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ORIGINAL PAPER

Self-Compassion and Symptoms of Depression and Anxiety in Chinese Cancer Patients: the Mediating Role of Illness Perceptions

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Abstract

Objectives An adaptive role of self-compassion for psychological functioning in cancer patients has been highlighted, yet less is known about the underlying mechanisms. This study aimed to examine the mediating role of cancer patients' illness perceptions in the relations between self-compassion and psychological symptoms.

Methods This cross-sectional study focused on 301 people with heterogeneous types of cancer. A self-reported questionnaire was used to collect participants' levels of self-compassion, illness perceptions, and symptoms of depression and anxiety. Parallel mediation analyses were performed to examine the research questions.

Results The relation between self-compassion and depressive symptoms was mediated by perceived consequences and a timeline cyclical of cancer. Perceived consequences also mediated the relation between self-compassion and symptoms of anxiety, with an additional mediating role of personal control.

Conclusions These findings suggest that both self-compassion and illness perceptions were closely linked with cancer patients' psychological symptoms. Particularly, cancer patients who feel more self-compassionate perceive fewer negative consequences of cancer, a less timeline cyclical, and more personal control over their life and report fewer psychological symptoms.

Keywords Self-compassion · Depressive symptoms · Anxiety symptoms · Illness perceptions · Cancer patients

Symptoms of depression and anxiety are highly prevalent psychological symptoms in cancer patients (Mitchell et al. 2011). Severe depressive and anxiety symptoms may contribute to a longer hospital stay, a reduced adherence to medical treatment, and a poor quality of life in cancer patients (Mausbach et al. 2015; Reich et al. 2008). Given such negative impacts, research has examined factors that can predict severe psychological symptoms. Self-compassion has been found as one protective factor that can enhance psychological adaptation to life stressors (MacBeth and Gumley 2012; Neff and McGehee 2010). Previous research in people with cancer has found that higher levels of self-compassion were associated with fewer symptoms of depression, anxiety, and distress (Arambasic et al. 2019; Gillanders et al. 2015; Lennon et al. 2018; Svendsen et al. 2016; Zhu et al. 2019).

According to Neff (2003a), self-compassion refers to a personal attitude that is characterized by being open to one's own suffering, taking an understanding and non-judgmental attitude toward one's failures, and recognizing traumatic experiences as part of human life. Neff (2003b) proposes that self-compassion consists of three positive components (i.e., self-kindness, common humanity, and mindfulness) and three negative components (i.e., self-judgment, isolation, and over-identification). A meta-analysis, including empirical studies in general population, has found a large effect size for the relations between self-compassion and psychological symptoms (MacBeth and Gumley 2012).

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As for the underlying mechanisms between self-compassion and psychological symptoms, it is reasonable to consider self-compassion as a relatively stable personal trait and then search for the underlying cognitive process, which may influence psychological symptoms (Raes 2010). Following this line of reasoning, several studies mainly with a cross-sectional design in the general population and people with depression have tested the mediating role of cognitive processes (Arimitsu and Hofmann 2015; Diedrich et al. 2017; Finlay-Jones et al. 2015; Krieger et al. 2013). In particular, rumination, worry, and negative automatic thoughts were found as important mediators.

The impact of self-compassion on cancer patients' psychological symptoms is still in its infancy. Several studies have confirmed that higher self-compassion was associated with fewer symptoms of distress, depression, and anxiety (Arambasic et al. 2019; Gillanders et al. 2015; Lennon et al. 2018; Svendsen et al. 2016; Zhu et al. 2019). About the underlying mechanisms between self-compassion and psychological symptoms in the context of cancer, only one study has tested possible mediators and found that one's cognitive process (i.e., rumination and worry) played a mediating role between self-compassion and symptoms of depression and anxiety in breast cancer patients (Brown et al. 2020). Up till now, very little is known regarding the mediating role of cognitive content derived from the cognitive processes in the association of self-compassion with psychological symptoms.

In the context of cancer, more illness-specific cognitions (i.e., illness perceptions) can be considered important cognitive contents derived from patients' cognitive processes about illness and medical treatment (Dempster et al. 2015; Richardson et al. 2017). A relevant model for studying illness perceptions is the Common Sense Model (CSM) of self-regulation (Leventhal et al. 2003). According to this model, people hold several cognitive representations of their illness (i.e., illness perceptions), including identity, timeline, consequences, causes, cure/controllability, and coherence (Leventhal et al. 1992). These perceptions are assumed to play an important role in patients' coping and adaptation to illness. Among cancer patients, several reviews have found that illness perceptions are indeed strongly associated with psychological symptoms (Dempster et al. 2015; Richardson et al. 2017). Particularly, perceived negative consequences, (a lack of) personal control and treatment control, and a cyclical, uncertain timeline have been consistently found to predict higher levels of psychological symptoms (Richardson et al. 2017).

According to the CSM model, one's personal trait can also impact their illness perceptions (Diefenbach and Leventhal 1996; Leventhal et al. 1997). Considering previous findings suggesting a mediating role of cognitive processes between self-compassion and psychological symptoms (Arimitsu and Hofmann 2015; Krieger et al. 2013; Raes 2010), self-compassion could also be argued as a personal trait relevant in this context of perceiving and coping with cancer. It can therefore be reasoned that self-compassion (i.e., providing self-care and kindness to oneself in the face of suffering) might be beneficial for cancer patients' psychological functioning by enhancing adaptive illness perceptions. This line of reasoning is also in line with previous research showing a mediation role of cognitive process in general population (Arimitsu and Hofmann 2015; Krieger et al. 2013; Raes 2010).

The present cross-sectional study in cancer patients focused on the mediating role of patients' perceptions of their illness in the association of self-compassion with depressive and anxiety symptoms. The aim of the study was to examine to what extent cancer patients' illness perceptions (i.e., perceptions of consequences, personal control, treatment control, and timeline cyclical) mediated the relations between self-compassion and symptoms of depression and anxiety (see Fig. 1 for a proposed model). To get a comprehensive overview, hereby taking into account recent recommendations of self-compassion conceptualization, we also aimed to explore possible mediation models by distinguishing the positive and negative components of self-compassion (Brenner et al. 2017; López et al. 2015; Muris et al. 2018; Muris and Petrocchi 2017). Based on the previous research (Richardson et al. 2017), it was hypothesized that higher self-compassion would be related to fewer depressive and anxiety symptoms through more adaptive illness perceptions (i.e., perceiving less negative consequences, perceiving higher personal and treatment control, and greater beliefs about the stability of the illness symptoms).

Method

Participants

Participants were 301 Chinese people with heterogeneous types of cancer. The inclusion criteria were as follows: (1) being diagnosed with cancer patients and were receiving cancer-related treatment, (2) age > 18 years old, and (3) able to comprehend self-reported questionnaire in Chinese. Table 1 shows the socio-demographic and medical characteristics of the 301 participants and the China cancer statistics in 2015 (Chen et al. 2016). The mean age was 50 years old, the majority were female, and most of them were low (i.e., elementary school) or moderately (i.e., middle or high school) educated. The most prevalent types of cancer were breast cancer (22.3%), gynecological cancer (16.7%), and lung cancer (16.7%) (Table 2).

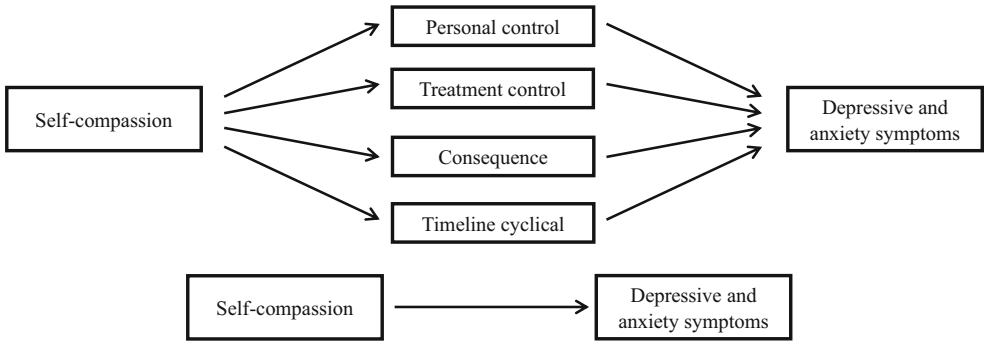

Fig. 1 The theoretical mediation model between self-compassion, illness perceptions, and psychological symptoms

Procedure

Participants were recruited from two hospitals in Xi'an, China. For potential participants, trained research nurses were responsible to screen for their eligibility. After obtaining written informed consent, eligible participants were asked to complete a self-reported questionnaire. We approached a total of 360 cancer patients: 330 agreed to participate in the study and provided a written informed consent (response rate = 92%). The 330 participants and 30 decliners did not differ significantly on demographic or medical characteristics. Of the 330 patients, 29 patients were excluded because they did not complete the questionnaires, and 301 patients constituted the final sample and were included in data analyses. The 29 excluded patients were not significantly different from the 301 participants on demographic or medical characteristics. We gave each cancer patient a coffee mug for their participation but did not offer any reimbursement.

Measures

Socio-demographic and Medical Characteristics A self-reported questionnaire was used to collect patients' socio-demographic (e.g., age, gender, marital status, and educational level) and medical characteristics (e.g., cancer type, metastases, cancer stage, and medical treatment).

Self-Compassion Self-compassion was measured by the Self-Compassion Scale Short Form (SCS-SF), one of the most commonly used questionnaires to measure self-compassion (Raes et al. 2011). The SCS-SF has demonstrated high correlations with the original scale (Raes et al. 2011) and has been validated in Chinese population (Meng et al. 2019). This scale included 12 items taken from the original scale that can be answered on a 5-point Likert scale from 1 (almost never) to 5 (almost always). Confirmatory factor analyses were conducted to test the validity of a one-factor model (i.e., considering all 12 items as one factor) and a two-factor model (i.e., positive self-compassion and negative self-compassion) in our sample. For the one-factor model, we found CFI = 0.47, TLI = 0.36, and RMSEA = 0.17, and for the two-factor model, we found CFI = 0.88, TLI = 0.85, and RMSEA = 0.08. The fit criteria of CFI/TLI ≥ 0.90 and RMSEA ≤ 0.06 indicate a good model fitting (Hu and Bentler 1999; Kenny et al. 2015). Although the two-factor model fell slightly outside of the recommended range for adequate fit, these results suggested that a two-factor model fitted our data better. In addition to calculating a sum score based on all 12 items, we summed the six items of positive self-compassion (including self-kindness, common humanity, and mindfulness) and the six items of negative self-compassion (including reversed items of self-judgment, isolation, and over-identification) separately. Total scores of the positive self-compassion and negative self-compassion subscale ranged from 6 to 30: A higher score of positive self-compassion indicated higher levels of positive self-compassion, and a higher negative self-compassion score referred to a lower level of self-judgment, isolation, and over-identification. The overall self-compassion total score could range from 12 to 60, with higher scores showing higher levels of self-compassion. The SCS-SF has shown good reliability and validity in general population (Finlay-Jones et al. 2015). In our study, the Cronbach's αs of total score, positive self-compassion, and negative self-compassion were 0.75, 0.71, and 0.77, respectively.

Illness Perception Illness perception was measured by the Illness Perception Questionnaire Revised (IPQ-R) (Hale et al. 2007; Moss-Morris et al. 2002). The IPQ-R has been validated in Chinese population (Huang et al. 2019). Four subscales of the IPQ-R were used: personal control (four items, e.g., the course of my illness depends on me), treatment control (five items, e.g., my treatment can control my illness), timeline cyclical (four items, e.g., my illness is unpredictable), and consequences (six items, e.g., my illness has major consequences on my life). Each item can be answered on a 5-point Likert scale from 1 (not at all) to 5 (very much). For the personal control subscale, only the four positive formulated items were used, as previous studies suggested that the two negative items did not perform well (Cabassa et al. 2008; Chen et al. 2008; Wu et al. 2018). Total scores of the personal control ranged from 4 to 20: Higher scores referred to higher beliefs about personal abilities to control the illness. Total scores of treatment control ranged from 5 to 25: Higher scores referred to higher beliefs about the ability of the

Table 1 Socio-demographic and medical characteristics of participants ($N = 301$)

Characteristic	Current sample M (SD)	National statistics[1] M (SD)
Age	50.07 (13.09)	–
Months since diagnosis	14.25 (16.44)	–
	%	
Gender		
Male	39.60%	58.53%
Female	60.40%	41.47%
Marital status		
Single	7.80%	–
Married	89.10%	–
Divorced	1.70%	–
Widowed	1.40%	–
Educational level		
Low	27.80%	–
Middle	56.90%	–
High	15.30%	–
Cancer type		
Breast cancer	22.30%	6.3%
Lung cancer	16.70%	17.09%
Gastric cancer	10.50%	15.82%
Gynecological cancer	16.70%	3.78%
Colorectal cancer	4.50%	8.77%
Pancreas cancer	2.80%	2.10%
Liver cancer	2.10%	2.06%
Lymphoma cancer	4.90%	–
Multiple malignant tumors	3.10%	–
Others	16.40%	–
Recurrence		
Yes	28.40%	–
No	71.60%	–
Cancer stage		
Stage I	18.90%	–
Stage II	28.40%	–
Stage III	21.10%	–
Stage IV	31.60%	–
Type of medical treatment		
Chemotherapy	65.10%	–
Surgery	21.80%	–
Radiation	6.30%	–
Chinese medicine treatment	4.00%	–
Chemotherapy + surgery +radiation	1.60%	–
Others	1.20%	–

M mean, *SD* standard deviation

[1] Data from Chen et al. 2016

treatment or therapy to control or cure the illness. Total scores of consequences ranged from 6 to 30: Higher scores referred to the beliefs about worse consequences caused by the illness. Total scores of timeline cyclical ranged from 4 to 20: Higher scores indicated higher beliefs about stability of the illness symptoms over time. The Cronbach's αs of the four IPQ-R subscales were 0.70 for personal control, 0.71 for treatment control, 0.74 for consequence, and 0.70 for timeline cyclical.

Table 2 The mean levels and Pearson correlation among study variables

	Current sample M (SD)	Normative data M (SD)	1	2	3	4	5	6	7	8	9
1. Self-compassion (total score)	39.51 (7.66)	38.93 (4.61)[1]	–								
2. Positive self-compassion (positive subscales)	18.98 (6.04)	–	0.75**	–							
3. Negative self-compassion (negative subscales)	20.49 (5.00)	–	0.61**	−0.07	–						
4. Consequence	19.84 (4.32)	13.99 (3.20)[2]	−0.31**	−0.07	−0.40**	–					
5. Personal control	13.10 (3.01)	10.17 (2.19)[2]	0.22**	0.19**	0.11	−0.15*	–				
6. Treatment control	17.21 (3.07)	18.28 (3.28)[2]	0.21**	0.18**	0.09	−0.25**	0.38**	–			
7. Timeline cyclical	11.03 (3.53)	12.32 (2.48)[2]	−0.18**	−0.04	−0.23**	0.27**	−0.08	−0.32**	–		
8. Depressive symptoms	7.23 (6.11)	3.30 (4.00)[3]	−0.37**	−0.06	−0.44**	0.42**	−0.19**	−0.24**	0.38**	–	
9. Anxiety symptoms	13.98 (4.14)	37.10 (10.1)[4]	−0.39**	−0.14*	−0.41**	0.35**	−0.26**	−0.24**	0.20**	0.64**	–

M mean, *SD* standard deviation; *$p < 0.05$, **$p < 0.01$

[1] Self-compassion (total score, positive and negative self-compassion) normative data from Raes et al. 2011

[2] Consequence, personal control, treatment control, and timeline cyclical normative data from Wu et al. 2018 and Huang et al. 2019

[3] Depressive symptoms' normative data from Wang et al. 2014

[4] Anxiety symptoms' normative data from Marteau and Bekker 1992

Depressive Symptoms Depressive symptoms were measured by the nine-item Patient Health Questionnaire (PHQ-9) (Kroenke et al. 2001). The Chinese version of the PHQ-9 has been validated in previous research (Tang et al. 2020). Each item can be answered from 0 (never) to 3 (nearly every day). The total scores ranged from 0 to 27, with higher scores indicating more severe depressive symptoms. The PHQ-9 has shown good reliability and validity in cancer patients (Hinz et al. 2016). In this study, the Cronbach's α was 0.89.

Anxiety Symptoms Anxiety symptoms were measured by the six-item version of the State-Trait Anxiety Inventory (STAI-6), which has been widely used to measure state anxiety (Marteau and Bekker 1992). The STAI has been validated in a sample of Chinese population (Shek 1993). Each item can be answered from 1 (not at all) to 4 (very much). The total scores ranged from 6 to 24: Higher scores referred to more severe anxiety symptoms. The STAI-6 has shown good reliability and validity in cancer patients (Zhu et al. 2017). In this study, Cronbach's α was 0.82.

Data Analyses

Descriptive statistics were used to describe mean levels of the study variables. Pearson correlations were conducted to examine the relations between self-compassion, illness perception, and symptoms of depression and anxiety. *T*-tests, ANOVA, and correlation analyses were conducted to identify potential covariates (i.e., socio-demographic and medical characteristics) in the parallel mediation models. The PROCESS macro in SPSS 23.0 was used to examine the parallel mediation models, with self-compassion (i.e., total score, positive self-compassion, and negative self-compassion) as independent variables, depressive and anxiety symptoms as dependent variables, and illness perceptions (personal control, treatment control, consequences, timeline cyclical) as parallel mediators. Bootstrapping with 10,000 resampling was used to test the indirect effect (Hayes 2009). A bootstrapping 95% confidence interval without zero indicated a significant mediation effect. Those variables were considered as significant mediators. The coefficient of kappa-squared (k^2) was used to determine the effect size of the mediation effect (Preacher and Kelley 2011). The small, medium, and large effect sizes are stated as 0.01, 0.09, and 0.25, respectively (Preacher and Kelley 2011).

Results

Relations Between Self-Compassion, Illness Perceptions, and Symptoms of Depression and Anxiety

Self-compassion total score was significantly, even though weakly correlated with all four illness perceptions (r ranged from −0.31 to 0.22, all $ps < 0.01$) and significantly, and moderately correlated with symptoms of depression and anxiety (r ranged from −0.37 to −0.39, all $ps < 0.01$). Higher negative self-compassion (i.e., a lower level of self-judgment, isolation, and over-identification) was significantly related to lower perceived consequence and timeline cyclical (r ranged from −0.23 to −0.40, all $ps < 0.01$), as well as with symptoms of depression and anxiety (r ranged from −0.41 to −0.44, $ps < 0.01$). In

contrast, positive self-compassion was significantly weakly correlated with personal control and treatment control (r ranged from 0.18 to 0.19, $ps < 0.01$) and correlated only with symptoms of anxiety ($r = -0.14$, $p < 0.05$) and not significantly depression ($r = -0.06$, *ns*).

The Mediating Role of Illness Perceptions Between Self-Compassion Total Score and Psychological Symptoms

Preliminary analyses showed that cancer recurrence was significantly related to self-compassion: for self-compassion total score, $t = -2.131$, $p < 0.05$; and for positive self-compassion, $t = -2.830$, $p < 0.01$. Educational levels were significantly related to depressive and anxiety symptoms: for depressive symptoms, F (2.236) = 3.759, $p < 0.05$; and for anxiety, F (2.238) = 4.051, $p < 0.05$. Therefore, we controlled for cancer recurrence and educational level in the following mediation analyses.

As shown in Fig. 2, perceived consequence, perceived timeline cyclical, and personal control mediated the association of self-compassion total score with symptoms of depression and anxiety. For depressive symptoms, the bootstrap results showed that consequence (indirect effect = − 0.064, $p < 0.001$; 95%CI, − 0.11, − 0.02; $k^2 = 0.074$, a small effect size) and timeline cyclical (indirect effect = − 0.037, $p < 0.001$; 95%CI, − 0.08, − 0.01; $k^2 = 0.043$, a small effect size) explained 32.69% of the total effect of the self-compassion on depressive symptoms (total effect = − 0.308, direct effect = − 0.187). There were no significant differences between the indirect effects of these two mediators (95%CI, − 0.06, 0.03; *ns*).

As for anxiety symptoms, the bootstrap results showed that perceived consequence (indirect effect = − 0.039, $p < 0.01$; 95%CI, − 0.07, − 0.01; $k^2 = 0.072$, a small effect) and personal control (indirect effect = − 0.023, $p < 0.01$; 95%CI, − 0.05, − 0.01; $k^2 = 0.044$, a small effect) explained 26.31% of the total effect of the self-compassion on symptoms of anxiety (total effect = − 0.237, direct effect = −0.17). There were no significant differences between the indirect effect of these two mediators (95%CI, − 0.01, 0.06, *ns*).

The Mediating Role of Illness Perceptions Between Positive and Negative Self-Compassion and Psychological Symptoms

In addition to educational levels and cancer recurrence, we also controlled for the other aspect of self-compassion when we examined the positive and negative self-compassion mediation models, in view of the possibility that positive self-compassion and negative self-compassion may influence the outcome at the same time.

Regarding the relation between positive self-compassion and psychological symptoms, bootstrap results showed that none of the illness perceptions mediated the relations between positive self-compassion and depressive symptoms (indirect effect = − 0.05, 95%CI, − 0.12, 0.01, *ns*). As for the relations between positive self-compassion and anxiety symptoms, personal control (indirect effect = − 0.029, $p < 0.01$; 95%CI, − 0.06, − 0.01; $k^2 = 0.037$, a small effect) was a significant mediator, which explained 22.30% of the total effect of positive self-compassion on symptoms of anxiety (total effect = − 0.129, direct effect = − 0.081) (see Fig. 3).

Consequence (indirect effect = − 0.089, $p < 0.001$; 95%CI, − 0.15, −0.03; $k^2 = 0.077$, a medium effect size) and timeline cyclical (indirect effect = − 0.057, $p < 0.01$; 95%CI, − 0.11, − 0.02; $k^2 = 0.051$, a small effect) explained 26.56% of the total effect of negative self-compassion on symptoms of depression (total effect = − 0.548, direct effect = − 0.402) (see Fig. 3). The differences between the indirect effect of these two mediators were not significant (95%CI, − 0.08, 0.07, *ns*). Perceived consequence (indirect effect = − 0.061, $p < 0.01$; 95%CI, − 0.11, − 0.02; $k^2 = 0.072$, a small effect size) explained 17.87% of the total effect of negative self-compassion on symptoms of anxiety (total effect = − 0.340, direct effect = − 0.275) (see Fig. 3).

Discussion

This study shows that cancer patients' illness perceptions mediate the association of self-compassion with symptoms of depression and anxiety. Particularly, more self-compassion was related to perceiving fewer negative consequences of cancer, more personal control, and a less unpredictable timeline of symptoms, and this was subsequently related to fewer symptoms of depression and anxiety. Further exploratory analyses showed that the mediation effect was more often found for negative self-compassion (i.e., self-criticism, isolation, over-identification) than for positive self-compassion (i.e., self-kindness, common humanity, mindfulness).

A key finding was that perceiving consequences of cancer as a strong mediator in the relations between self-compassion and symptoms of depression and anxiety. This suggests that patients who report higher levels of self-compassion are less likely to perceive cancer as a serious condition that has major consequences on their lives and subsequently are less likely to experience psychological symptoms. Such findings add to previous research on mediators of self-compassion (Arimitsu and Hofmann 2015; Diedrich et al. 2017; Finlay-Jones et al. 2015; Krieger et al. 2013), by looking at cancer-specific cognitive factors as mediators of the relation between self-compassion and psychological symptoms. Results are also in

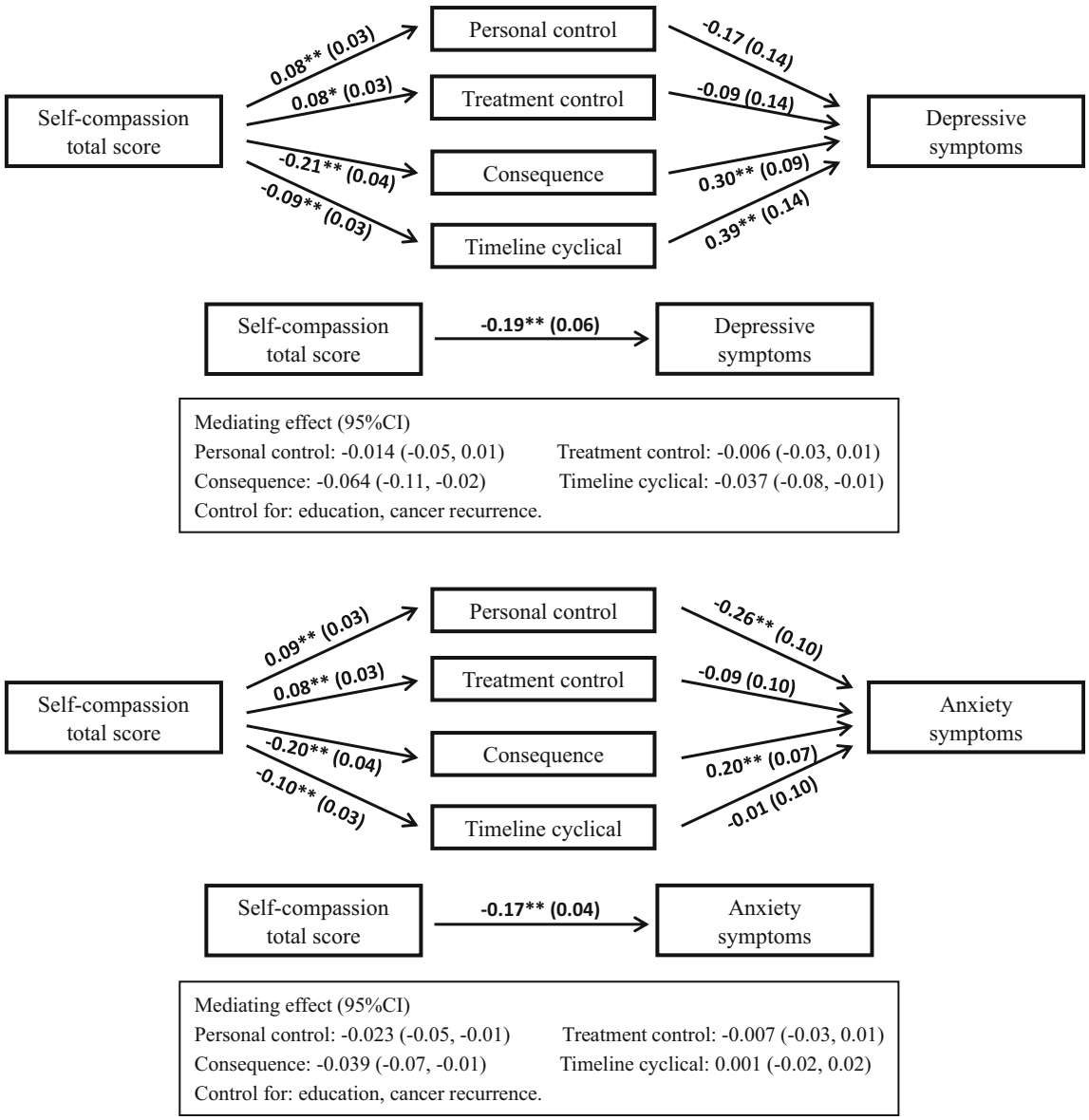

Fig. 2 The parallel mediation models between self-compassion and psychological symptoms. *$p < 0.05$. **$p < 0.01$

line with research in a range of samples, showing that cognitive process (i.e., worrying and negative thinking) mediates an association of self-compassion with psychological symptoms (Arimitsu and Hofmann 2015; Brown et al. 2020; Diedrich et al. 2017; Finlay-Jones et al. 2015; Krieger et al. 2013; Raes 2010). Yet, it should be noted that such cognitive processes are not the same as cognitive contents (i.e., illness perceptions), even though research has shown that illness-specific perceptions and processes of worrying and rumination are closely related (Lu et al. 2014). Perceived consequence is differently formulated (e.g., "my cancer is a serious condition" and "my cancer has major consequences on my life") than indicators of rumination (e.g., "I think a great deal about how I feel" and "I cannot stop thinking about this"). Also, we do not know to what extent illness perceptions (e.g., perceived seriousness) are more realistic or more negative thinking. Future research may consider examining this issue further. Moreover, results are also in line with the previous review in cancer patients, showing that perceiving consequences was most strongly related to both symptoms of depression and anxiety (Richardson et al. 2017).

We also found a mediating role of perceiving a timeline cyclical for symptoms of depression and of perceiving control for symptoms of anxiety. This suggests that patients with higher levels of self-compassion perceive their physical symptoms to be less unpredictable and less changeable from day to day and perceive more personal control over the illness, which is subsequently associated with fewer psychological symptoms. One can reason that perceiving physical symptoms to be very unpredictable and a lack of personal control can easily

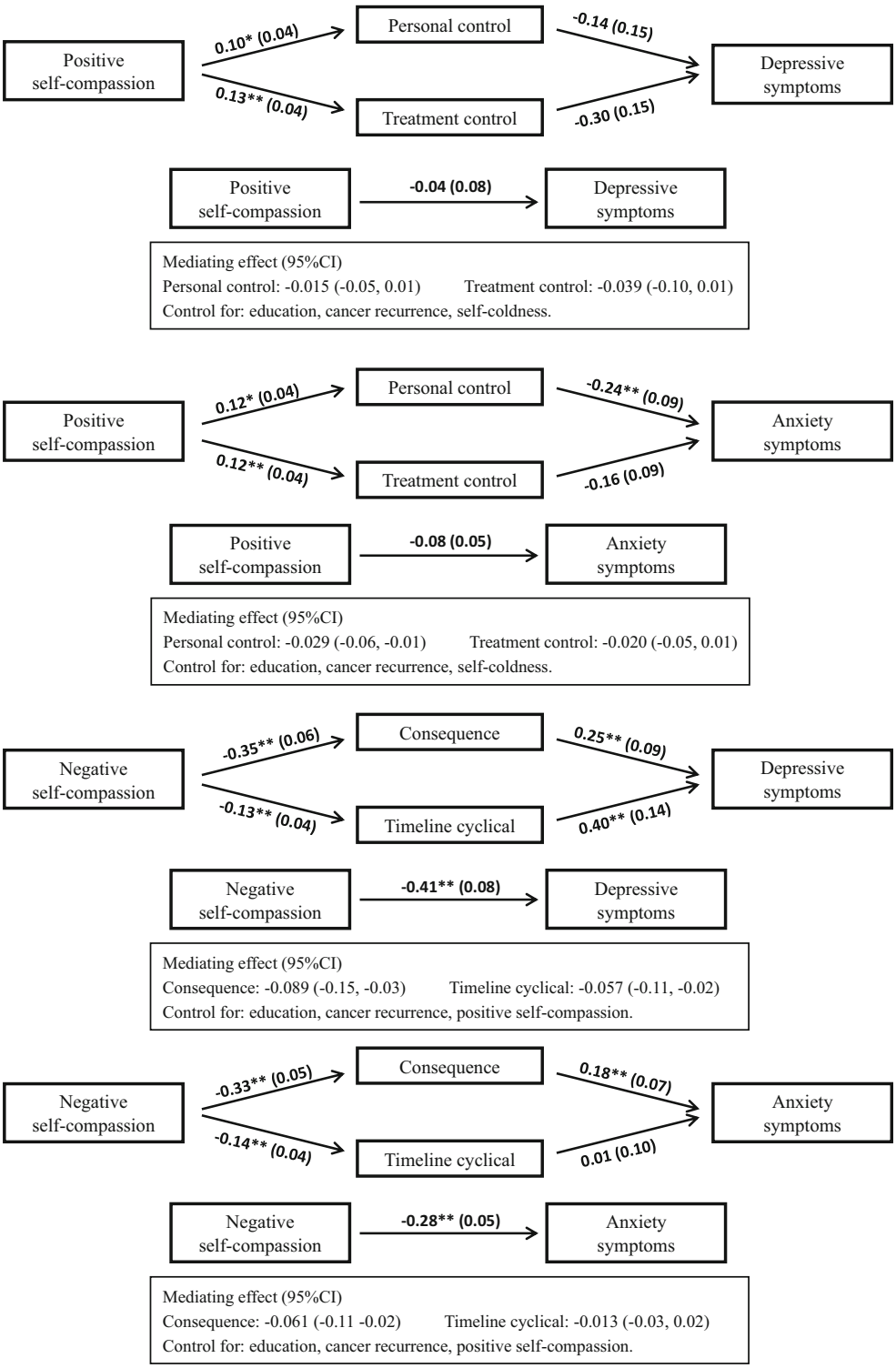

Fig. 3 The parallel mediation models between positive self-compassion, negative self-compassion and psychological symptoms. *$p < 0.05$. **$p < 0.01$

lead to a ruminative process. This is in line with the model of illness perceptions, assuming that illness perceptions can influence people's coping responses, and with empirical evidence showing a relation between illness perceptions (e.g., perceived consequence and personal control) and rumination (Lu et al. 2014). As little research has been performed on this, more longitudinal research is needed to verify these associations, hereby also including the use of different coping strategies. In general, our mediation findings are in line with the CSM model of illness representations of Leventhal et al. (2003) and suggest that self-compassion, as a trait-like concept, can influence one's illness specific cognitions and

subsequently psychological functioning. These findings also provided evidence showing that self-compassion could be considered a trait-like concept rather than a more situational response.

Another important finding was that negative self-compassion (e.g., self-criticism) was more strongly related to symptoms of depression and anxiety than the presence of the positive component of self-compassion (e.g., self-kindness). This could be due to the fact that the negative components of self-compassion are more strongly linked with pathological psychological symptoms including depressive and anxiety symptoms (Muris et al. 2018), which may in turn influence one's process of negative thinking. These findings add to the ongoing debate about the usefulness of distinguishing positive versus negative self-compassion and show that in cancer patients, it was mainly a lack of self-compassion related to symptoms of depression and anxiety rather than the presence of self-compassion. Our findings, together with findings in other populations, suggest that positive and negative indicators of self-compassion are different in nature (López et al. 2015; Muris et al. 2018; Muris and Petrocchi 2017). Findings of this study also show that these two indicators of self-compassion differed in their mediators. This calls for more studies to examine the differential role of positive versus negative self-compassion in relation to psychological outcomes.

Limitations and Future Research Directions

When interpreting our results, several limitations should be considered. First, given the cross-sectional design of our study, it is not possible to infer temporal order between self-compassion, illness perceptions, and psychological symptoms (Maxwell and Cole 2007). Based on our study, it can be hypothesized that higher self-compassion may lead to fewer psychological symptoms through a more adaptive illness perception. Future studies with other designs (e.g., intensive longitudinal design) are needed to examine this hypothesis. Second, this study was conducted in Chinese cancer patients, so results may not generalize to cancer patients in other countries and cultures. Even though findings regarding the associations of self-compassion with symptoms of depression and anxiety are in line with studies conducted in Western cultures, future studies should replicate our findings in cancer patients from different countries. Third, the current study did not include measures of psychological well-being (e.g., positive affect) and therefore could not examine the distinct role of positive self-compassion and negative self-compassion in psychological well-being and psychological symptoms. Based on our findings, it could be assumed that illness perceptions would mediate the relations between self-compassion and positive psychological outcomes. Future research is needed to test this hypothesis. Forth, as this study was merely based on self-reported measures, it is possible that our study may have suffered from common method bias. Future research may consider using more objective measures to assess one's levels of self-compassion and using psychiatric interviews to assess psychological symptoms.

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Authors' Contributions LZ designed and executed the study and wrote the paper. JW analyzed the data and wrote the paper. SYL, HYX, and YQH collaborated with the study execution and data collection. JTY, AVR, MJS, and JF collaborated in the study design and editing of the final manuscript. All authors approved the final version of this manuscript.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures were approved by the ethics committee at the Shaanxi Provincial Tumour Hospital and were in accordance with the 1964 Helsinki Declaration and its later amendments.

Informed Consent Written informed consent was obtained from all cancer patients included in the study.

References

Arambasic, J., Sherman, K. A., & Elder, E. (2019). Attachment styles, self-compassion, and psychological adjustment in long-term breast cancer survivors. *Psycho-Oncology, 28*(5), 1134–1141. https://doi.org/10.1002/pon.5068.

Arimitsu, K., & Hofmann, S. G. (2015). Cognitions as mediators in the relationship between self-compassion and affect. *Personality and Individual Differences, 74*, 41–48. https://doi.org/10.1016/j.paid.2014.10.008.

Brenner, R. E., Heath, P. J., Vogel, D. L., & Credé, M. (2017). Two is more valid than one: examining the factor structure of the Self-Compassion Scale (SCS). *Journal of Counseling Psychology, 64*(6), 696–707. https://doi.org/10.1037/cou0000211.

Brown, S. L., Hughes, M., Campbell, S., & Cherry, M. G. (2020). Could worry and rumination mediate relationships between self-compassion and psychological distress in breast cancer survivors? *Clinical Psychology & Psychotherapy, 27*(1), 1–10. https://doi.org/10.1002/cpp.2399.

Cabassa, L. J., Lagomasino, I. T., Dwight-Johnson, M., Hansen, M. C., & Xie, B. (2008). Measuring Latinos' perceptions of depression: a confirmatory factor analysis of the illness perception questionnaire. *Cultural Diversity and Ethnic Minority Psychology, 14*(4), 377–384. https://doi.org/10.1037/a0012820.

Chen, S.-L., Tsai, J.-C., & Lee, W.-L. (2008). Psychometric validation of the Chinese version of the illness perception questionnaire-revised for patients with hypertension. *Journal of Advanced Nursing, 64*(5), 524–534. https://doi.org/10.1111/j.1365-2648.2008.04808.x.

Chen, W., Zheng, R., Baade, P. D., Zhang, S., Zeng, H., Bray, F., Jemal, A., Yu, X. Q., & He, J. (2016). Cancer statistics in China, 2015. *CA: a Cancer Journal for Clinicians, 66*(2), 115–132. https://doi.org/10.3322/caac.21338.

Dempster, M., Howell, D., & McCorry, N. K. (2015). Illness perceptions and coping in physical health conditions: a meta-analysis. *Journal of Psychosomatic Research, 79*(6), 506–513. https://doi.org/10.1016/j.jpsychores.2015.10.006.

Diedrich, A., Burger, J., Kirchner, M., & Berking, M. (2017). Adaptive emotion regulation mediates the relationship between self-compassion and depression in individuals with unipolar depression. *Psychology and Psychotherapy: Theory, Research and Practice, 90*(3), 247–263. https://doi.org/10.1111/papt.12107.

Diefenbach, M. A., & Leventhal, H. (1996). The common-sense model of illness representation: theoretical and practical considerations. *Journal of Social Distress and Homeless, 5*(1), 11–38. https://doi.org/10.1007/BF02090456.

Finlay-Jones, A. L., Rees, C. S., & Kane, R. T. (2015). Self-compassion, emotion regulation and stress among Australian psychologists: testing an emotion regulation model of self-compassion using structural equation modeling. *PLoS One, 10*(7), e0133481. https://doi.org/10.1371/journal.pone.0133481.

Gillanders, D. T., Sinclair, A. K., MacLean, M., & Jardine, K. (2015). Illness cognitions, cognitive fusion, avoidance and self-compassion as predictors of distress and quality of life in a heterogeneous sample of adults, after cancer. *Journal of Contextual Behavioral Science, 4*(4), 300–311. https://doi.org/10.1016/j.jcbs.2015.07.003.

Hale, E. D., Treharne, G. J., & Kitas, G. D. (2007). The common-sense model of self-regulation of health and illness: how can we use it to understand and respond to our patients' needs? *Rheumatology, 46*(6), 904–906. https://doi.org/10.1093/rheumatology/kem060.

Hayes, A. F. (2009). Beyond baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs, 76*(4), 408–420. https://doi.org/10.1080/03637750903310360.

Hinz, A., Mehnert, A., Kocalevent, R.-D., Brähler, E., Forkmann, T., Singer, S., & Schulte, T. (2016). Assessment of depression severity with the PHQ-9 in cancer patients and in the general population. *BMC Psychiatry, 16*(1), 22. https://doi.org/10.1186/s12888-016-0728-6.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118.

Huang, W., Zhang, L., & Yan, J. (2019). Psychometric evaluation of the Chinese version of the revised illness perception questionnaire for breast cancer-related lymphedema. *European Journal of Cancer Care, 28*(1), e12900. https://doi.org/10.1111/ecc.12900.

Kenny, D. A., Kaniskan, B., & McCoach, D. B. (2015). The performance of RMSEA in models with small degrees of freedom. *Sociological Methods & Research, 44*(3), 486–507. https://doi.org/10.1177/0049124114543236.

Krieger, T., Altenstein, D., Baettig, I., Doerig, N., & Holtforth, M. G. (2013). Self-compassion in depression: associations with depressive symptoms, rumination, and avoidance in depressed outpatients. *Behavior Therapy, 44*(3), 501–513. https://doi.org/10.1016/j.beth.2013.04.004.

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9 validity of a brief depression severity measure. *Journal of General Internal Medicine, 16*(9), 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x.

Lennon, J., Hevey, D., & Kinsella, L. (2018). Gender role conflict, emotional approach coping, self-compassion, and distress in prostate cancer patients: a model of direct and moderating effects. *Psycho-Oncology, 27*(8), 2009–2015. https://doi.org/10.1002/pon.4762.

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. A. Weinman (Eds.), *Perceptions of health and illness: Current research and applications* (pp. 19–45). Harwood Academic Publishers.

Leventhal, H., Brissette, I., & Leventhal, E. A. (2003). The common-sense model of self-regulation of health and illness. In L. D. Cameron & H. Leventhal (Eds.), *The Self-regulation of Health and Illness Behavior* (pp. 42–65). Routledge.

Leventhal, H., Diefenbach, M., & Leventhal, E. A. (1992). Illness cognition: using common sense to understand treatment adherence and affect cognition interactions. *Cognitive Therapy and Research, 16*(2), 143–163. https://doi.org/10.1007/BF01173486.

López, A., Sanderman, R., Smink, A., Zhang, Y., van Sonderen, E., Ranchor, A., & Schroevers, M. J. (2015). A reconsideration of the self-compassion scale's total score: self-compassion versus self-criticism. *PLoS One, 10*(7), e0132940. https://doi.org/10.1371/journal.pone.0132940.

Lu, Y., Tang, C., Liow, C. S., Ng, W. W. N., Ho, C. S. H., & Ho, R. C. M. (2014). A regressional analysis of maladaptive rumination, illness perception and negative emotional outcomes in Asian patients suffering from depressive disorder. *Asian Journal of Psychiatry, 12*, 69–76. https://doi.org/10.1016/j.ajp.2014.06.014.

MacBeth, A., & Gumley, A. (2012). Exploring compassion: a meta-analysis of the association between self-compassion and psychopathology. *Clinical Psychology Review, 32*(6), 545–552. https://doi.org/10.1016/j.cpr.2012.06.003.

Marteau, T. M., & Bekker, H. (1992). The development of a six-item short-form of the state scale of the Spielberger State—Trait Anxiety Inventory (STAI). *British Journal of Clinical Psychology, 31*(3), 301–306. https://doi.org/10.1111/j.2044-8260.1992.tb00997.x.

Mausbach, B. T., Schwab, R. B., & Irwin, S. A. (2015). Depression as a predictor of adherence to adjuvant endocrine therapy (AET) in women with breast cancer: a systematic review and meta-analysis. *Breast Cancer Research and Treatment, 152*(2), 239–246. https://doi.org/10.1007/s10549-015-3471-7.

Maxwell, S. E., & Cole, D. A. (2007). Bias in cross-sectional analyses of longitudinal mediation. *Psychological Methods, 12*(1), 23–44. https://doi.org/10.1037/1082-989X.12.1.23.

Meng, R., Yu, Y., Chai, S., Luo, X., Gong, B., Liu, B., Hu, Y., Luo, Y., & Yu, C. (2019). Examining psychometric properties and measurement invariance of a Chinese version of the Self-Compassion Scale – Short Form (SCS-SF) in nursing students and medical workers. *Psychology Research and Behavior Management, 12*, 793–809. https://doi.org/10.2147/PRBM.S216411.

Mitchell, A. J., Chan, M., Bhatti, H., Halton, M., Grassi, L., Johansen, C., & Meader, N. (2011). Prevalence of depression, anxiety, and adjustment disorder in oncological, haematological, and palliative-care settings: a meta-analysis of 94 interview-based studies. *The Lancet Oncology, 12*(2), 160–174. https://doi.org/10.1016/S1470-2045(11)70002-X.

Moss-Morris, R., Weinman, J., Petrie, K., Horne, R., Cameron, L., & Buick, D. (2002). The Revised Illness Perception Questionnaire (IPQ-R). *Psychology & Health, 17*(1), 1–16. https://doi.org/10.1080/08870440290001494.

Muris, P., & Petrocchi, N. (2017). Protection or vulnerability? A meta-analysis of the relations between the positive and negative components of self-compassion and psychopathology. *Clinical Psychology & Psychotherapy, 24*(2), 373–383. https://doi.org/10.1002/cpp.2005.

Muris, P., van den Broek, M., Otgaar, H., Oudenhoven, I., & Lennartz, J. (2018). Good and bad sides of self-compassion: a face validity check of the self-compassion scale and an investigation of its relations to coping and emotional symptoms in non-clinical adolescents. *Journal of Child and Family Studies, 27*(8), 2411–2421. https://doi.org/10.1007/s10826-018-1099-z.

Neff, K. D. (2003a). Self-compassion: an alternative conceptualization of a healthy attitude toward oneself. *Self and Identity, 2*(2), 85–101. https://doi.org/10.1080/15298860309032.

Neff, K. D. (2003b). The development and validation of a scale to measure self-compassion. *Self and Identity, 2*(3), 223–250. https://doi.org/10.1080/15298860309027.

Neff, K. D., & McGehee, P. (2010). Self-compassion and psychological resilience among adolescents and young adults. *Self and Identity, 9*(3), 225–240. https://doi.org/10.1080/15298860902979307.

Preacher, K. J., & Kelley, K. (2011). Effect size measures for mediation models: quantitative strategies for communicating indirect effects. *Psychological Methods, 16*(2), 93–115. https://doi.org/10.1037/a0022658.

Raes, F. (2010). Rumination and worry as mediators of the relationship between self-compassion and depression and anxiety. *Personality and Individual Differences, 48*(6), 757–761. https://doi.org/10.1016/j.paid.2010.01.023.

Raes, F., Pommier, E., Neff, K. D., & Van Gucht, D. (2011). Construction and factorial validation of a short form of the Self-Compassion Scale. *Clinical Psychology & Psychotherapy, 18*(3), 250–255. https://doi.org/10.1002/cpp.702.

Reich, M., Lesur, A., & Perdrizet-Chevallier, C. (2008). Depression, quality of life and breast cancer: a review of the literature. *Breast Cancer Research and Treatment, 110*(1), 9–17. https://doi.org/10.1007/s10549-007-9706-5.

Richardson, E. M., Schüz, N., Sanderson, K., Scott, J. L., & Schüz, B. (2017). Illness representations, coping, and illness outcomes in people with cancer: a systematic review and meta-analysis. *Psycho-Oncology, 26*(6), 724–737. https://doi.org/10.1002/pon.4213.

Shek, D. T. L. (1993). The Chinese version of the state-trait anxiety inventory: its relationship to different measures of psychological well-being. *Journal of Clinical Psychology, 49*(3), 349–358. https://doi.org/10.1002/1097-4679(199305)49:3<349::AID-JCLP2270490308>3.0.CO;2-J.

Svendsen, J. L., Osnes, B., Binder, P.-E., Dundas, I., Visted, E., Nordby, H., Schanche, E., & Sørensen, L. (2016). Trait self-compassion reflects emotional flexibility through an association with high vagally mediated heart rate variability. *Mindfulness, 7*(5), 1103–1113. https://doi.org/10.1007/s12671-016-0549-1.

Tang, L., Li, Z., & Pang, Y. (2020). The differences and the relationship between demoralization and depression in Chinese cancer patients. *Psycho-Oncology, 29*(3), 532–538. https://doi.org/10.1002/pon.5296.

Wang, W., Bian, Q., Zhao, Y., Li, X., Wang, W., Du, J., Zhang, G., Zhou, Q., & Zhao, M. (2014). Reliability and validity of the Chinese version of the Patient Health Questionnaire (PHQ-9) in the general population. *General Hospital Psychiatry, 36*(5), 539–544. https://doi.org/10.1016/j.genhosppsych.2014.05.021.

Wu, X., Lau, J. T. F., Mak, W. W. S., Gu, J., Mo, P. K. H., & Wang, X. (2018). How newly diagnosed HIV-positive men who have sex with men look at HIV/AIDS – validation of the Chinese version of the revised illness perception questionnaire. *BMC Infectious Diseases, 18*(1), 2. https://doi.org/10.1186/s12879-017-2902-y.

Zhu, L., Ranchor, A. V., van der Lee, M., Garssen, B., Almansa, J., Sanderman, R., & Schroevers, M. J. (2017). Co-morbidity of depression, anxiety and fatigue in cancer patients receiving psychological care. *Psycho-Oncology, 26*(4), 444–451. https://doi.org/10.1002/pon.4153.

Zhu, L., Yao, J., Wang, J., Wu, L., Gao, Y., Xie, J., Liu, A., Ranchor, A. V., & Schroevers, M. J. (2019). The predictive role of self-compassion in cancer patients' symptoms of depression, anxiety, and fatigue: a longitudinal study. *Psycho-Oncology, 28*(9), 1918–1925. https://doi.org/10.1002/pon.5174.