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Review

The relationship between acceptance of cancer and distress: A meta-analytic review

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HIGHLIGHTS

- Integrated model of acceptance of cancer is presented.
- A meta-analytic review of acceptance of cancer and distress relationships
- Results revealed significant relationships with small-to-moderate effect sizes.
- Age, marital status, and cancer stage were significant moderators.
- Theoretical and clinical implications with future directions are discussed.

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ABSTRACT

Acceptance of cancer has long been recognized as playing a critical role in psychological adjustment to the illness, but its associations with distress outcomes have not been quantitatively reviewed. Informed by coping theory and third wave conceptualizations of acceptance, we first propose an integrated model of acceptance of cancer. Then we examine the strength of the relationships between acceptance of cancer and general and cancer-specific distress in cancer patients and potential moderators of these relationships. *CINAHL*, *Embase*, *MEDLINE*, *PsycINFO*, *PsycARTICLES*, and *Web of Science* databases were searched. Random-effects meta-analyses were conducted on 78 records ($N = 15{,}448$). Small-to-moderate, negative, and significant relationships were found between acceptance of cancer and general distress ($r = -0.31$; 95% CI: -0.36 to -0.26, $k = 75$); cancer-specific distress ($r = -0.18$; 95% CI: -0.21 to -0.14, $k = 13$); depressive symptoms ($r = -0.25$; 95% CI: -0.31 to -0.19, $k = 41$); and anxiety symptoms ($r = -0.22$; 95% CI: -0.30 to -0.15, $k = 29$). Age, marital status, and stage of cancer were identified as significant moderators. Findings suggest that acceptance of cancer may be important to target in interventions to reduce general and cancer-specific distress in cancer patients. Future research should focus on developing multifaceted measures of acceptance and identifying theory-based psychological and social processes that lead to greater acceptance.

1. Introduction

When diagnosed with a life-threatening disease such as cancer, patients are confronted with a range of distressing circumstances (Giese-Davis et al., 2012). Many cancer patients endure aggressive treatments that result in high symptom burden and functional limitations as well as financial difficulties (Cleeland et al., 2013; Peppercorn, 2014). Early-stage cancer patients cope with uncertainties about the future, given their risk of recurrence and metastasis (Dinkel, Kremsreiter, Marten-Mittag, & Lahmann, 2014). In comparison, at the advanced stages of cancer, patients often face the reality of a limited life expectancy, complex medical decision-making, and end-of-life planning (Jaiswal, Alici, & Breitbart, 2014; Tang et al., 2014). Not surprisingly, as many as 40% of cancer patients suffer from mood disorders or clinically elevated levels of distress, including increased anxiety and depressive symptoms (Caruso, Nanni, Riba, Sabato, & Grassi, 2017; Linden, Vodermaier, MacKenzie, & Greig, 2012; Mitchell et al., 2011), and up to 80% of patients experience symptoms of cancer-specific

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distress (i.e., cancer-related post-traumatic stress disorder [PTSD] or fear of recurrence) (Abbey, Thompson, Hickish, & Heathcote, 2015; Caruso et al., 2017; Dinkel et al., 2014; van den Beuken-van Everdingen et al., 2008). Among cancer patients, higher levels of distress have been associated with reduced quality of life (L. F. Brown, Kroenke, Theobald, Wu, & Tu, 2010; Koch et al., 2014), poor medication and treatment adherence (Lin, Clark, Tu, Bosworth, & Zullig, 2017; Mausbach, Schwab, & Irwin, 2015), and poor physical health outcomes such as greater symptoms of pain, fatigue, nausea, and sleep difficulties (Brown et al., 2010; Pinquart & Duberstein, 2010; van den Beuken-van Everdingen et al., 2008). Further, depressive symptoms have been associated with lower survival rates following a cancer diagnosis (Pinquart & Duberstein, 2010; Satin, Linden, & Phillips, 2009).

1.1. Acceptance of cancer

Acceptance of cancer, or making peace with the disease, is one factor that may play an important role in reducing patients' distress. Acceptance of illness has been conceptualized in multiple ways. Initially, acceptance of illness was defined as a *process of value change* by which the patient accepts the losses related to the illness while maintaining a sense of self-worth (Wright, 1983). This process may involve exploring new meanings or possibilities in life based on one's existing values and strengths (Wright, 1983). Later, acceptance was defined as a willingness to be present with one's illness-related thoughts, feelings, and bodily sensations without judging or making unnecessary attempts to control them (Hayes, Jacobson, Follette, & Dougher, 1994). Similarly, McCracken and Eccleston (2003) described acceptance as a realistic way of living with illness; that is, an accepting patient does not judge, avoid, or deny the illness, but continues feasible engagement in everyday activities.

Acceptance differs from resignation (i.e., fatalism). For cancer patients, resignation refers to considering the illness as fate and believing that there is little or nothing one can do to change or control the illness, its symptoms, and one's quality of life (Livneh, 2000). In other words, resignation refers to giving up and no longer striving for a fulfilling life—choosing instead to remain helpless, hopeless, and passive. Although some researchers have considered acceptance and resignation as part of the same process (Barata et al., 2018; Wells, Booth-Jones, & Jacobsen, 2009), others have argued that resignation is the opposite of acceptance (Williams & Lynn, 2010; Wright, 1983). In line with this view, research suggests that acceptance is associated with lower anxiety and depressive symptoms (e.g., Bussell & Naus, 2010; Peters, Goedendorp, Verhagen, van der Graaf, & Bleijenberg, 2014), whereas resignation is associated with higher anxiety and depressive symptoms (Andreu et al., 2012; Hong, Wei, & Wang, 2015). In this review, resignation is excluded, as it appears to be a different process with a distinct relation to psychological distress.

Acceptance also differs from a fighting spirit. In the context of cancer, having a fighting spirit involves viewing the illness as a challenge, maintaining an optimistic outlook, and working toward *beating* the disease (Livneh, 2000; Watson et al., 1988). Although both acceptance and having a fighting spirit involve taking an active stance, acceptance does not necessarily include efforts of positive reframing or aiming to change the course of the disease. We contend that acceptance of cancer might be closely linked with having a fighting spirit, but only when it is in line with patients' value systems and the realities of their illness. Further, associations between having a fighting spirit and distress are mixed (e.g., Gillanders, Sinclair, MacLean, & Jardine, 2015; Watson & Homewood, 2008). Among advanced cancer patients in particular, endorsing a fighting spirit has been associated with greater psychological distress (Rand et al., 2016). Thus, the concept of a fighting spirit was excluded from this review.

1.1.1. Theoretical framework

The acceptance literature is grounded in multiple theories (Carver, Scheier, & Weintraub, 1989; Hayes et al., 1994; Kabat-Zinn, 1990; Lazarus & Folkman, 1984; Linehan, 1993; Park, 2010). In this review, we focus on the most prominent theories: coping theory and third wave cognitive-behavioral therapy approaches. We then propose an integrated model of acceptance based on these theories.

1.1.1.1. Coping theory. Coping theory posits that when confronted with significant stressors such as cancer, people evaluate the situation with regard to its impact on their lives (i.e., primary appraisals), and what, if anything, might be done about it (i.e., secondary appraisals) (Lazarus & Folkman, 1984). Based on their appraisals, people employ various cognitive and behavioral efforts (i.e., coping strategies) to manage the demands (Lazarus & Folkman, 1984). In a cancer context, acceptance is emotion-focused coping that involves acknowledging the reality of the illness, learning to live with it, and engaging in attempts to address it (Carver et al., 1989). Acceptance coping may also involve maintaining an empathic attitude toward oneself (i.e., self-compassion) or expressing feelings about the illness experience to others (Sirois, Molnar, & Hirsch, 2015; Williams, 2007; Williams & Lynn, 2010).

Another aspect of acceptance coping is developing a sense of meaning in life that broadens one's focus beyond the illness (Threader & McCormack, 2016). According to Park's (2010) integrated meaning-making model, acceptance is conceptualized as meanings made, that is, coming to terms with the illness as a result of meaning-making processes. For example, meanings made may include identifying benefits in the illness experience (i.e., benefit finding) or experiencing positive life changes as a result of the illness experience (i.e., post-traumatic growth) (Manne et al., 2018; Park, 2010; Sears, Stanton, & Danoff-Burg, 2003). However, in line with third wave approaches (Fletcher & Hayes, 2005), acceptance can also be conceptualized as a process or a part of ongoing meaning-making efforts.

1.1.1.2. Third wave approaches. An alternative conceptualization of acceptance comes from theories underlying third wave cognitive-behavioral therapies, such as Acceptance and Commitment Therapy (ACT: Hayes, Strosahl, & Wilson, 1999), Dialectical Behavioral Therapy (DBT: Linehan, 1993), mindfulness-based interventions (e.g., Mindfulness-Based Stress Reduction [MBSR]: Kabat-Zinn, 1990; Mindfulness-Based Cognitive Therapy [MBCT]: Segal, Williams, & Teasdale, 2002), as well as theories of mindfulness (e.g., Mindfulness-to-Meaning Theory: Garland, Farb, Goldin, & Fredrickson, 2015; Monitor and Acceptance Theory: Lindsay & Creswell, 2017). According to this conceptualization, acceptance involves active awareness of the present moment, including unwanted thoughts, feelings, and bodily sensations, without unnecessary attempts to change these experiences (i.e., “allowing things to be as they already are” Segal et al., 2002, p. 271). From an ACT perspective, acceptance contributes to the development of psychological flexibility, which involves maintaining full awareness of the present moment while persisting in actions aligned with personal values (Hayes, Luoma, Bond, Masuda, & Lillis, 2006).

According to third wave theorists, acceptance of cancer involves a non-judgmental stance and willingness to experience the realities of the disease, such as symptoms, physical decline, and living with uncertainty (Fashler, Weinrib, Azam, & Katz, 2018; Hayes, Follette, & Linehan, 2004; Hulbert-Williams, Storey, & Wilson, 2015). These theorists contend that acceptance is not simply *tolerating* the existence of cancer, but, rather, embracing the moment-by-moment experience of the illness including the difficult private events (e.g., thoughts, feelings, bodily sensations) as they occur (Hayes et al., 2004). This willingness to experience the events without defense has been referred to as experiential acceptance (Hayes et al., 1994; Karekla & Panayiotou, 2011; Kashdan, Barrios, Forsyth, & Steger, 2006; Williams & Lynn, 2010). For some patients, acceptance may involve shifting from heightened emotional reactivity to cancer-related thoughts to a stance that reduces this struggle (i.e., cognitive defusion). Third wave theorists also contend

that experiential acceptance is the opposite of experiential avoidance, defined as attempts or desires to avoid unwanted private events, such as thoughts, feelings, and symptoms (Hayes et al., 2004; Hulbert-Williams et al., 2015; Kashdan et al., 2006). For example, a cancer patient may withdraw from meaningful social activities in order to avoid exacerbations of pain or fatigue and, as a consequence, may experience increased loneliness and distress. Conversely, experiential acceptance of cancer may lead to growth in self-compassion, courage, and value-based living, which are theoretically linked to increased psychological flexibility and better psychological well-being (Hayes et al., 1994; Lindsay et al., 2018; Williams, 2007).

In third wave theories, acceptance is closely related to mindfulness, defined as an open and nonjudgmental awareness of one's experiences in the present moment (Kabat-Zinn, 1994). Indeed, some theorists conceptualize acceptance as an aspect of mindfulness (Baer, Smith, & Allen, 2004; Lindsay & Creswell, 2017). For example, in their Monitor and Acceptance Theory, Lindsay and Creswell (2017) posited that acceptance and attention monitoring are the two main components of mindfulness. Thus, acceptance is defined as a "dynamic emotion regulation skill," which, in the context of cancer, may lead to reduced emotional reactivity and reappraisal of cancer-related stressors (Lindsay & Creswell, 2017, p. 51). Similarly, Mindfulness-to-Meaning Theory (Garland et al., 2015) suggests that acceptance, as a part of mindfulness, is critical to facilitating positive reappraisal which, in turn, improves psychological and existential outcomes (e.g., a sense of meaning in life).

1.1.1.3. Integrated model of acceptance. Our integrated model of acceptance of cancer draws upon coping theory (Carver et al., 1989; Lazarus & Folkman, 1984; Park, 2010) and third wave theories (Garland et al., 2015; Hayes et al., 1994; Kabat-Zinn, 1990; Linehan, 1993; Segal et al., 2002). Broadly, we conceptualize acceptance of cancer as an active willingness to be present with cancer-related realities while giving up efforts to judge or control cancer-related appraisals or feelings. In addition, acceptance of cancer involves a behavioral willingness in response to cancer-related stressors, resulting in action aligned with deeply held values (Hayes et al., 1994; Williams & Lynn, 2010). Thus, acceptance of cancer is a coping strategy that is evidenced by value-based action. For instance, patients accepting early-stage cancer might actively engage in medical decision-making and select treatment options based on personal values. Among patients with terminal cancer, acceptance might lead to diverse behavioral outcomes ranging from clinical trial enrollment to seeking hospice care. In all cases, patients would be showing acceptance if their behavioral responses to cancer are consistent with their values.

According to our integrated model, acceptance of cancer is a nonjudgmental and compassionate way of relating to internal experiences of the illness, such as appraisals, emotional responses, memories, and bodily sensations. Acceptance involves letting go of the struggle to control these internal experiences while simultaneously embracing the reality of the illness. Thus, our definition of acceptance blends coping and third wave theories by acknowledging the central role of appraisals in coping (Lazarus & Folkman, 1984; Park, 2010) while suggesting that the way cancer patients relate to their appraisals (i.e., degree of cognitive fusion) can also lead to distress (Garland et al., 2015; Gillanders et al., 2015; Hayes et al., 2006). In other words, being caught up in the content of distressing thoughts about the illness and viewing them as permanent realities may result in additional suffering. Conversely, adopting an open, accepting posture toward illness-related thoughts and feelings may allow patients to experience this reality with greater ease. We contend along with third wave theorists that acceptance is not an end in itself (Hayes et al., 2006); by accepting the illness to a greater degree, patients are empowered to engage in value-based actions, which might subsequently improve psychological well-being.

1.2. Present study: acceptance of cancer and distress

Consistent with our integrated model of acceptance, studies have shown that greater acceptance of cancer is related to reduced symptoms of cancer-specific distress, depression, and anxiety; however, effect sizes for these relationships vary from small to large (e.g., Dasch et al., 2010; Mack et al., 2008; Peters et al., 2014). Differences in sample characteristics and measures of acceptance across studies may contribute to this variability in effect sizes. Certain demographic and medical subgroups of cancer patients might experience greater mental health benefits from acceptance. In addition, it is possible that only some facets of acceptance captured by certain measures are strongly correlated with distress.

Increasingly, acceptance has been targeted in mindfulness and acceptance-based therapies for cancer patients (e.g., ACT for cancer patients: J. Low et al., 2016). Recent reviews suggest that among cancer patients, mindfulness and acceptance-based interventions lead to significant moderate to large improvement in emotional well-being and quality of life as well as moderate to large reductions in anxiety and depressive symptoms and traumatic stress responses (Fashler et al., 2018; Graham, Gouick, Krahé, & Gillanders, 2016; Haller et al., 2017; Hulbert-Williams et al., 2015; Zhang et al., 2015; Zimmermann, Burrell, & Jordan, 2018). However, few studies have investigated acceptance as a mechanism of change in acceptance-based intervention trials with cancer populations (e.g., Hawkes, Pakenham, Chambers, Patrao, & Courneya, 2014). Determining the strength of the relationship between acceptance of cancer and distress will provide further evidence of its clinical relevance and inform interventions for distressed cancer patients. Therefore, guided by our integrated model of acceptance, we conducted the first meta-analyses to examine the average strength of relationships between acceptance of cancer and (1) general distress; (2) cancer-specific distress (i.e., fear of recurrence and cancer-related PTSD); (3) depressive symptoms; and (4) anxiety symptoms among cancer patients. We also explored potential moderators of these associations, all of which had sufficient variance for meta-regression analyses (i.e., age, gender, marital status, time since cancer diagnosis, and cancer stage). Such analyses inform clinical practice by elucidating whether certain subgroups might derive greater benefit from an acceptance-based intervention. Based on our findings, we then present a number of directions for future research and implications for clinical practice.

2. Method

2.1. Literature search

This review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement (Moher, Liberati, Tetzlaff, & Altman, 2009). A systematic literature search using *CINAHL, Embase, MEDLINE, PsycINFO, PsycARTICLES,* and *Web of Science* databases, using combinations of (a) *cancer* and (b) *acceptance of cancer* related search terms was conducted until August 15, 2018 (see Supplementary material 1 for the full list of search terms). Reference lists and forward citations of selected eligible articles were examined to identify any studies that may have been missed in the database searches. Authors of the studies that did not include sufficient information to determine study eligibility or conduct statistical analyses were contacted.

2.2. Inclusion and exclusion criteria

Eligibility criteria were applied in two phases: (1) title and abstract screening, and (2) full-text screening. Eligibility criteria included: (1) examining a sample of adult (18+ years of age) cancer patients/survivors; (2) reporting sufficient information to calculate an effect size representing a relationship between acceptance of cancer and distress

(i.e., an effect size or mean, standard deviation, and *n*); and (3) being written in English. Eligible records included journal articles, books and book chapters, theses and dissertations, brief reports, and conference abstracts and presentations. As part of the inclusion criteria, validated self-report measures of acceptance of cancer were selected a priori. During the database search, additional measures were included if they assessed acceptance in line with our conceptual definition (i.e., recognizing and staying present with the reality of the diagnosis rather than engaging in resignation or fatalism), and if they had acceptable psychometric properties, including reliability (i.e., Cronbach's alpha ≥ 0.70) and validity evidence (e.g., strong correlations with other reliable measures of acceptance). Similarly, validated self-report measures of distress were selected a priori, and additional measures found during the database search were included if they had acceptable psychometric properties. When the study sample included multiple disease groups, only information pertaining to cancer patients/survivors was included. When there were multiple records using the same sample, peer-reviewed articles and/or the most relevant studies (e.g., records that examined the acceptance-distress association in greater detail) were chosen. Studies were excluded when sufficient information to compute effect sizes was not provided in the text or could not be received from the authors.

2.3. Study selection

Fig. 1 shows a flowchart of study selection. The first author (ES) screened all of the titles and abstracts and, when found eligible, the full-texts; the second author (DBT) screened 20% of the titles and abstracts and 20% of the full-texts. Any discrepancies were resolved through consensus meetings. The electronic database search identified 8449 records. After excluding duplicates and adding 73 records found from other sources (e.g., backwards and forwards citation searches), 3983 records were extracted for title and abstract screening. A total of 3507 records were excluded with 95.3% agreement between raters (Cohen's *kappa* = 0.72). Thus, 476 records were selected for full-text screening of which 342 records were excluded, and 134 were selected for meta-analyses. There was 92.6% interrater agreement for full-text screening (Cohen's *kappa* = 0.79). Of the 134 records examined for coding, 36 records included sufficient information for analyses. We contacted authors of 98 records and received sufficient data for 42 records. Overall, 78 records with sufficient information were included in effect size calculations, and the remaining 56 records were excluded due to insufficient information for these calculations. When records reported effect sizes individually for each sex or subsample (e.g., individual samples from different sites), these were treated as individual samples, resulting in effect sizes from 86 independent samples. Each independent sample was coded separately.

From 75 separate records, we included 83 independent samples in the analysis examining the relationship between acceptance of cancer and general distress. We included 13 independent samples from 13 records in the analysis examining the relationship between acceptance of cancer and cancer-specific distress. From 41 records, we included 46 independent samples in the analysis examining the relationship between acceptance of cancer and depressive symptoms, and from 29 records, we included 31 independent samples in the analysis examining the relationship between acceptance of cancer and anxiety.

2.4. Coding

A systematic coding frame was created based on a modified version of Lipsey and Wilson's (2001) example codebook. For each record, the following information was coded: type of record (e.g., journal article, dissertation); year of publication; year of data collection; publication status (i.e., published vs. not published); and study design (i.e., cross-sectional, longitudinal, case-control, or intervention). For each sample, the following descriptive information was coded: sample size, ethnic composition (i.e., percent White), mean years of education, cancer type (e.g., breast, prostate), and country (e.g., country where the data were collected). The following potential moderators were coded: mean age of the sample; gender (i.e., percent female); marital status (i.e., percent married/partnered); mean time since diagnosis (in years); and advanced stage (i.e., percent with advanced-stage cancer). Advanced-stage cancer included: stage III, IV, and metastatic breast cancer, colorectal cancer, gynecological cancer, Hodgkin's lymphoma, non-small cell lung cancer, and prostate cancer; stage III and metastatic testicular cancer; and extensive-stage small cell lung cancer (National Cancer Institute, 2015). The first author (ES) conducted the initial coding, and the second author (DBT) coded the information reported in 20% of the selected full-texts. There was 94.8% interrater agreement for coding (Cohen's *kappa* = 0.89). Cases of disagreement were resolved during consensus meetings.

Pearson's product-moment correlation coefficient (*r*) was used as the main outcome metric. For cross-sectional and case-control studies, acceptance of cancer and general and/or cancer-specific distress correlation coefficients were extracted. For longitudinal and intervention studies, only the initial (or baseline) acceptance of cancer and general and/or cancer-specific distress correlation coefficients were extracted in order to include the largest possible sample and minimize the effects of extraneous factors (e.g., intervention, practice effects). All of the extracted correlation coefficients were weighted by sample size to compute the overall study effect sizes.

2.5. Quality assessment

The quality of study reporting was assessed using the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (von Elm, Altman, & Egger, 2008). The first author (ES) assessed reporting quality for all of the records, and the second author (DBT) assessed the reporting quality of 20% of the records. The interrater agreement for study reporting quality was 91.4% (Cohen's *kappa* = 0.81). Disagreements were resolved during consensus meetings.

2.6. Meta-analytic method

Four separate meta-analyses were conducted examining the relationships between acceptance of cancer and (1) general distress (i.e., distress, depressive and anxiety symptoms, reduced mental health and emotional well-being); (2) cancer-specific distress (i.e., fear of recurrence and cancer-related PTSD); (3) depressive symptoms; and (4) anxiety symptoms. General distress was examined separately because some measures of distress do not differentiate between depressive and anxiety symptoms and only provide information about global distress or general emotional/mental health. Separate meta-analyses for depressive and anxiety symptoms were conducted due to their prevalence in cancer patients and associations with important health outcomes (Brown et al., 2010; Lin et al., 2017; Pinquart & Duberstein, 2010). When studies reported multiple effect sizes from the same sample, these effect sizes were aggregated using the *MAc* package available in R, which accounts for the dependencies among within-study effect sizes (Hunter & Schimdt, 2004).

All data were coded in SPSS (version 24.0) and analyzed using *MAc* and *metafor* packages in R v.3.4.0 (R Core Team, 2013). Raw correlations were converted to the Fisher's *Z* scale to stabilize the variance, and analyses were performed using the transformed values (Hedges & Olkin, 1985). Summary statistics of Fisher's *Z*-transformed values and their 95% confidence intervals (CIs) were converted back to the *r* metric (Schulze, 2004) using an integral z-to-r transformation for ease of interpretation.

Meta-analyses were conducted using random-effects models with restricted maximum likelihood estimators (Viechtbauer, 2005). Random-effects models were chosen as they compute less biased and

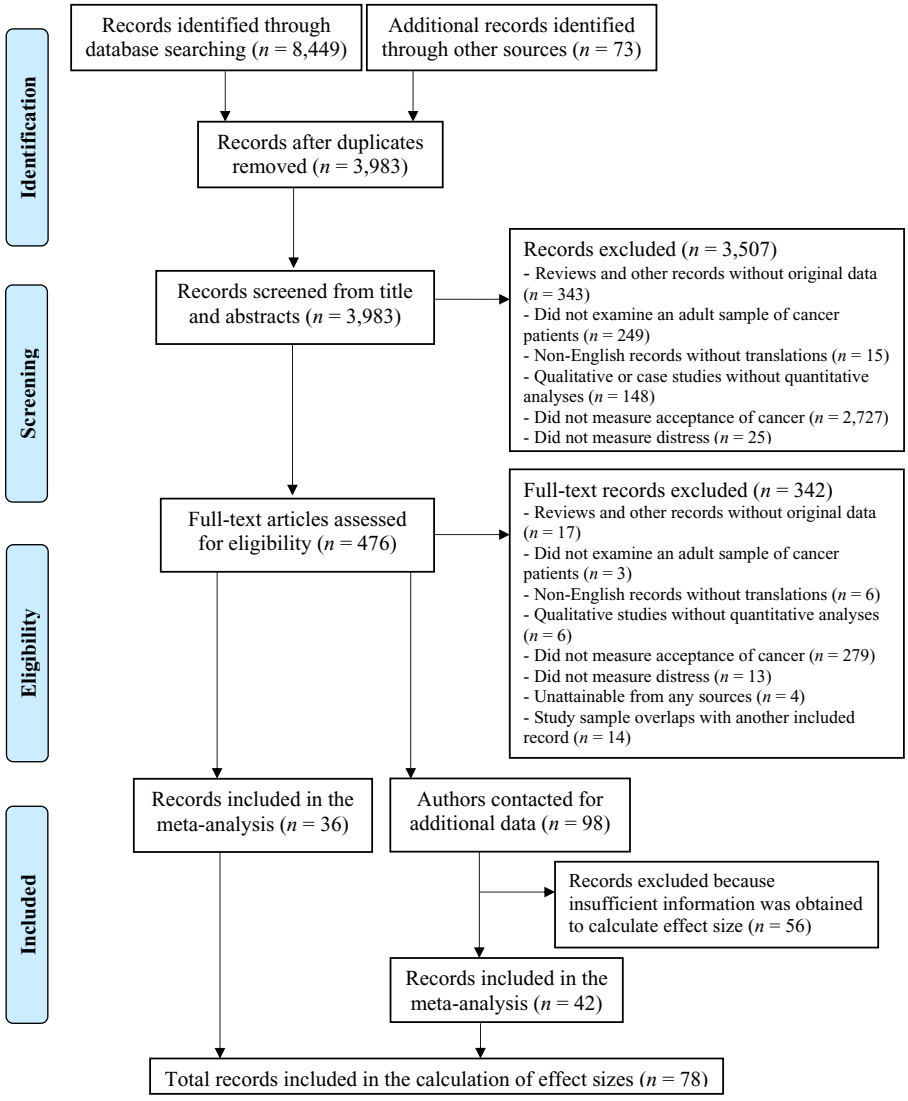

Fig. 1. Flow chart of record selection.

more conservative estimated effect sizes compared to fixed-effects models (Card, 2011). In accordance with Hunter and Schimdt (2004), meta-analyses were conducted with raw correlations (*r*) and correlations corrected for measurement reliability (ρ). When reliability coefficients were not reported in the study, the median reliability coefficients of the measures were imputed based on those reported in the sample. For single-item measures, a reliability coefficient of 0.60 was imputed (Hunter & Schimdt, 2004; Sharma & Yetton, 2007). Effect sizes were considered statistically significant for *p*-values $< .05$.

Following the computation of the mean effect size, heterogeneity of effect sizes was described using Cochrane *Q*, I^2 and Tau^2 (τ^2) statistics. Potential moderators were examined when significant heterogeneity was present, as demonstrated by an $I^2 \geq 25\%$, a $\tau^2 > 0$, and a significant *Q*-statistic (Borenstein, Hedges, Higgins, & Rothstein, 2011). Effects of potential moderators, such as age, gender, marital status, time since diagnosis, and stage of cancer, were examined with meta-regression analyses using a restricted maximum likelihood model. Each moderator was examined independently in order to maximize the number of studies included in the analyses.

To identify potential publication bias, Begg's funnel plots (Begg & Mazumdar, 1994) with Duval and Tweedie's (2000) trim-and-fill adjustment were created and inspected visually as well as with Egger's test of asymmetry and Begg's rank test (Begg & Mazumdar, 1994; Sterne & Egger, 2006). In addition, Orwin's *Fail-safe N* was calculated to estimate the number of studies with an effect size of zero ($r = 0.00$) that would be required to reduce the mean effect size across studies to a specified inconsequential level (i.e., a non-significant effect size) (Lipsey & Wilson, 2001). Finally, meta-regression analyses were conducted examining publication status (i.e., published vs. not published), year of data collection, and study reporting quality as potential moderators.

3. Results

3.1. Characteristics of the studies

Of the 78 records included, 43 were cross-sectional, 26 were longitudinal, two were case-control, and seven were intervention studies. The mean sample size of the included studies was 179.62 ($SD = 211.20$; range = 12–1280). The mean age of the samples was 55.75 ($SD = 8.52$; range = 25.00–73.30; $k = 68$). Concerning gender, 32 studies included a mixed sample; 36 studies included a female sample; six studies included a male sample; and four studies did not report the gender of the sample. The mean percentage of females across studies was 71.13% ($SD = 33.43\%$; $k = 74$). The mean percentage of Caucasians across studies was 78.09% ($SD = 27.84\%$; range = 0.00–100.00; $k = 51$). The mean percentage of participants who were married or partnered was

71.61% (*SD* = 15.92%; range = 31.37–100.00; *k* = 56). The mean time since diagnosis was 2.16 years (*SD* = 1.78; range = 0.01–8.46; *k* = 28). The mean percentage of participants with advanced-stage cancer (e.g., stage III, IV, or metastatic) was 25.87% (*SD* = 25.40%; range = 0.00–100.00; *k* = 41). The majority of studies included samples of mixed cancer patients (29.49%, 23/78) or breast cancer patients (41.03%, 32/78). Supplementary material 2 provides additional information about the studies included in the meta-analyses.

3.2. Study reporting quality

The mean study reporting quality rating based on the STROBE criteria was 73.29% (*SD* = 8.99%; range = 57.14–93.10). The majority of studies fulfilled over 60% of the STROBE criteria. Almost all studies provided adequate information about the scientific background, specified their hypotheses, described measures and methods of main analyses, and discussed study limitations. However, several prevalent weaknesses in reporting methods and results were identified. For example, a small minority of studies reported how sample size was determined (reported in 5.13%, 4/78), reasons for non-participation (23.08%, 18/78), and methods of dealing with missing data (17.95%, 14/78). Supplementary material 3 provides additional information about study reporting quality.

3.3. Mean effect sizes

Table 1 presents the mean effect sizes that were calculated for the relationships between acceptance of cancer and (1) general distress, (2) cancer-specific distress, (3) depressive symptoms, and (4) anxiety symptoms. Supplementary material 4 presents the forest plots depicting the mean effect sizes for each study and the 95% CIs for the effect sizes. We found small to moderate, negative, and statistically significant mean effect sizes for the relationships between acceptance of cancer and general distress ($r = -0.31$, $p < .0001$), cancer-specific distress ($r = -0.18$, $p < .0001$), depressive symptoms ($r = -0.25$, $p < .0001$), and anxiety symptoms ($r = -0.22$, $p < .0001$). Based on stem-and-leaf plots, one study (Lyons et al., 2015) was identified as an outlier for the association between acceptance of cancer and depressive symptoms. Sensitivity analyses conducted excluding this study did not yield statistically significant differences in the results; thus, the study was included in the final analyses (Lipsey & Wilson, 2001).

3.4. Moderator analyses

Heterogeneity analyses demonstrated significant between-study variance in the relationships between acceptance of cancer and general distress (Q = 873.24; $I^2 = 0.91$; $\tau^2 = 0.06$), depressive symptoms (Q = 370.98; $I^2 = 0.87$; $\tau^2 = 0.04$), and anxiety symptoms (Q = 206.82; $I^2 = 0.86$; $\tau^2 = 0.04$); thus, we conducted moderation analyses for these associations. However, there was minimal heterogeneity in the relationship between acceptance of cancer and cancer-specific distress (Q = 12.76; $I^2 = 0.00$; $\tau^2 = 0.00$); therefore, we did not conduct moderation analyses for this association. Table 2 presents the results of the meta-regression analyses examining the five moderators.

3.4.1. Age

Patients' age was a significant moderator of the relationship between acceptance of cancer and depressive symptoms. We found that for every 1 year increase in age, the relationship between acceptance of cancer and depressive symptoms strengthened by 0.010 ($b = -0.010$, SE = 0.005, $z = -2.10$, 95% CI −0.019 to −0.001; $k = 34$). However, age did not significantly moderate associations between acceptance of cancer and general distress ($b = -0.001$, SE = 0.004, $z = -0.31$, 95% CI −0.009 to 0.006; $k = 65$) or anxiety symptoms ($b = -0.007$, SE = 0.005, $z = -1.30$, 95% CI −0.017 to 0.003; $k = 26$).

Table 1
Mean effect sizes for associations between acceptance of cancer and distress outcomes.

Association	*k*	*N*	*r*	*SE*	95% CI for *r*	*Z* for *r*	τ^2	*Q*	I^2	Fail-safe *N*	ρ	80% CR for ρ	*Z for* ρ
Acceptance of cancer – general distress	75	14368	−0.31	0.03	−0.36, −0.26	−10.79***	0.06	873.24***	0.91	183	−0.41	−0.84, 0.33	−9.68***
Acceptance of cancer – cancer-specific distress	13	2943	−0.18	0.02	−0.21, −0.14	−9.70***	0.00	12.76	0.00	13	−0.22	−0.31, −0.13	−9.23***
Acceptance of cancer – depressive symptoms	41	8606	−0.25	0.03	−0.31, −0.19	−7.94***	0.04	370.98***	0.87	73	−0.33	−0.73, 0.22	−7.58***
Acceptance of cancer – anxiety symptoms	29	4974	−0.22	0.04	−0.30, −0.15	−5.63***	0.04	206.82***	0.86	40	−0.29	−0.69, 0.25	−5.59***

Note. CI = confidence interval. CR = credibility interval. Fail-safe *N* = Orwin's Fail-safe *N*. I^2 = percentage of between-study variability. *k* = number of studies. *N* = total number of participants included in the analysis. ρ = reliability corrected mean effect size (correlation). *Q* = Cochran's (1954) *Q*-statistic of heterogeneity. *r* = mean effect size (correlation). *SE* = standard error. τ^2 = estimated variance of the population effect sizes. Z = z-test for statistical significance of the mean effect size. A z-score greater than the absolute value of 1.96 indicates statistical significance (Higgins, Thompson, Deeks, & Altman, 2003).
*** $p < .001$.

Table 2
Meta-regression analyses examining moderators of associations between acceptance of cancer and distress outcomes.

Moderator	Outcome	*k*	*N*	I^2	R^2	*B*	*SE*	95% CI	*Z*	$Q_{(w)}$
Age	General distress	65	11622	0.91	0.00	−0.001	0.004	−0.009, 0.006	−0.31	724.21*** (*df* = 69)
	Depressive symptoms	34	6099	0.83	0.11	−0.010	0.005	−0.019, −0.001	−2.10*	216.60*** (*df* = 36)
	Anxiety symptoms	26	3709	0.82	0.04	−0.007	0.005	−0.017, 0.003	−1.30	130.81*** (*df* = 26)
Gender	General distress	71	13306	0.91	0.00	−0.001	0.001	−0.003, 0.001	−1.32	832.24*** (*df* = 76)
	Depressive symptoms	39	7752	0.87	0.03	−0.002	0.001	−0.004, 0.001	−1.36	344.16*** (*df* = 42)
	Anxiety symptoms	28	4503	0.85	0.00	−0.001	0.001	−0.004, 0.002	−0.85	185.19*** (*df* = 28)
Marital status	General distress	53	10499	0.91	0.04	0.003	0.002	−0.001, 0.008	1.55	677.57*** (*df* = 56)
	Depressive symptoms	26	5735	0.89	0.20	0.007	0.003	0.001, 0.012	2.43*	239.84*** (*df* = 27)
	Anxiety symptoms	20	3184	0.85	0.18	0.006	0.003	0.000, 0.011	2.08*	126.78*** (*df* = 19)
Time since diagnosis	General distress	28	5328	0.87	0.08	0.036	0.023	−0.010, 0.082	1.55	182.55*** (*df* = 28)
	Depressive symptoms	13	2874	0.82	0.21	0.047	0.025	−0.002, 0.097	1.87†	53.49*** (*df* = 12)
	Anxiety symptoms	7	1531	0.85	0.13	0.054	0.040	−0.023, 0.131	1.37	42.28*** (*df* = 6)
Cancer stage	General distress	39	5818	0.90	0.00	0.000	0.002	−0.004, 0.003	−0.21	363.50*** (*df* = 39)
	Depressive symptoms	18	2885	0.54	0.63	0.004	0.002	0.001, 0.007	2.59**	40.91** (*df* = 16)
	Anxiety symptoms	13	1598	0.00	1.00	0.004	0.001	0.002, 0.006	3.40***	12.18 (*df* = 11)

Notes: I^2 = percentage of between-study variability. *k* = number of records included the analysis. *N* = total number of participants included in the analysis. *Q (w)* = the variance within group means. R^2 = percentage of between-study variability explained by the moderator. *SE* = standard error. 95% CI = 95% confidence interval for *B*. Z = z-test for statistical significance of *B*. Age = the average age of the sample. Gender = percent female. Marital status = percent married/partnered. Time since diagnosis = mean time since diagnosis in years. Cancer stage = percent with advanced-stage cancer (e.g., stage III, IV, or metastatic).
† $p < .10$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

3.4.2. Gender

Gender did not significantly moderate relationships between acceptance of cancer and general distress ($b = -0.001$, SE = 0.001, $z = -1.32$, 95% CI −0.003 to 0.001; $k = 71$), depressive symptoms ($b = -0.002$, SE = 0.001, $z = -1.36$, 95% CI −0.004 to 0.001; $k = 39$), or anxiety symptoms ($b = -0.001$, SE = 0.001, $z = -0.85$, 95% CI −0.004 to 0.002; $k = 28$).

3.4.3. Marital status

Marital status (i.e., percent of patients married/partnered) was a significant moderator of the relationships between acceptance of cancer and depressive symptoms ($b = 0.007$, SE = 0.003, $z = 2.43$, 95% CI 0.001 to 0.012; $k = 26$) as well as anxiety symptoms ($b = 0.006$, SE = 0.003, $z = 2.08$, 95% CI 0.000 to 0.011; $k = 20$). For each percent increase in married/partnered patients in the sample, the relationship between acceptance of cancer and depressive symptoms weakened by 0.007, and the relationship between acceptance of cancer and anxiety symptoms weakened by 0.006. However, the relationship between acceptance of cancer and general distress was not significantly moderated by marital status ($b = 0.003$, SE = 0.002, $z = 1.55$, 95% CI −0.001 to 0.008; $k = 53$).

3.4.4. Time since diagnosis

Time since diagnosis did not significantly moderate the relationships between acceptance of cancer and general distress ($b = 0.036$, SE = 0.023, $z = 1.55$, 95% CI −0.010 to 0.082; $k = 28$), depressive symptoms ($b = 0.047$, SE = 0.025, $z = 1.87$, 95% CI −0.002 to 0.097; $k = 13$), or anxiety symptoms ($b = 0.054$, SE = 0.040, $z = 1.37$, 95% CI −0.023 to 0.131; $k = 7$).

3.4.5. Cancer stage

Cancer stage was a significant moderator of the relationships between acceptance of cancer and depressive symptoms ($b = 0.004$, SE = 0.002, $z = 2.59$, 95% CI 0.001 to 0.007; $k = 18$) as well as anxiety symptoms ($b = 0.004$, SE = 0.001, $z = 3.40$, 95% CI 0.002 to 0.006; $k = 13$). For each percent increase in advanced-stage cancer patients in the sample, associations between acceptance of cancer and both depressive and anxiety symptoms weakened by 0.004. However, the relationship between acceptance of cancer and general distress was not significantly moderated by cancer stage ($b = 0.000$, SE = 0.002, $z = -0.21$, 95% CI −0.004 to 0.003; $k = 39$).

3.5. Publication bias

Publication bias was an unlikely explanation for the relationships between acceptance of cancer and general distress (fail-safe $N = 183$), depressive symptoms (fail-safe $N = 73$), and anxiety (fail-safe $N = 40$), given the high number of studies with null effects that would be required to reduce the effect sizes to inconsequential levels. Further support for a low likelihood of publication bias included symmetrical distribution of the effect sizes in trim-filled funnel plots (see Supplementary material 5) and non-significant results for Egger's regression and Begg's rank correlation tests. For the acceptance of cancer and cancer-specific distress association, fail-safe *N* indicated that only 13 studies with null effects would be required to bring this relationship below a significant level ($r = -0.10$, $p > .05$). However, publication bias was determined to be unlikely, as the trim-filled funnel plot showed symmetrical distribution of the effect sizes and Egger's regression and Begg's rank correlation tests were non-significant.

Additionally, publication status (i.e., published vs. not published), year of data collection, and study reporting quality did not significantly moderate the associations between acceptance of cancer and general distress (*p*s = 0.429, 0.544, and 0.059, respectively), cancer-specific distress (*p*s = 0.279, 0.748, and 0.667, respectively), depressive symptoms (*p*s = 0.235, 0.773, and 0.342, respectively), or anxiety (*p*s = 0.335, 0.322, and 0.338, respectively).

4. Discussion

The aims of the current meta-analysis were to estimate associations between acceptance of cancer and distress outcomes and examine whether the strength of these associations differed by demographic or medical factors. We found significant, small to moderate, negative relationships between acceptance of cancer and general distress, cancer-specific distress, depressive symptoms, and anxiety symptoms. These results are consistent with our integrated model of acceptance of cancer, which is grounded in coping theory (Lazarus & Folkman, 1984) and third wave theories (Hayes et al., 1999; Kabat-Zinn, 1990; Linehan, 1993; Segal et al., 2002). Additionally, age, marital status, and stage of cancer were identified as significant moderators of associations

between acceptance of cancer and certain types of distress.

Overall, our findings suggest that acceptance may play a role in reducing cancer patients' psychological distress. As stated earlier, we conceptualize acceptance of cancer as an active process that changes how patients relate to their internal experiences of the illness such as appraisals, emotional responses, and bodily sensations. Specifically, acceptance involves taking a nonjudgmental and compassionate stance toward internal experiences, thereby reducing the struggle with the realities of the illness. In addition, we conceptualize acceptance as behavioral willingness in response to cancer-related stressors, resulting in action consistent with deeply held values. For example, cancer patients employing acceptance-based coping strategies may focus on learning to live with the disease, take an active role in treatment decision-making, or express their thoughts and feelings about the disease to loved ones, all of which may reduce distress (Mack et al., 2008).

Although all of our results were small to moderate effect sizes, acceptance of cancer had the smallest association with cancer-specific distress, the largest association with general distress, and similar small associations with anxiety and depressive symptoms. Several explanations for these findings warrant mention. First, most of the included measures of cancer-specific distress assessed cancer-related post-traumatic stress symptoms, which tend to be endorsed at low levels compared to fear of recurrence and general distress (Abbey et al., 2015). Thus, limited variance in cancer-specific distress may have resulted in a small correlation with acceptance. In addition, fewer studies assessed cancer-specific distress ($k = 13$) relative to other distress outcomes ($ks = 29–75$). These findings also might be partially explained by limitations of acceptance measures (e.g., unitary construct). For instance, current measures do not assess acceptance of cancer-specific stressors, such as the prospect of death, changes in physical appearance, and role changes, which may be more strongly associated with cancer-specific distress.

4.1. Moderators of the acceptance of cancer and distress relationship

The current results suggest that acceptance confers greater psychological benefits for certain subgroups of cancer patients.

4.1.1. Age

Although the relationship between acceptance of cancer and depressive symptoms was stronger for older cancer patients, this moderation effect was not significant when examining general distress or anxiety. These findings should be cautiously interpreted, as both younger and older adults were underrepresented in the studies. Acceptance may be an important process for older adults as they attain a developmental stage that involves reflection on their lives, including fulfilled life goals and regrets. Alternatively, acceptance may be equally important for adults across the age spectrum as they face a medical reality that interferes with important life goals or activities.

4.1.2. Gender

Gender did not significantly moderate the relationships between acceptance of cancer and general distress, anxiety, or depressive symptoms, suggesting that acceptance may be an equally important coping strategy for men and women. Gender differences in acceptance coping have not been consistent across studies (Czerw, Religioni, & Deptala, 2016; Nowicki, Marciniak, Farbicka, & Banaszkiewicz, 2015). It is possible that acceptance of different facets of cancer (e.g., reduced self-sufficiency, changes in body image) may confer greater mental health benefits for certain gender groups. However, current measures of acceptance are not multidimensional, thereby limiting our ability to identify possible gender differences in these associations. Alternatively, our null moderation findings for gender may be due to the limited representation of male cancer patients in the analyses.

4.1.3. Marital status

Acceptance of cancer was more strongly correlated with depressive and anxiety symptoms among cancer patients without a spouse or partner. Marital status can be considered a proxy variable for enhanced social support, which appears to influence patients' choice of coping strategies (Holland & Holahan, 2003; Kim, Han, Shaw, McTavish, & Gustafson, 2010) and, in turn, influence distress. When partner support is absent, coping strategies such as acceptance might be more important for reducing distress. However, the present findings were not entirely consistent, as marital status did not moderate the acceptance of cancer-general distress relationship. Our mixed findings might reflect the variable quality of marital relationships, as being in an unsatisfying marriage might undermine mental health to a greater extent than being single or divorced (Thomas, Liu, & Umberson, 2017; Williams, 2003).

4.1.4. Time since diagnosis

Time since diagnosis did not significantly moderate the relationships between acceptance of cancer and general distress, anxiety, or depressive symptoms, suggesting that acceptance may be equally important at different phases of the cancer trajectory. As patients cope with initial diagnosis, or different phases of treatment or end-of-life care, acceptance may play a critical role in regulating emotions. Future longitudinal research should examined this hypothesis at different phases of the cancer trajectory. Additionally, information regarding time since diagnosis was limited and long-term cancer survivors were underrepresented in our analyses.

4.1.5. Stage of cancer

Acceptance of cancer was more strongly correlated with depressive and anxiety symptoms among cancer patients with early-stage disease; however, this finding was not replicated when examining general distress. As advanced-stage cancer patients were underrepresented in the analyses, the results should be interpreted with caution. Additionally, given that many cancer patients do not have an accurate perception of their disease stage (Applebaum et al., 2014), stage of cancer as identified from medical charts might not be an appropriate proxy variable for patients' understanding of their prognosis.

4.2. Limitations

Limitations of included studies should be noted. First, most of the studies were conducted in the United States, and the majority of participants were married middle-aged Caucasian women. In addition, most participants were diagnosed with early-stage cancers within the past 5 years. Given the current variance in sample characteristics, we only examined five demographic and medical variables as potential moderators. Future studies should explore other possible moderators (e.g., cancer type, comorbid medical conditions) in more diverse samples. Also, certain demographics or medical information were not reported in some studies, which led to reduced statistical power for a subset of the moderation analyses. The measurement of acceptance is another limitation, with all studies assessing it as a unitary construct that does not include all aspects of our conceptual definition. We contend that acceptance of cancer may be a multifaceted construct (e.g., acceptance of death, changes in physical appearance, reduced self-sufficiency). Therefore, measure development is required in order to identify potentially distinct associations of acceptance facets with distress and determine if these associations differ by gender or other moderating factors. Additionally, few authors using the COPE or Brief COPE reported whether the instructions were revised to refer to acceptance of cancer-specific stressors. However, it is likely that many patients considered their cancer experience when completing these measures, as the original instructions focus on coping with stressful life events.

Other study design and reporting issues warrant attention. First, in order to maximize the sample sizes and reduce the impact of third

variables, all of our analyses were based on baseline correlational data. Thus, we cannot infer directionality and change over time in the acceptance of cancer-distress relationships. It is possible that increased acceptance is a result of reductions in distress, a hypothesis that may be tested in future longitudinal investigations. Additionally, as in prior reviews, our analysis of study reporting quality showed that many researchers did not report information such as the determination of sample size or reasons for non-participation, thereby lowering their reporting quality and limiting our ability to evaluate their research procedures. Even though moderation analyses for study reporting quality did not suggest that this was a significant concern, greater transparency in study reporting would improve readers' ability to evaluate findings. Finally, as in previous reviews, our meta-analytic results may be affected by publication bias (i.e., the file drawer problem). However, we attempted to minimize this limitation by including unpublished results (e.g., dissertations, conference abstracts), and analyses of publication bias suggested that this was not a significant concern.

4.3. Directions for future research

4.3.1. Measurement of acceptance of cancer

Current measures do not assess certain aspects of acceptance (e.g., behavioral willingness) and acceptance of specific cancer-related stressors (e.g., role changes). Multifaceted measures of acceptance are needed that incorporate patients' perspectives through cognitive interviewing. Developing behavioral indices of acceptance focused on value-based action related to the cancer experience (e.g., adherence to goal-concordant medical care) would advance intervention research.

4.3.2. Acceptance in relation to attention monitoring and cognitive appraisal

According to Monitor and Acceptance Theory (MAT) (Lindsay & Creswell, 2017), acceptance and attention monitoring skills together explain how mindfulness leads to reduced distress, raising the question as to whether acceptance without attention monitoring is sufficient for improving psychological outcomes. As none of the studies included in our meta-analyses measured attention monitoring, future research should test this hypothesis.

Additionally, some theorists contend that as part of mindfulness, acceptance has a critical role in promoting positive reappraisal (i.e., mentally reconstructing the illness and related stressors as meaningful or growth promoting), which confers mental health benefits (Garland et al., 2010, 2015). Although greater acceptance is correlated with more positive reappraisal in cancer patients (e.g., Bright & Stanton, 2018), the directionality of this relationship should be tested. Alternatively, acceptance might initially require cognitive control or non-appraisal in order to overcome habitual emotional reactivity (Tang, Hölzel, & Posner, 2015), and over time, cognitive control efforts may not be required to facilitate acceptance. Research is needed to test these hypotheses.

4.3.3. Acceptance and positive psychological outcomes

Positive psychological outcomes (e.g., meaning in life, benefit finding, posttraumatic growth, courage, self-compassion, value clarification, positive emotions) in relation to acceptance of cancer have received less attention (Butts & Gutierrez, 2018; Garland et al., 2010; Garland et al., 2015; Gilbert & Choden, 2014; Hayes et al., 2006; Park, 2010). While Park (2010) contended that acceptance of a stressor is an outcome of the meaning-making process, acceptance may also be part of an active meaning-making process (Garland et al., 2017), leading to more effective meanings-made or growth, and, in turn, reducing distress. Acceptance can also be conceptualized as a profound act of courage and self-compassion (Gilbert & Choden, 2014; Neff, 2003). Research is needed to test these competing conceptualizations of acceptance.

4.3.4. Acceptance of cancer in a medical context

In a cancer context, acceptance involves acknowledging one's disease stage, prognosis, and available treatment options. However, up to 75% of cancer patients do not have an accurate understanding of their disease stage or prognosis (Applebaum et al., 2014), which may, in part, reflect a lack of acceptance.

Additionally, acceptance of cancer might impact patients' engagement in medical decision-making. For example, patients with greater acceptance of their advanced cancer might be more willing to have end-of-life discussions, which may result in higher rates of advance care planning and enrollment in hospice compared to patients with less acceptance. Longitudinal studies are needed to investigate the potential predictive value of acceptance in medical decision-making while taking into account patients' prognostic awareness and their values.

4.3.5. Acceptance of cancer in a social and cultural context

Most cancer patients have a primary family caregiver who shares the psychosocial burden of the illness. Caregiver support may facilitate patient acceptance through enhanced emotional and cognitive processing of cancer information and meaning-making. Additionally, the majority of studies on acceptance of cancer have been conducted in the United States, and few studies have included information on patients' and caregivers' religious or spiritual beliefs and practices. Future cross-cultural studies are needed, as the meaning of acceptance of cancer for patients and caregivers depends on cultural and religious worldviews.

4.4. Implications for clinical practice and intervention research

Our findings have a number of implications for clinical practice and intervention research. First, our results contribute to a growing body of research suggesting that interventions fostering acceptance in cancer patients might improve mental health outcomes (Hulbert-Williams et al., 2015; Zhang et al., 2015). Reviews examining the effects of MBCT and MBSR in cancer patients showed moderate to large effects on anxiety and depressive symptoms (ds = 0.28–0.90) (Haller et al., 2017; Zhang et al., 2015). Additionally, pilot findings suggest that ACT leads to significant improvement in acceptance and reductions in distress outcomes in cancer patients (Fashler et al., 2018; Hulbert-Williams et al., 2015). Overall, our findings in combination with these trial results suggest that acceptance of cancer-related experiences might be targeted in interventions aiming to improve mental health in cancer patients. As the evidence for mindfulness-based interventions grows, clinicians have effectively disseminated them in cancer centers and cancer support groups (Shennan, Payne, & Fenlon, 2011).

Our findings also tentatively suggest that acceptance of cancer may benefit a number of patient subgroups (e.g., men and women, patients at different periods since diagnosis). However, a number of our moderation findings were mixed and limited by the small sample sizes for certain subgroups. Thus, recommendations regarding the targeting or tailoring of acceptance-based interventions to cancer patient subgroups are premature.

Regarding intervention research, identifying mechanisms of change in mindfulness and acceptance-based interventions for cancer patients is an important future direction. Recent reviews of studies with primarily healthy adults found promising evidence that changes in acceptance, mindfulness, rumination, worry, and self-compassion are potential mechanisms underlying the mental health benefits of mindfulness- and acceptance-based interventions (Alsubaie et al., 2017; Gu, Strauss, Bond, & Cavanagh, 2015). In addition, it is not clear whether acceptance, mindfulness more broadly (including acceptance and attention monitoring), or a combination of the aforementioned variables is the critical mechanism of change leading to psychological improvement. Two recent studies comparing attention monitoring training to acceptance and attention monitoring training in healthy adults found that the latter group had greater reductions in distress reactivity (Lindsay, Chin, et al., 2018; Lindsay, Young, Smyth, Brown, & Creswell,

2018). However, the pain literature has produced mixed evidence of the mediating role of acceptance in acceptance-based interventions (Elvery, Jensen, Ehde, & Day, 2017; McCracken & Gutierrez-Martinez, 2011). Future research may examine other potential mechanisms of change in acceptance-based interventions with cancer and other medical populations, such as meaning-making, value clarification, and value-based action. Finally, future research could focus on identifying therapist behaviors that may promote acceptance of cancer such as processing patients' understanding of their diagnosis and its impact on their life or guiding patients through mindfulness exercises.

5. Conclusion

Consistent with our integrated model of acceptance based on coping theory (Lazarus & Folkman, 1984) and third wave theories (Hayes et al., 1999; Kabat-Zinn, 1990; Linehan, 1993; Segal et al., 2002), we found that greater acceptance of cancer was related to reduced distress. We also found preliminary evidence that acceptance of cancer might have a greater impact on the mental health of older age groups, singles, and those with early-stage disease. Findings suggest that links between acceptance of cancer and psychological outcomes warrant further study in mindfulness and acceptance-based intervention trials. Critical next steps include developing multifaceted measures of acceptance of cancer, clarifying the directionality of the acceptance-distress relationship, and identifying psychological and social processes that facilitate acceptance.

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Contributors

Authors E.S. and C.E.M. developed the idea for the manuscript and the hypotheses. Author D.B.T. conducted part of the literature searches and coding. Author S.A.J. contributed to theoretical synthesis. Author E.S. conducted the literature searches and statistical analyses and wrote the first draft of the manuscript. All authors contributed to subsequent revisions and have approved the final manuscript.

Conflict of interest

The authors declare that they have no conflicts of interest.

Declarations of interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cpr.2019.05.001.

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