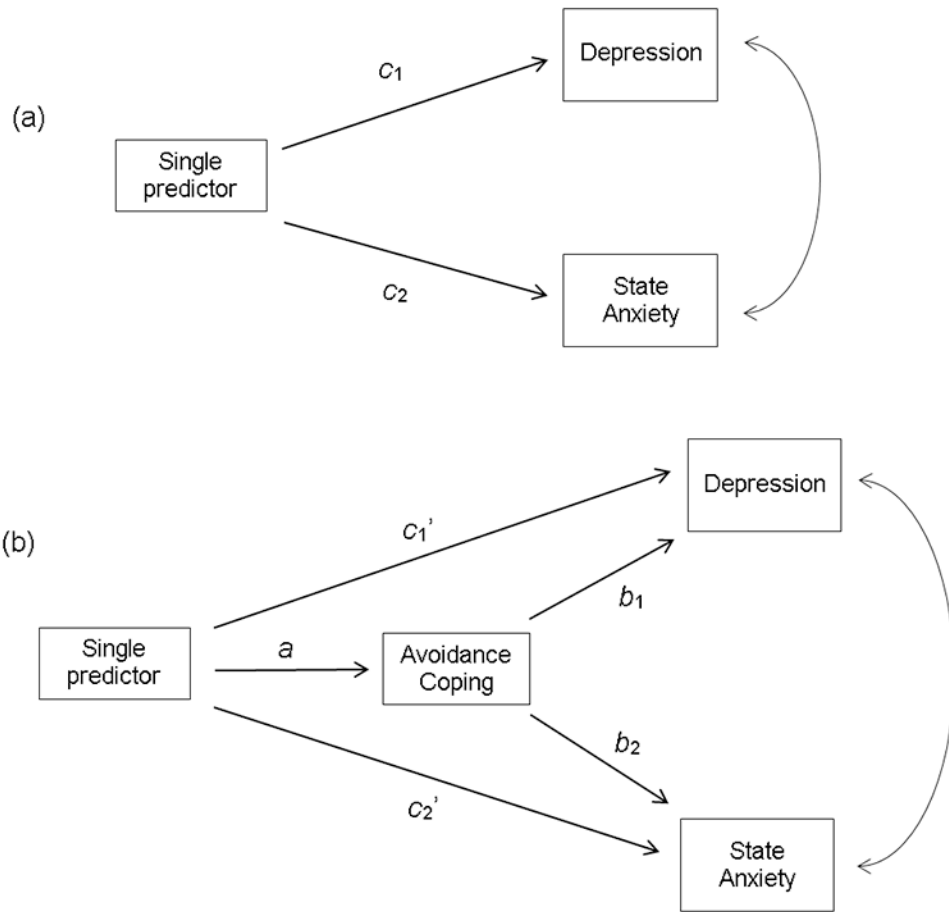


Figure 1. Mediation Models in Path Model Form*.

*Diagram (1a) shows the effect of the single predictor on the outcomes (depression and state anxiety) with no mediation. Diagram (1b) shows the effect of the single predictor on the outcomes mediated by avoidance coping. The single predictor represents one of six variables: fear of recurrence, fatigue, attention function, social support partner, social constraints partner or body image. The estimated values of a , b_1 , b_2 , c_1 , c_1' , c_2 and c_2' path coefficients are shown in Table 1; c_1 and c_2 indicate the total effect of the predictor on the outcomes ignoring avoidance coping; c_1' and c_2' indicate the direct effects of the predictor on the outcomes adjusted for avoidance coping; and the indirect effect of the predictor on the outcomes through avoidance coping is indicated by the product of a and b_1 , and separately a and b_2 (i.e., $a*b_1$, $a*b_2$). Since depression and state anxiety tend to be at least moderately correlated in practice, their error terms are allowed to be correlated in the model (indicated by a curved arrow).

Table 1.

Demographic and Health Characteristics of Breast Cancer Survivors

Variable	N	Mean (SD) or n (%)
Demographics		
Age, mean (SD); range	1127	57.1 (11.6); range = 28 to 78
Education (years), mean (SD); range	1115	14.5 (2.7); range = 7 to 20
Race, n (%)	1127	
Caucasian		1041 (92.4)
African American		43 (3.8)
Other		43 (3.8)
Marital status (married or long term), n (%)	1109	836 (75.4)
Employment (full-time), n (%)	1127	431 (38.2)
Income (total household), n (%)	1089	
\$50,000 or less		403 (37.0)
\$50,001 through \$100,000		442 (40.6)
Greater than \$100,001		244 (22.4)
Medical History		
Comorbidities (number of), mean (SD); range	1127	2.1 (1.8); range = 0 to 12
Time since diagnosis (years), mean (SD); range	1127	5.9 (1.5); range = 3 to 9
Surgery type, n (%)	1127	
Mastectomy		591 (52.4)
Lumpectomy		536 (47.6)
Reconstructive surgery, n (%)	589	289 (49.1)
Initial Stage of Diagnosis, n (%)	1099	
I		244 (22.2)
II		728 (66.2)
III		127 (11.6)
Hormonal Therapy, any current or past, n (%)	1101	865 (78.6)
Depression or anxiety med use, current, n (%)	1118	278 (24.9)

Table 2.

Bivariate Pearson correlation coefficients, means, and standard deviations for measures used in path models.

Variable	Type [†]	Independent Variables					Mediator		Dependent Variables	
		1	2	3	4	5	6	7	8	9
1. Fear of recurrence	I	1.00	-0.24	-0.25	-0.22	0.32	-0.35	0.42	0.35	0.41
2. Fatigue	I		1.00	0.68	0.23	-0.29	0.36	-0.32	-0.62	-0.47
3. Attention Function	I			1.00	0.30	-0.29	0.39	-0.33	-0.63	-0.53
4. Social support	I				1.00	-0.69	0.32	-0.32	-0.36	-0.41
5. Social constraints	I					1.00	-0.29	0.43	0.40	0.41
6. Body image	I						1.00	-0.32	-0.42	-0.39
7. Avoidance coping	M							1.00	0.52	0.47
8. Depression	D								1.00	0.67
9. State anxiety	D									1.00
N		1127	1125	1127	848	843	1125	1126	1124	1111
Mean		10.4	40.0	6.9	27.2	21.0	22.6	2.7	9.8	32.4
SD		5.1	10.1	1.8	5.7	8.0	5.7	3.0	9.0	10.6
Minimum		4	4	1.6	7	14	7	0	0	20
Maximum		24	52	10	35	56	35	19	51	80

[†]Indicates how variable was used in each path model: independent (I), mediator (M) and dependent variable (D).

Standardized path coefficients with 95% bootstrap confidence intervals from mediation model with PM effect size for indirect effect. [†]

Table 3.

Model	<i>x</i>	<i>m</i>	<i>y</i>	<i>a</i> (<i>x</i> to <i>m</i>)	<i>b</i> (<i>m</i> to <i>y</i>)	Total Effect <i>c</i> (<i>x</i> to <i>y</i>)	Direct Effect <i>c'</i> (<i>x</i> to <i>y</i>)	Indirect Effect <i>a</i> * <i>b</i> (<i>x</i> to <i>y</i>)	Proportion Mediated (PM effect size)
1	Fear of recurrence	Avoidance coping	Depression	0.42 (0.36, 0.48)	0.45 (0.39, 0.51)	0.35 (0.29, 0.41)	0.16 (0.10, 0.23)	0.19 (0.15, 0.23)	0.54 (0.41, 0.66)
			State anxiety						
2	Fatigue	Avoidance coping	Depression	-0.32 (-0.38, -0.26)	0.36 (0.31, 0.41)	-0.61 (-0.66, -0.57)	-0.50 (-0.55, -0.45)	-0.11 (-0.14, -0.09)	0.19 (0.14, 0.23)
			State anxiety						
3	Attention Function	Avoidance coping	Depression	-0.33 (-0.38, -0.27)	0.35 (0.30, 0.40)	-0.63 (-0.67, -0.59)	-0.51 (-0.56, -0.47)	-0.11 (-0.14, -0.09)	0.18 (0.14, 0.22)
			State anxiety						
4	Social support partner	Avoidance coping	Depression	-0.32 (-0.39, -0.25)	0.47 (0.41, 0.53)	-0.36 (-0.43, -0.29)	-0.21 (-0.27, -0.15)	-0.15 (-0.19, -0.11)	0.42 (0.31, 0.52)
			State anxiety						
5	Social constraints partner	Avoidance coping	Depression	0.43 (0.37, 0.49)	0.44 (0.38, 0.51)	0.40 (0.33, 0.47)	0.21 (0.14, 0.28)	0.19 (0.15, 0.23)	0.48 (0.37, 0.58)
			State anxiety						
6	Body image	Avoidance coping	Depression	-0.32 (-0.38, -0.26)	0.43 (0.38, 0.49)	-0.42 (-0.47, -0.36)	-0.28 (-0.33, -0.23)	-0.14 (-0.17, -0.11)	0.33 (0.26, 0.40)
			State anxiety						

[†]Avoidance coping is the mediator variable (*m*) in all models; *x* = independent variable, *y* = dependent variable. There are 2 dependent variables (depression and state anxiety) for each model; *a* = path coefficient from *x* to mediator; *b* = path coefficient from mediator to *y*; *c* = path coefficient from *x* to *y* with no mediator in model (total effect); *c'* = path coefficient from *x* to *y* with mediator in model (direct effect); *a***b* = indirect effect; proportion mediated (PM) = effect size calculated as the ratio of the indirect effect to total effect. Sample sizes for each model: Model 1 = 1127, Model 2 = 1125, Model 3 = 1127, Model 4 = 848, Model 5 = 843, and Model 6 = 1125.