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Exploring emotion regulation as a mediator of the relationship between resilience and distress in cancer

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Abstract

Objectives: Distress in patients with cancer is a significant problem that affects up to 32% of patients. Yet research indicates that 35% of cancer patients do maintain high levels of well-being. Resilience is one psychological factor implicated as being protective against distress; however, the mechanisms for this relationship are currently unknown. The present study aimed to explore emotion regulation as a potential mediator of the relationship between resilience and distress.

Methods: A cross-sectional survey examining emotional regulation, resilience, and distress was completed by 227 patients from two hospitals with heterogeneous cancer types. Measures included the Difficulties in Emotion Regulation Scale (DERS), the Connor Davidson Resilience Scale, and the Depression, Anxiety, Stress Scale.

Results: Difficulties in emotion regulation and resilience explained 33.2% of the variance in distress. Resilience had a significant direct effect on distress, accounting for 15.8% of the variance. However, this effect was no longer significant when difficulties in emotion regulation were controlled for. The indirect effect through difficulties in emotion regulation was significant, $b = 0.009$, 95% CI [−0.013,−0.007], suggesting that the effect of resilience on distress was fully mediated by emotion regulation. Parallel mediation analyses also examined the differential effects of the six DERS subscales on the relationship between resilience and distress.

Conclusion: These findings suggest that emotion regulation is an important mediator of resilience in cancer. Hence, in patients with cancer, difficulties in emotion regulation (and the DERS specifically) might be a useful focus for screening for patients at risk of distress.

KEYWORDS

cancer, distress, emotion regulation, oncology, resilience

1 | INTRODUCTION

Distress in cancer patients is a significant problem, affecting approximately 32% of patients.[1] Conversely, up to 35% of cancer patients maintain high levels of well-being.[2] Given that distress in cancer has been linked with severity of cancer symptoms, reduced treatment compliance, increased psychiatric morbidity, increased mortality rate, and lower quality of life (QoL), it is important to understand why some patients develop significant distress and others do not.[3-6]

Resilience is one psychological construct that has been demonstrated to protect against distress.[7,8] It is broadly conceptualised as the maintenance of healthy psychological functioning in the face of

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disruptive life events.[9] Resilience has been conceptualised in variety of ways including as a psychological trait, a changeable "process" factor, and a potential outcome after exposure to stress.[10] For the current study, resilience was considered as a predisposing factor to outcomes in cancer.

Cross-sectional studies have consistently shown a negative correlation between resilience and distress.[2,11,12] A study of 253 breast cancer patients and 211 healthy control found no difference between the two groups on resilience[6] suggesting that adversity did not seem to have an effect on the level of resilience but resilience was found to be associated with lower rates of depression and anxiety in both women with breast cancer and in controls with stronger association in cancer cases.[6] This research suggests that resilience could be an important factor in protecting against distress following cancer diagnosis. However, the mechanism through which this relationship occurs is largely unknown.[13] The present study aimed to partially address this gap, by exploring one potential mechanism: emotion regulation. While relatively unexplored in cancer, difficulties in emotion regulation is an established transdiagnostic mechanism of psychological dysfunction in other clinical populations, including anxiety disorders,[14] depression,[15] and alcohol dependence.[16]

Defined as difficulties in changing one's emotion in order to maintain a preferred emotional state following a stressor,[5] extensive empirical testing has found difficulties in emotion regulation is composed of six distinct factors: lack of emotional awareness ("*awareness*") which reflects whether one attends to and acknowledges their emotions; lack of emotional clarity ("*clarity*") which reflects whether one has a clear understanding of what their emotional response means; "*nonacceptance*" which is the tendency to have negative secondary emotions to one's emotional experience; limited access to emotion regulation strategies ("*strategies*") which measures the belief that there is little to be done to regulate one's emotions once they are upset; impulse control difficulties ("*impulse*") which covers the difficulties experienced in controlling behaviour when they are experiencing negative emotions; and difficulties engaging in goal directed behaviour ("*goals*"), which reflects difficulties concentrating and accomplishing tasks when one is experiencing negative emotions.[17] As defined by Gratz and Roemer, difficulties in any or all of these areas would indicate difficulties in emotion regulation.[17]

Although the trait of resilience encompasses much more than emotion regulation, the effective use of emotion regulation is proposed as crucial in reducing negative emotions after a stressful event and therefore may be a primary mechanism of resilience.[18] Previous research has suggested that resilient individuals cultivate positive emotions (an emotion regulation strategy) to bounce back from negative emotional experiences.[19] Emotion regulation has consequently been proposed to mediate an individual's adjustment to stress, such that stress exposure leads to difficulties in emotion regulation which can then cause negative psychological outcomes.[20] Similarly, people who cannot regulate their emotional responses effectively to events are theorised to experience longer, more severe periods of distress, which can lead to depression and anxiety.[11] Therefore, resilience may determine a person's response to a stressful event via their ability to regulate emotions.[10]

Emotion regulation in the context of cancer has been linked to patients' adaptation, well-being and QoL.[4] However, much of the knowledge on emotion regulation in cancer has come from the study of coping processes.[5] As a result, research to date has focused nearly exclusively on emotion regulation *strategies* which is only a small subsection of the emotion regulation model. Research has also been predominantly in women with breast cancer. Indeed, two recent systematic reviews have highlighted that there are no published studies that have used the gold-standard measure of difficulties in emotion regulation, the Difficulties with Emotion Regulation Scale (DERS) to assess emotion regulation in cancer.[4,5]

The present research aimed to explore how the six dimensions of the DERS and overall difficulties in emotion regulation relate to the constructs of resilience and distress in cancer patients at various stages of the cancer trajectory, to examine whether emotion regulation mediates the relationship between resilience and distress in a cross-sectional model. We hypothesised that the established negative relationship between resilience and distress is mediated by difficulties in emotion regulation.

2 | METHOD

2.1 | Participants and procedures

Patients aged 18 and over, with any form of cancer diagnosis, were recruited from two hospital sites in Adelaide, Australia. All patients were eligible for the study unless their English was insufficient to understand the Participant Information and Consent Form and questionnaire. Participants were recruited in two cohorts: July to August 2016, and May to June 2017.

Participants were invited by a clinician during their doctor's appointment (which could have been for routine follow-up, before chemotherapy, and/or receiving results) to complete a survey consisting of a number of self-report measures. They were given the option of completing the questionnaire on site or at home at their convenience and returning it via reply-paid envelope. Ethics approval for this study was obtained from the Southern Adelaide Clinical Human Research Ethics Committee (231.16). No signed consent form was completed by participants, as the ethics agreement was that the completion and return of the survey via mail or drop box equalled consent. This was approved by the Southern Adelaide Clinical Human Research Ethics Committee and outlined in the Participant Information and Consent Form.

2.2 | Measures

All measures were well-established, self-report scales, and are summarised below.

2.2.1 | Demographic and medical characteristics

Demographic questions were asked to capture the sample's profile, including cancer type, age, gender, date of diagnosis, and recruitment

site which were Flinders Centre for Innovation in Cancer (public) or Adelaide Cancer Centre (private), cancer stage, and perceived intent of treatment.

2.2.2 | Resilience

Resilience was assessed using the 25-item Connor-Davidson Resilience Scale (CD-RISC) which has demonstrated sound psychometric properties and is able to distinguish between those with greater and lesser resilience.[21] Scores range from 0 to 40, with higher scores indicating greater resilience. In the present study, the CD-RISC had strong internal consistency reliability ($\alpha = 0.92$).

2.2.3 | Emotion regulation

Emotion regulation was measured using the 36-item Difficulties in Emotion Regulation Scale (DERS) ($\alpha = 0.95$). The DERS is composed of a total scale score and six subscales that reflect the six dimensions of emotion regulation theory; difficulty with awareness ($\alpha = 0.75$); difficulty with emotion clarity ($\alpha = 0.72$); nonacceptance ($\alpha = 0.89$); difficulty with strategies ($\alpha = 0.85$); impulsiveness ($\alpha = 0.79$); and difficulty with goals ($\alpha = 0.71$).[17] The DERS has been found to have good test-retest reliability, as well as adequate predictive and constructive validity. In the present study, the total scale DERS had strong internal consistency reliability ($\alpha = 0.93$).

2.2.4 | Distress

Distress was measured using the 21-item Depression Anxiety Stress Scale short form.[22] The measure provides mean severity scores for depression, anxiety, and stress as well as a total distress score. For the present study, only the total distress score was used for model testing, with higher scores indicating greater severity of distress. DASS-21 had strong internal consistency reliability ($\alpha = 0.94$).

2.3 | Analysis

Analyses for this study were all performed using IBM SPSS Statistics software 23.[23]

To test for mediation, a series of correlations were first conducted to investigate relationships between resilience, difficulties in emotion regulation, and distress. Differences between gender and place of treatment were explored using a series of t-tests. Differences between categories of perceived treatment on distress were explored using a one-way ANOVA. While age has been inversely related to emotional distress in some cancers, a large study of 10 153 cancer patients found that for a number of cancer types no age effect emerged and suggested that cancers with unfavourable prognosis affect all age groups equally.[24] Age was therefore not tested as a control variable in this paper. Time since diagnosis was not tested as a potential control variable given heterogeneity of cancer types and stages. Perceived intent of treatment was chosen instead of cancer stage due to a third of patients not knowing what stage of cancer they had.

Using PROCESS,[25] a series of simple mediator models were then tested to assess whether difficulties in emotion regulation mediates the relationship between resilience and distress. An exploratory parallel multiple mediator model was then run to evaluate which of the subscales of the DERS was most strongly associated with resilience and distress. All six subscales (awareness, clarity, nonacceptance, strategies, impulse, and goals) were inserted as mediators. As part of the mediation analysis, a 95% bootstrapped confidence interval was derived to estimate the difference between specific indirect effects. As most of the DERS subscales were highly intercorrelated, it should be noted that in the process of controlling for certain subscales, the effects of the highly correlated subscales may have been suppressed due to their shared variance.

For this study, bias-corrected bootstrap confidence intervals for indirect effects were based on 10 000 samples and were considered significant if they did not include 0.

3 | RESULTS

3.1 | Participants

An estimated 500 surveys were given out, and 227 were returned (estimated response rate of 45.4%). The demographic and clinical characteristics of participants are summarised in Table 1. A total of 227 cancer patients (site 1: n = 129 participants; Site 2: n = 96; unknown: n = 2) returned surveys, with 51.5% of respondents being female. Participants were on average 64.57 years (SD = 11.61) and predominantly married (67.7%).

The five most common cancers accounted for 64.7% of the sample, with breast cancer being most common, followed by prostate and lung cancers. The average time since diagnosis of cancer was 3.36 years, and stage 4 (37.3%) was the most common stage. Irrespective of cancer stage, 43.8% did not believe that their cancer was being treated with curative intent, 33.9% did believe their cancer was being treated with curative intent, 18.0% responded with "unlikely but I hope so," and 3.9% said they did not know. Four patients did not answer where they were being treated, 85 patients did not know or answer the question about their cancer stage, and four patients did not answer whether their cancer was being treated with curative intent.

There were no significant gender differences on measures of resilience, emotion regulation, or distress. Similarly, there were no significant differences on these psychological constructs between those being treated privately versus those being treated publically. There were also no significant differences in distress between patients who believed they were being "treated with curative intent," those who believed they were "not being treated with curative intent," those who said "unlikely but I hope so," and "I don't know." Therefore, they were not included as control variables in the regression model.

TABLE 1 Demographic and medical characteristics of sample

	Sample (n = 228)
Demographic characteristics	
Age	64.57 years (SD = 11.61)
Female	115 (51.5%)
Male	107 (48.5%)
Married	154 (68.1%)
Tertiary educated	121 (53.7%)
Employed	51 (22.8%)
Retired	151 (67.4%)
Gross salary > $35 000	88 (44.4%)
Medical characteristics	
Treatment centre	
Flinders Centre for Innovation in Cancer	129 (57.5%)
Adelaide Cancer Centre	96 (42.5%)
Time since diagnosis	3.36 years (SD = 4.56)
Cancer type	
Breast	52 (22.9%)
Prostate	28 (12.3%)
Lung	28 (12.3%)
Bowel	26 (11.5%)
Pancreas	13 (5.7%)
Other	81 (35.3%)
Cancer stage	
Stage 4	76 (37.3%)
Stage 3	35 (17.2%)
<Stage 3	32 (15.7%)
Treatment	
Surgery	140 (62.8%)
Chemotherapy	198 (88%)
Radiotherapy	122 (53.5%)
Have not completed treatment	186 (82.3%)
Is with curative intent	
"Yes"	76 (33.9%)
"No"	98 (43.8%)
"Unlikely but I hope so"	41 (18.3%)
"I do not know"	9 (3.9%)

3.2 | Mediation testing

Total difficulties in emotion regulation had a strong, negative correlation with resilience, $r(226) = -0.564$, $P < .001$, indicating that people with less resilience had more difficulties with emotion regulation. Difficulties in emotion regulation also had a strong, positive correlation with distress, $r(226) = 0.595$, $P < .001$, indicating that people with more difficulties in emotion regulation were more distressed. Resilience was moderately negatively correlated with distress, $r(226) = -0.416$, $P < .001$,

indicating that people with higher resilience levels had lower distress. As can be in seen in Table 2, all six subscales of the DERS were significantly correlated with distress and resilience; these correlations ranged from moderate ($r = 0.167$) to strong ($r = 0.586$).

Together, difficulties in emotion regulation and resilience explained 33.2% of the variance in distress, $R^2 = 0.332$, $F(2,220) = 54.74$, $P < .001$. The total effect (the sum of the direct and indirect effects) of resilience on distress was significant, $b = -0.013$, $t(221) = -6,44$, $P < .001$, and accounted for 15.8% of the variance in distress, $R^2 = 0.158$, $F(1, 221) = 41.52$, $P < .001$. As can be seen in Figure 1, the direct effect of resilience on distress was not significant when total difficulties in emotion regulation was controlled for. The indirect effect through difficulties in emotion regulation was significant, $b = 0.009$, 95% CI [−0.013, −0.007].

In the final multiple mediator model test, resilience had a significant effect on all six subscales of the DERS. Only two DERS subscales had a significant effect on distress when the other DERS subscales and resilience were controlled for: difficulties with emotional clarity and difficulties with strategies. Table 3 shows that resilience significantly affected distress indirectly only via difficulties with emotion regulation strategies and difficulties with emotional clarity. The strength of these two indirect effects were not significantly different from each other as the confidence interval straddled 0, 95% CI [−0.005, −0.002]. All other indirect pathways were not significant. Thus, difficulties with strategies and emotional clarity were mediators of the relationship between resilience and distress.

4 | DISCUSSION

This study investigated whether emotion regulation mediated the relationship between resilience and distress. The novel contribution from this study is that the relationship between resilience and distress was mediated by difficulties in emotion regulation. These results aligned with previous research findings that resilience was negatively correlated with distress.[2,6,26]

As was hypothesised, resilience was not a significant predictor of distress when difficulties in emotion regulation were controlled for. Of the DERS subscales, difficulties with emotional clarity and strategies were the only significant pathways between resilience and distress, suggesting that they may be important unique mechanisms between the two factors. The use of emotion regulation strategies has previously been demonstrated as important in determining how one adjusts to cancer, but have mostly focused on one or two strategies at a time.[27-30] This study is the first to show that as a whole, difficulties in accessing strategies to manage one's emotional response was significantly associated with increased distress.

Difficulties with emotional clarity was also significantly related to increased distress and mediated the relationship between resilience and distress. Emotional clarity is defined as the ability to identify, understand, and distinguish one's own emotional experience.[31] Difficulties with emotional clarity has previously been linked with panic disorder,[32] depression,[33] binge eating,[33] and alcohol use.[33] Intuitively,

TABLE 2 Pearson correlations of DERS subscales with scores on distress (DASS-21) and resilience (CD-RISC), *P < .05, two tailed, **P < .001, two tailed

DERS Subscale	Distress (DASS-21)	Resilience (CD-RISC)
Lack of awareness	0.167*	−0.407**
Lack of clarity	0.513**	−0.453**
Nonacceptance	0.438**	−0.266**
Difficulty with strategies	0.586**	−0.510**
Impulsiveness	0.471**	−0.445**
Difficulty with goals	0.460**	−0.459**

*P < .05, two tailed.

**P < .001, two tailed.

it would be more difficult for people to regulate their distress if they are unclear about the emotion/s they are experiencing. Alexithymia, a multidimensional concept of cognitive affective difficulties including difficulties identifying and describing emotions. It has some overlap with difficulties with emotional clarity and has been researched in the cancer population.[34] In a longitudinal study of 122 women with breast cancer,[34] significant associations were found between depression and alexithymia, both at baseline (the day before surgery) and at follow-up (6 months later). As the concepts of difficulties in emotional clarity and alexithymia are similar, this research may suggest that difficulties with emotional clarity could be a predictor of distress longitudinally in cancer patients.

Difficulties in emotion regulation and resilience explained around 33% of the variance in distress, there are a number of well-established factors that could account for the remaining variance in distress, such as age, family relationship problems, pain, and fatigue.[35]

4.1 | Study limitations

The study has some notable limitations. First, we were unable to conclusively determine the direction of relationships between resilience, distress, and emotion regulation given cross-sectional design. A longitudinal study is recommended for future studies.

Second, participants' transient mood states may have amplified their potential recall bias, such that if people were experiencing acute distress at the time of completing the questionnaire (eg, they may have received bad scan results that week), this may have affected their subsequent responses. However, in a study of women with breast cancer compared
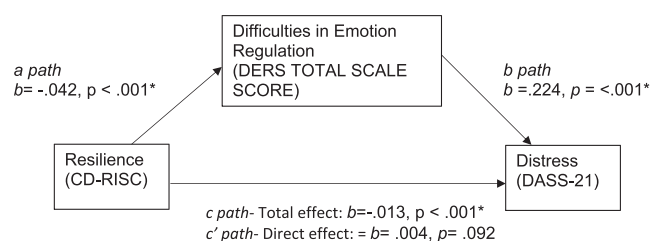
against healthy female controls, resilience did not differ significantly between the two groups.[6] While cancer patients reported higher levels of anxiety, depression, and negative effect, higher levels of resilience were associated with better emotional adjustment with both women with cancer and in control women. This suggests that resilience may

TABLE 3 The direct effect of: (a) resilience on each DERS subscale; and (b) DERS subscales and resilience on distress; and the indirect effects of (c) resilience on distress through the DERS subscales

(a) Resilience → mediators	b	se	t	P
Resilience → awareness	−0.017	0.003	−6.71	<.00**
Resilience → clarity	−0.017	0.002	−7.63	<.001**
Resilience → nonacceptance	−0.004	0.001	−4.15	<.001**
Resilience → strategies	−0.005	0.001	−8.91	<.001**
Resilience → impulse	−0.005	0.001	−7.47	<.001**
Resilience → goals	−0.018	0.001	7.77	<.001**

(b) Mediators → distress resilience → distress	b	Se	t	P
Awareness	−0.025	0.042	−0.59	.557
Clarity	0.165	0.056	2.96	.003*
Nonacceptance	0.279	0.139	2.01	.046*
Strategies	0.865	0.262	3.30	.001**
Impulse	−0.137	0.232	−0.59	.556
Goals	0.081	0.053	1.53	.127
Resilience	−0.003	0.002	−1.76	.080

(c) Indirect path: Resilience → mediator → distress	b	Lower limit CI	Upper limit CI
Resilience → awareness → distress	0.001	−0.001	.002
Resilience → clarity → distress	−0.003	−0.006	−.001[a]
Resilience → nonacceptance → distress	−0.001	−0.002	.000
Resilience → strategies → distress	−0.005	−0.009	−.002[a]
Resilience → impulse → distress	0.001	−0.002	.004
Resilience → goals → distress	−0.002	−0.004	.000

**Significant value, P < .001.

*Significant value, P < .05.

[a]Indicates that bootstrapped confidence interval does not go through zero.

a path
b= -.042, p < .001*

Difficulties in Emotion Regulation (DERS TOTAL SCALE SCORE)

b path
b =.224, p = <.001*

Resilience (CD-RISC)

Distress (DASS-21)

c path- Total effect: b=-.013, p < .001*
c′ path- Direct effect: = b= .004, p= .092

FIGURE 1 Unstandardised regression coefficients for the relationship between resilience and distress as mediated by difficulties in emotion regulation

be a relatively stable construct and a predictor of lower distress both before a woman is diagnosed with cancer and after.

A limitation of using the DERS is that the scale does not look at specific emotion regulation strategies, but rather at the overarching theme of difficulties in accessing emotion regulation strategies. Most of the literature on emotion regulation in cancer has focused on specific emotion regulation strategies such as reappraisal,[29] suppression,[36] restraint,[36] and acceptance.[28] This meant that little comparisons could be done in terms of these specific strategies and this sample. As difficulties in accessing emotion regulation strategies had the largest relationship with distress in this study, a more sensitive measure of emotion regulation strategies could be useful in conjunction with the DERS.

It is possible that there may have been some construct overlap between the Conner Davidson Resilience Scale (CD-RISC) and the DERS. However, the weak to moderate correlations between the DERS subscales and the CD-RISC (separate scoring of factor subscales not recommended) would suggest that while these constructs are related, they do not overlap.

Another limitation is that exact data on how many participants received the survey was not collected although approximately 500 surveys were given out. Reasons for nonparticipation were not obtained.

Lastly, clinicians may have been selective in inviting patients to participate in the study. Anecdotally, referrers commented that some of their distressed patients chose not to participate so this patient population may not have been captured adequately in the sample.

4.2 | Clinical implications

This study provides some clarity to the literature about how resilience works, with the results suggesting that resilient people are more adept at emotion regulation where they have greater clarity about their emotions and can utilise strategies to change or process their negative emotional response. This is in line with previous work that has found that resilient people still experience negative emotions while they are faced with a stressful event, but they possess characteristics (such as effective emotion regulation) that make them better equipped to deal with negative emotions, which in turn prevents them from developing psychopathology.[6]

In contrast to the broad construct of resilience, difficulties in emotion regulation has a clearer and more concise definition and lends itself to more specific interventions.[17] Indeed, interventions for emotion regulation strategies have been previously trialled with cancer patients.[27,36] In a study of 123 women with metastatic breast cancer, changes in emotion regulation strategies were observed with decreased suppression of negative affect and increased restraint of aggressive and inconsiderate behaviour after supportive expressive group therapy.[36] Similarly, after a group intervention based on altering emotion regulation processes in women with breast cancer, increases in emotional well-being, and perceived control as well as decreases in perceived risk of recurrence, cancer worry and anxiety were observed.[27]

As difficulties in emotion regulation strategies and clarity were associated with more distress in cancer patents in this study, it is

recommended that future studies focus in on these areas. Dialectical Behaviour Therapy, a well-researched treatment for difficulties in emotion regulation,[37] is designed to teach people skills to actively regulate their own emotions. It has not been trialled with cancer patients, and this could be an area for future research.

In conclusion, this study builds on the body of research demonstrating that resilience and distress are negatively related, with the unique finding that difficulties in emotion regulation is a mediator of the relationship. The two specific difficulties in emotion regulation domains, difficulties accessing strategies and difficulties with emotional clarity, mediated the relationship between resilience and distress and future research could target these for clinical intervention.

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