

## POSTTRAUMATIC GROWTH IN ADULT CANCER PATIENTS: AN UPDATED SYSTEMATIC REVIEW

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**ABSTRACT:** The current systematic review is an updated analysis of studies with adult cancer patients, regarding factors associated with posttraumatic growth (PTG), which is defined as perceived positive changes after traumatic event, such as cancer. A systematic review was conducted according to the PRISMA Statement guidelines. Seven electronic databases were searched. Quantitative studies with or without psychosocial group intervention that assessed PTG or similar construct (benefit finding [BF], positive life changes, stress-related growth, growth) as main outcome were included. The initial systematic search yielded 659 papers, published between 2006 and 2015. From those, 81 studies fulfilled the inclusion criteria: 73 studies without intervention and 8 entailing an intervention program. The results suggested that socio-demographic (e.g. age, educational level, household income), clinical (e.g. stage of cancer), cognitive (e.g. intrusiveness, challenge to core beliefs), coping-related (e.g. positive reframing, religious coping) and other psychosocial variables (e.g. social support, optimism, spirituality) are positively associated with PTG. BF is associated with gender, marital status, cancer stage, both cancer and treatment type, positive active coping, positive reappraisal, social support and optimism. Psychosocial group interventions with cancer patients show significant effect on the increase of growth reported (PTG or BF). As conclusion, Growth following a cancer experience is an effect of several variables which might be targeted and promoted in the context of multidisciplinary teams, in hospital and clinical settings. Group interventions are a favorable context to the development of PTG after cancer, but interventions that assess PTG as primary outcome are still needed to evaluate the effect of group on PTG' facilitation.

**Keywords:** growth, posttraumatic growth, benefit finding, cancer

## CRESCIMENTO PÓS-TRAUMÁTICO EM ADULTOS COM CANCRO: UMA REVISÃO SISTEMÁTICA ATUALIZADA

**RESUMO:** A presente revisão sistemática é uma análise atualizada de estudos com adultos com cancro, em relação aos fatores associados ao crescimento pós-traumático (CPT), o qual é definido como mudanças positivas percebidas após um acontecimento traumático como cancro. Esta revisão sistemática foi conduzida de acordo com as diretrizes da PRISMA. A pesquisa foi efetuada utilizando sete base de dados e os seguintes critérios de inclusão:

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estudos quantitativos com ou sem intervenção em grupo que avaliaram o CPT, ou constructo semelhante (benefícios percebidos [BP], mudanças de vida positivas, crescimento relacionado ao stress, crescimento), como resultado principal foram incluídos. De 659 artigos, publicados entre 2006 e 2015, 81 estudos preencheram os critérios de inclusão: 73 estudos sem intervenção e 8 estudos com programa de intervenção. Os resultados indicam que variáveis sócio-demográficas (e.g., idade, educação, estatuto sócio-económico), clínicas (por exemplo, estadio do cancro), cognitivas (e.g., pensamentos intrusivos, mudança de crenças centrais), relacionadas com o *coping* (e.g., reestruturação positiva, *coping* religioso) e outras variáveis psicossociais (e.g., apoio social, otimismo, espiritualidade) estão positivamente associadas ao CPT. BP está associado ao género, ao estado civil, ao estadio do cancro, ao tipo de cancro, ao tipo de tratamento, coaching ativo positivo, reavaliação positiva, apoio social e otimismo. As intervenções do grupo psicossocial com pacientes com câncer apresentam efeito significativo no aumento do relatório de crescimento (CPT ou BP). Como conclusão, o crescimento após uma experiência de cancro é um efeito de várias variáveis que podem ser direcionadas e promovidas por equipas multidisciplinares em contextos hospitalares e clínicos. As intervenções em grupo são um contexto favorável ao desenvolvimento de CPT após o câncer, mas as intervenções que avaliam o CPT como resultado primário ainda são necessárias para avaliar o efeito do grupo na facilitação do CPT.

*Palavras-chave:* crescimento, crescimento pós-traumático, benefícios percebidos, cancro

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Recebido em 22 de Fevereiro de 2018/ Aceite em 04 de Junho de 2018

During the last decades there has been an increase in the number of cancer diagnoses. According to World Health Organization (WHO, 2015), about 14 million new cases emerge every year, of which 8.2 million ultimately die. Having cancer represents an experience associated with multiple stressors. Due to a sudden and unexpected diagnosis, cancer can be a traumatic experience, which induces strong emotional responses, such as stress, anxiety, depression or Post-Traumatic Stress Disorder (PTSD) (Barskova & Oesterreich, 2009).

Although the majority of studies have been focusing on the negative outcomes of cancer experience, there has been recent empirical studies showing a perception of positive changes after cancer. Posttraumatic Growth (PTG) has been recognized in the literature as the mainstream concept to define these positive changes, which accrue from the subject's attempts to cope with trauma (Tedeschi & Calhoun, 1996; 2004).

Such as PTG, benefit finding (BF) is also another mainstream concept to define positive changes after trauma; however, they appear to be different constructs. According to Mols and colleagues (2009), BF develops immediately after the traumatic experience, whether PTG develops through time, since it is a product of successive rumination and cognitive restructuring. As a consequence, BF appears to be more superficial and fleeting, unlike PTG that changes the individual way of living and perceiving oneself (Harding et al., 2014). Other authors suggested the same idea, emphasizing that PTG originates self-related changes, unlike BF, which causes life style and behavioral changes (Koutroli et al., 2012; Lelorain et al., 2010). Being a complex and dynamic process, PTG occurs in interaction with multiple factors, which influence the subjective perception of the traumatic event (Tedeschi and Calhoun, 2004). The PTG model (Tedeschi & Calhoun 1996; 2004) lists several variables as facilitators to the development of PTG, such as environmental characteristics (e.g. social support), event characteristics (e.g. duration), or coping strategies (e.g. problem-focused coping). Several empirical studies conducted with cancer patients are in line with this model, suggesting that PTG is predicted by the following variables: sociodemographic (e.g. age, educational level, income, marital status) (Bellizzi & Blank, 2006; Cordova et al., 2007; Danhauer et

al., 2013a; Llewellyn et al., 2013); clinical (e.g. stage, type of cancer, type of treatment) (Danhauer et al., 2013a; Thornton et al., 2012); psychological (e.g. anxiety, depression, PTSD) (Cordova et al., 2007; Thornton et al., 2012); physical (e.g. cortisol, immune function, physical exercise) (Diaz et al., 2014; Wang et al., 2014); cognitive (e.g. coping, rumination, core beliefs) (Bellizzi & Blank, 2006; Danhauer et al., 2013b; Llewellyn et al., 2013; Thornton et al., 2012); social (e.g. social support, emotional disclosure) (Danhauer et al., 2013a; Llewellyn et al., 2013); and others such as optimism (Llewellyn et al., 2013), spirituality (Danhauer et al., 2013a), and religiosity (Thuné-Boyle et al., 2011).

Even though there has been empirical evidence about which factors are PTG' predictors in cancer patients, inconsistencies remain relatively to the predictive value of some factors towards PTG, such as PTSD symptoms for example (Cordova et al., 2007; Morrill et al., 2008). In an effort to shed light on this construct, some systematic reviews have been conducted (Casellas-Grau, Font, & Vives, 2014; Casellas-Grau, Ochoa, & Ruini, 2017; Harding et al., 2014; Kolokotroni et al., 2014; Koutroli et al., 2012; Shand et al., 2015; Stanton et al., 2006). However, these inconsistencies are still to be clarified in the light of current empirical and intervention studies.

Hence, there is still a need to further systematize the available results in order to offer both clinicians and researchers a better understanding about the predictors of the development of personal growth in the aftermath of cancer, and new evidences of relationships between personal growth after cancer and psychological and physical variables that, until now, were not covered by past studies. Also, we intend to explore some aspects neglected by previous systematic reviews, such as: a) the inclusion of studies with similar concepts, for example BF, stress-related growth, and positive life changes, since the independence of these concepts and PTG has not been fully demonstrated (Kolokotroni et al., 2014; Koutroli et al., 2012); b) the inclusion of different types of cancer, since the previous reviews only included a specific type of cancer such as breast (Kolokotroni et al., 2014; Koutroli et al., 2012) or head and neck cancer (Harding et al., 2014); c) the inclusion of intervention studies in addition to empirical studies (Casellas-Grau et al., 2014; 2017; Harding et al., 2014; Kolokotroni et al., 2014; Shand et al., 2015); and d) the assessment of risk of bias of the empirical articles (Kolokotroni et al., 2014; Koutroli et al., 2012).

With the purpose to fill these gaps, this updated review will include studies with both PTG and BF (or similar constructs defining the perceived positive changes after a traumatic event) and will assess the quality of the included studies. The objectives of the current systematic review are as follows: to analyze the presence of growth in patients with the diagnosis of cancer; to explore the relationship between growth and clinical, sociodemographic, and psychosocial variables; to discuss the perception about positive changes during the course of different types of cancer; and to contribute to enlarge the scientific and clinical knowledge about PTG in cancer patients.

## METHOD

This systematic review was developed according to APA's Meta-Analysis Reporting Method (APA Publications and Communications Board Working Group on Journal Article Reporting Standards, 2008) and Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement guidelines (Liberati et al., 2009); and had the review record CRD420103012 on the PROSPERO register.

### Inclusion and Exclusion Criteria

Eligible studies were original, published, and empirical (with or without intervention) studies, that had assessed growth in cancer patients and had examined the relationship between growth and at least one socio-demographic, psychological or social variable. Cross-sectional or longitudinal studies were eligible for inclusion as well as quantitative studies, randomized controlled trials (studies with an intervention) and comparative studies. English, French, Spanish and Portuguese papers were included. Additional

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inclusion criteria were the following: In primary studies, positive changes were assessed through the construct of PTG, BF, positive life changes, adversarial growth, or stress-related growth; Growth was evaluated with a valid measure (e.g. Posttraumatic Growth Inventory – original or short form; Benefit Finding Scale); PTG (or similar construct) was defined as primary outcome in empirical studies and as primary or secondary outcome in intervention studies; Study participants were adult patients who had been diagnosed with any type of cancer (e.g. breast, prostate, colon, etc.), who were in phase of diagnosis, treatment, or surveillance. Randomized controlled trials that included any type of psychosocial intervention, conducted by a health professional (e.g. psychologist, nurse, physiotherapist); Individual or group interventions, targeting patients (who adhere individually or with a partner/spouse or other family member) were also included.

Conversely, the exclusion criteria were the following: qualitative studies; mixed methods; meta-analysis, systematic and literature reviews; unpublished researches; book chapters, commentaries and editorials, thesis, or abstracts from Congresses' presentations; studies free of intervention, that assessed PTG as a secondary outcome or as a mediator variable were excluded; However, since most interventions did not directly focus PTG's development, this systematic review included intervention studies which had PTG as a secondary outcome. Studies that measured PTG through open questions and not through valid measures (e.g. PTGI) and studies with interventions only with family members of a cancer patient were also not considered. Articles in which samples included cancer patients in addition to patients from other diseases were also not included in this systematic review. Exclusion criteria related to individual characteristics (e.g. gender or ethnicity) and cancer-related characteristics (e.g. stage, surgery, or metastasis) were not used.

It is important to note that, overlapping samples were found: when different papers reported separate results regarding the same sample or substantially overlapping samples, the distinct papers were assumed as one single study, counting as one entry (e.g. Ruini et al., 2013; 2014).

### Search Strategy

Studies were identified by searching multiple literature databases related to health, medicine and psychology, such as MEDLINE, PsychArticles, PsycINFO, PubMed, Scielo, PePsic, and Web of Science. We restricted the search to studies published between January 2006 and May 2015, since the last systematic review with adult cancer patients had included studies up to the year 2005 (Stanton et al., 2006). The selection of studies for eligibility and data extraction were performed by five independent researchers and possible disagreements were discussed and solved between them.

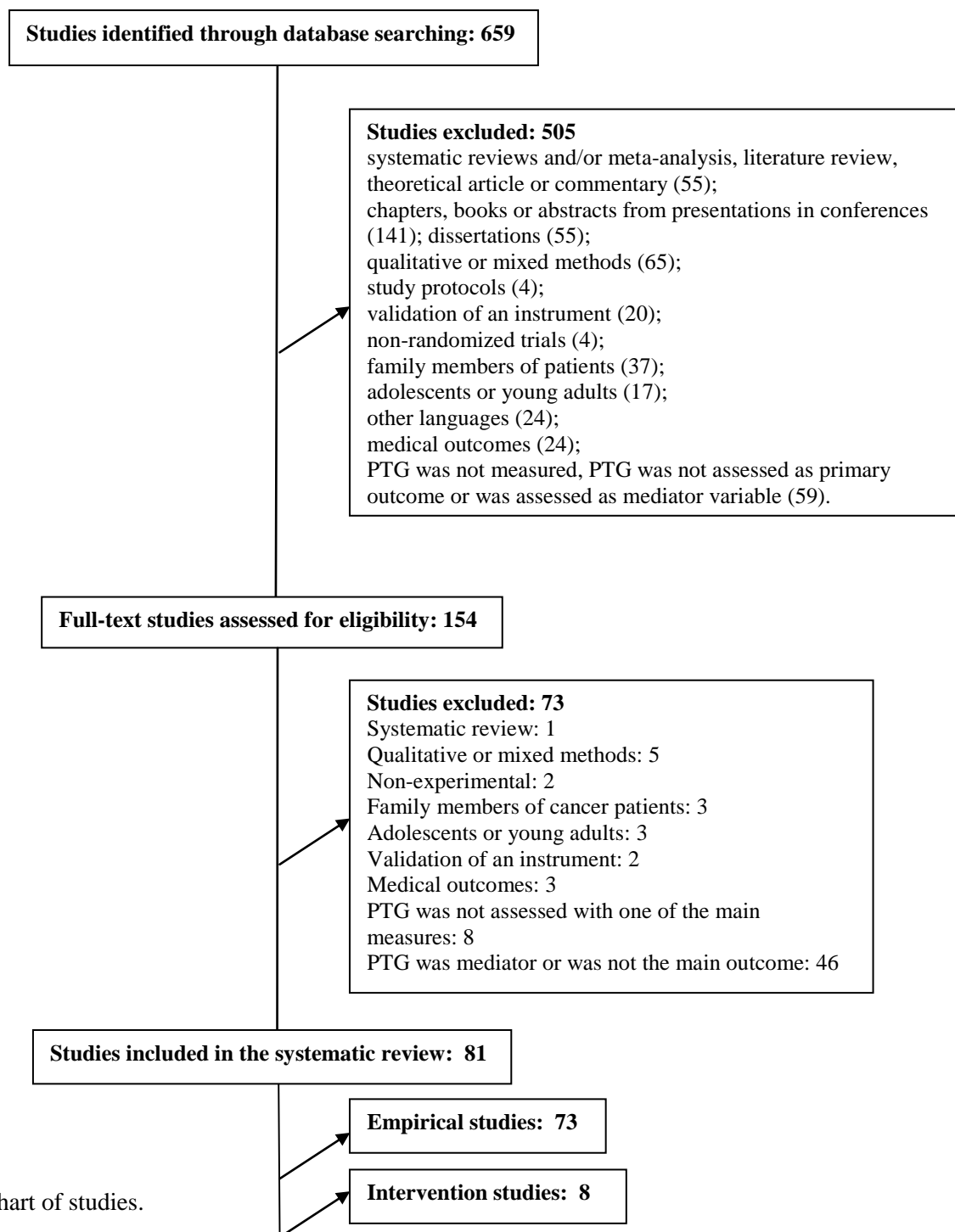
To identify papers addressing growth and cancer the following search terms were used: posttraumatic growth; growth; benefit finding; positive life changes; stress-related growth; cancer; oncological disease; neoplasm; tumor; and carcinoma. In order to select the articles that met the inclusion criteria and to exclude the others that did not meet them, the titles and abstracts were examined. If necessary, and in order to clarify any information, the full papers were also examined.

In order to avoid source selection bias and to ensure an exhaustive and comprehensive search procedure, additional search strategies were applied such as searching of scientific journals which had published relevant articles in this area, analyzing the reference list of primary studies, and exploring other databases such as national library databases.

### Search Results

The initial searches from the databases identified 659 potentially relevant studies. After the examination of the titles, abstracts and full articles, we excluded papers based on inclusion criteria mentioned above. Thus, a total of 578 studies were excluded because they were systematic reviews and/or meta-analysis, literature reviews, theoretical articles or commentaries (56); were chapters, books, or abstracts from presentations in conferences (141); were thesis or dissertations (55); used qualitative or

mixed methodology (70); were study protocols (4); assessed psychometric properties or validated a measure that assessed PTG or similar construct (22); were non-randomized trials or non-experimental studies (6); used only caregivers or family members of patients, as sample (40); used samples consisted of children or adolescents that suffered from cancer (20); were papers written in languages other than the ones mentioned in the inclusion criteria (24); assessed only medical outcomes or PTG as a result of a medical procedure (27); did not measure PTG (or similar construct), PTG was not assessed as primary outcome or was assessed as a mediator variable (105); used open questions to measure PTG, did not use one of the main growth measures or used changed versions (without previous validation) of the measure (8). Figure 1 displays a flowchart of studies.



**Fig. 1.** Flowchart of studies.

### Quality Assessment

The final sample consists of 81 eligible studies and the general quality of each study was assessed using a 29-item check-list adapted from the Quality Assessment Tool – Cochrane’s Handbook (Higgins & Green, 2011). Accordingly, the quality from each study was assessed by the evaluation of the following items: 1) introduction (e.g., background of the existing literature); 2) objectives (description of objectives and/or hypothesis of the study); 3) study design; 4) sampling process; 5) participants’ recruitment; 6) sample size calculation; 7) inclusion and exclusion criteria; 8) data collection locals (name and/or other characteristics of data collection locals); 9) ethic committee’ approval; 10) differences between groups (description of the identification and/or resolution of the differences between groups); 11) identification of the existent conditions/groups – e.g. control vs. treatment; 12) randomization method description; 13) description of the intervention for the experimental group; 14) description of the intervention for the control/alternative group; 15) study’ costs; 16) assessments (description of how, who and where were carried out); 17) blind assessment; 18) drop-outs (numbers and/or reasons for drop-outs); 19) socio-demographic characteristics; 20) cancer-related characteristics; 21) measures (description and/or psychometric properties); 22) statistical analysis; 23) results (detailed and adequate description of the results); 24) discussion (literature-based discussion of the results); 25) generalization (or not) of the results; 26) limitations; 27) registration of the intervention program; 28) sources of funding; and 29) conflict of interests. It is important to note that the items 12, 13, 14, and 27 were exclusive to studies that encompassed a group intervention.

The majority of the 29 items was scored through a scale consisted of three points from 0 to 2: 0 (not done / or not reported), 1 (done but unclear and /or reported to some extend), 2 (adequately done and/ or adequately reported) (Higgins & Green, 2011). However, five items were scored from 0 to 3, since they accumulated more than one aspect needed to be assessed in the context of quality evaluation; an example of this was the item that assessed the quality of the measures’ report (0 - not done; 1- done but not clear; 2- reported without psychometric characteristics; 3- reported, including psychometric characteristics).

Five researchers independently assessed the quality of the included studies. The inter-rater agreement between pairs of two researchers was calculated on 65 papers (80%) through the Cohen’s Kappa and the averages were good, as following: .966; .963; .943; .898; .801. Disagreements in quality assessment were resolved by consensus between pairs of two researchers. Remain divergences were clarified by the researcher CR.

A summary of the quality assessment is presented in table 1 for cross-sectional studies, and in table 2, for longitudinal and intervention studies.

**Table 1.**  
Quality assessment of cross-sectional studies

Article	1	2	3	4	5	6	7	8	9	15	16	18	19	20	21	22	23	24	25	26	28	29	Total
Andrykowski et al. [2]	2	3	1	2	2	0	2	2	2	2	1	0	2	1	2	2	2	2	0	2	2	0	34
Baník & Gajdošová [4]	2	2	0	1	2	0	2	1	2	0	2	0	2	2	2	2	2	2	0	2	0	0	28
Bellizzi & Blank [5]	2	3	2	2	2	2	0	2	2	2	2	3	2	2	3	1	2	2	2	2	2	0	42
Bellizzi et al. [6]	2	3	2	2	1	0	0	2	2	0	1	3	2	2	3	2	2	2	2	2	0	0	35
Bozo et al. [7]	2	3	2	2	1	0	0	2	2	0	2	0	2	2	3	1	2	2	1	2	0	0	31
Büyükaçık-Çolak et al. [10]	2	2	2	2	0	0	0	1	1	0	0	0	1	2	3	0	1	2	0	0	0	0	19
Cavell et al. [12]	1	2	2	2	1	0	2	2	2	0	1	2	2	2	1	1	2	2	2	2	0	0	31
Chan et al. [13]	2	3	2	2	1	0	2	2	2	0	0	0	2	2	3	2	2	2	2	1	0	0	32
Cohen, & Numa [14]	2	3	2	2	2	0	0	2	2	2	2	0	2	2	3	2	2	2	2	2	0	0	36
Cordova et al. [15]	2	3	2	2	2	0	2	2	2	2	2	3	2	2	3	2	2	2	2	2	2	0	43
Cormio et al. [16]	2	2	2	2	1	0	2	2	2	0	2	3	2	1	2	1	2	2	1	2	0	0	33
Crawford et al. [17]	2	3	2	2	1	0	2	2	2	0	2	3	2	2	3	2	2	2	0	2	0	2	38
Diaz et al. [21]	2	3	2	2	2	0	2	2	0	0	1	2	2	1	3	2	2	1	2	2	2	2	37
Dunn et al. [22]	2	3	2	2	2	0	2	2	2	0	2	1	1	1	3	2	2	2	0	2	0	2	35
Garland et al. [23]	2	3	2	2	1	0	2	2	2	0	2	3	2	2	2	2	2	2	0	1	2	2	38
Harrington et al. [25]	2	3	2	2	1	0	3	1	1	0	1	3	2	2	3	1	2	2	2	2	0	0	35
Heidarzadeh et al. [27]	2	2	2	2	1	0	2	2	0	0	1	0	2	2	3	1	2	2	0	2	0	2	30
Ho et al. [28]	2	3	2	2	1	0	0	2	2	0	2	0	2	2	3	1	2	2	2	2	2	0	34
Ho et al. [29]	2	3	2	2	2	0	2	2	2	0	1	2	2	2	3	2	2	2	1	2	0	2	38
Kangas et al. [31]	2	3	2	1	1	0	1	2	2	0	1	0	3	2	2	2	1	2	2	0	2	0	31
Karanci & Erkam [32]	2	2	2	2	2	0	2	2	0	2	2	3	2	2	3	1	2	2	0	0	0	0	33
Kinsinger et al. [34]	2	2	2	2	2	0	2	2	1	0	2	0	2	2	3	1	2	2	2	2	2	0	35
Lelorain et al. [37]	2	3	2	2	2	0	3	2	2	0	2	3	2	2	3	2	2	2	1	2	2	0	41
Li et al. [38]	2	1	2	2	2	0	0	2	2	0	1	0	1	1	3	0	2	2	0	2	0	0	25
Martins da Silva et al. [41]	2	3	2	2	2	0	2	2	2	0	2	3	2	2	3	2	2	2	1	2	1	0	39
Mols et al. [43]	2	2	2	2	2	0	2	2	0	0	2	1	0	2	0	2	2	2	2	2	2	0	31
Morris & Shakespeare-Finch [44]	2	3	2	1	1	0	0	1	2	0	1	0	2	2	3	2	2	2	2	2	0	0	30
Morris & Shakespeare-Finch [45]	2	3	2	2	2	0	0	1	1	0	2	2	2	1	3	2	2	2	0	2	0	0	31
Morris et al. [46]	2	3	2	2	1	0	0	2	0	0	1	2	2	1	3	1	2	2	0	1	0	0	27
Mystakidou et al. [47]	1	2	2	2	0	0	2	2	2	0	0	2	2	1	3	1	2	2	0	2	0	0	28
Mystakidou et al. [48]	2	3	2	2	1	0	2	1	2	2	2	3	2	2	3	2	2	2	0	2	0	2	39
Rahmani et al. [52]	2	2	2	1	1	0	2	1	2	0	2	0	2	1	3	1	2	2	2	2	2	0	32
Rand et al. [53]	1	2	2	2	1	0	2	2	0	2	2	2	1	1	3	2	2	2	0	2	2	0	33
Ruini et al. [54]	2	3	2	2	2	0	2	1	1	2	2	3	2	1	3	2	2	2	0	2	0	0	36
Ruini et al. [55]	2	3	2	2	1	0	1	2	2	2	2	3	2	1	3	2	2	2	1	2	0	2	39
Schmidt et al. [57]	1	2	2	2	2	0	2	1	1	0	2	2	2	1	3	2	2	2	2	2	0	0	33
Schroevens et al. [58]	1	2	2	2	1	0	0	2	0	0	2	2	2	2	3	2	2	2	2	2	0	0	31
Schroevens & Teo [59]	2	3	2	2	2	0	0	1	1	0	2	0	2	1	3	2	2	2	2	2	0	0	31
Smith et al. [63]	2	3	2	2	2	0	2	2	0	0	1	3	2	2	3	0	2	2	2	2	0	0	34
Smith et al. [64]	2	3	2	2	2	0	2	2	2	2	1	0	2	2	3	2	2	2	1	2	2	0	38
Soo & Sherman [65]	2	3	2	2	2	0	1	2	2	0	2	0	2	2	3	2	2	2	2	2	2	2	39
Strack et al. [67]	1	3	2	2	0	0	0	1	0	2	1	0	1	0	2	1	2	1	0	0	0	0	19
Svetina & Nastran [68]	1	2	2	2	2	0	0	2	2	0	1	3	2	2	3	2	2	2	0	0	0	2	32
Tanriverd et al. [70]	1	2	2	2	0	0	0	2	2	0	2	3	2	0	3	0	1	1	0	0	0	0	23
Tanyi et al. [72]	2	2	2	2	1	0	2	2	2	0	2	0	2	2	3	2	2	2	1	2	2	2	37

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Thombre et al. [73]	2	3	2	2	2	0	2	2	2	0	1	3	2	2	3	2	2	2	1	2	2	0	39
Thuné-Boyle et al. [75]	2	3	2	2	2	0	2	2	2	0	2	2	2	0	3	2	2	2	0	2	2	2	38
Wang et al. [78]	2	2	2	2	1	0	2	1	2	0	1	3	2	2	3	2	2	2	1	2	2	2	38
Wilson et al. [80]	2	3	2	2	2	0	1	2	2	0	2	2	2	1	3	2	2	2	0	2	2	2	38
Yu et al. [81]	2	3	2	2	1	0	2	2	2	0	1	2	2	1	3	2	2	2	1	2	2	0	36

0 - not done / or not reported; 1- done but unclear and /or reported to some extend; 2- adequately done and/ or adequately reported.

Table 2.  
Quality assessment of longitudinal and intervention studies

Article	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	Weighted mean
Abdullah et al. [1]	2	2	2	2	1	0	3	1	2	2	—	—	—	—	0	1	—	2	2	2	3	2	2	2	0	2	—	2	2	49
Antoni et al. [3]	1	3	2	2	1	0	2	1	0	0	2	0	2	2	0	2	0	3	2	2	2	2	2	2	2	2	0	2	0	41
Brix et al. [8]	2	3	2	2	1	0	2	1	0	—	—	—	—	—	0	2	—	3	2	2	2	2	2	2	2	2	—	2	2	50
Bussell & Naus [9]	2	3	2	2	1	0	0	2	1	—	—	—	—	—	0	1	—	0	2	2	3	2	2	2	0	2	—	0	0	38
Cameron et al. [11]	2	3	2	0	1	0	2	2	2	—	2	—	—	—	0	2	—	3	2	2	2	2	2	2	2	2	—	2	0	49
Danhauer et al. [18]	2	3	2	2	1	0	2	2	0	0	—	—	—	—	0	1	—	2	2	2	3	2	2	2	2	2	—	2	0	45
Danhauer et al. [19]	2	3	2	2	2	0	2	2	2	—	—	—	—	—	1	2	—	1	2	2	3	2	2	2	2	2	—	2	2	55
Danhauer et al. [20]	2	3	2	2	2	0	2	2	0	—	—	—	—	—	0	1	—	3	2	1	1	2	2	2	0	2	—	2	2	46
Garlick et al. [24]	2	3	2	2	2	0	3	1	0	0	0	—	2	0	0	2	0	0	2	1	2	2	2	2	1	2	0	2	0	35
Hawkes et al. [26]	2	3	2	2	1	0	2	2	2	0	0	1	2	0	0	1	0	0	2	1	2	2	2	2	1	2	2	2	2	40
Kállay & Baban [30]	2	2	2	0	1	0	0	2	0	—	—	—	—	—	0	1	—	1	1	1	2	1	1	1	0	2	—	0	0	26
Kent et al. [33]	2	3	2	2	1	0	2	2	2	0	—	—	—	—	0	1	—	3	2	2	3	2	2	2	2	2	—	2	2	52
Labelle et al. [35]	2	2	2	2	2	0	2	1	2	2	1	—	—	—	0	2	0	3	2	2	2	3	2	2	2	2	0	2	0	47
Lechner et al. [36]	2	2	2	2	1	0	0	1	0	—	—	—	—	—	0	1	—	2	2	2	1	1	2	2	2	2	—	2	0	38
Liu et al. [39]	2	3	2	2	2	1	2	2	2	—	—	1	—	—	0	1	—	2	2	2	3	2	2	2	1	2	—	1	2	52
Llewellyn et al. [40]	1	2	2	2	0	0	3	1	1	—	—	—	—	—	0	1	—	3	0	0	3	2	2	2	0	2	—	2	0	38
McDonough et al. [42]	2	3	2	1	2	0	2	0	1	—	—	—	—	—	0	1	—	0	1	2	3	2	2	2	2	2	—	2	0	42
Park et al. [49]	2	3	2	2	2	0	2	2	0	—	—	—	—	—	0	2	—	2	2	1	3	2	2	2	2	2	—	2	0	49
Pat- Horenczyk et al. [50]	1	3	2	0	2	0	2	2	1	—	—	—	2	2	0	1	—	2	2	2	3	2	2	1	1	2	—	0	0	42
Posluszny et al. [51]	2	1	2	2	1	0	2	2	2	1	1	—	—	—	1	1	—	1	2	2	3	2	2	2	1	2	—	0	0	42
Salsman, et al. [56]	2	3	2	2	2	0	3	2	2	—	—	—	—	—	2	2	—	3	2	2	3	2	2	2	2	2	—	0	0	55
Schultz & Mohamed [60]	2	1	2	2	1	0	1	1	0	—	—	—	—	—	0	1	—	2	1	1	3	1	2	2	0	0	—	0	0	30
Scignaro et al. [61]	2	3	2	2	1	0	2	1	2	—	—	—	—	—	0	1	—	3	2	2	3	2	2	2	2	2	—	0	0	48
Silva et al. [62]	2	3	2	2	1	1	2	1	2	2	—	—	—	—	0	1	—	3	1	1	3	1	2	2	1	2	—	0	0	44
Stafford et al. [66]	2	3	2	2	2	0	2	1	1	—	—	—	2	—	0	1	0	2	2	2	3	2	2	2	0	2	0	2	1	44
Tang et al. [69]	2	2	2	2	2	0	2	1	2	3	—	—	—	—	0	1	—	3	2	1	2	2	2	2	2	2	—	2	2	52
Tanyi et al. [71]	2	3	2	2	2	0	2	2	2	2	—	—	—	—	1	2	—	2	2	2	3	2	2	2	2	2	—	0	0	52
Thornton et al. [74]	2	3	1	2	2	0	3	2	2	—	—	—	—	—	0	2	—	3	2	2	3	2	2	2	0	2	—	2	2	54
Tomich & Helgeson [76]	2	3	2	2	1	0	1	1	2	—	—	1	—	—	0	1	1	3	2	2	3	2	2	2	1	2	1	2	0	45
Wang et al. [77]	2	2	2	2	1	0	2	1	1	1	—	—	—	—	2	2	—	2	2	2	3	2	2	2	2	2	—	2	0	49
Wang et al. [79]	2	2	2	2	1	0	3	1	2	—	—	—	—	—	0	1	—	2	2	2	3	2	2	2	0	2	—	2	2	49

0 - not done / or not reported; 1- done but unclear and /or reported to some extend; 2- adequately done and/ or adequately reported.



Data Extraction

Both study selection procedure and data extraction were carried out by the five independent researchers. Discrepancies related to the data extraction were discussed between the five researchers in consensus meetings.

Table 3 in the Supplementary Material summarizes the main characteristics of the 73 non-intervention studies: a) study (authors, date); b) number of participants; c) cancer type; d) cancer stage; e) time since diagnosis; f) design; g) measure of growth (i.e., instrument used to assess growth and mean and standard deviation of growth); h) other variables (namely, additional variables assessed and respective measures used to evaluate each of them); i) main outcomes (factors associated with or predictors of growth). These characteristics were selected in order to advance the understanding of the relations between growth and sociodemographic, psychological and social variables among adult patients diagnosed with cancer. The intervention studies were characterized regarding the same features; additionally the type of the intervention was included, as shown in table 4 in the Supplementary Material.

Table 3.  
Characteristics of empirical studies without intervention

Study (Authors, date)	<i>n</i>	Cancer	Time since cancer	Design	Scale	Total score M (SD)	Variable	Scale	Outcomes (Factors associated with growth)
Abdullah et al. [1]	50 (33 men; 17 women)	Head and neck  (Stage I-IV)	Range 0-12 months	Longitudinal T1= within 1 year diagnosis; T2 = 6 months after T1	PTGI -SF	Nr	Gender, age, monthly income, education status, diagnosis, stage of cancer, treatment, anxiety and depression	HADS <sup>1</sup>	The correlations between PTG, depression and anxiety were not significant at T1. Anxiety and depression did not predict PTG, longitudinally.
Andrykowski et al. [2]	242 (190 lung cancer survivors (LC); 152 healthy controls (HC) )	Lung  (Stage nr)	<i>M</i> = 15,7 months; <i>SD</i> = 2.30 months	Cross-sectional	PTGI	LC ( <i>M</i> = 50.1; <i>SD</i> = 28.3); HC ( <i>M</i> = 38.5; <i>SD</i> = 30.3)	Physical comorbidity	List of items	The LC group reported greater PTGI scores and greater growth for 3 of 5 subscales.  The LC group was more likely to report PTG in the areas of social relationships and appreciation for life.
Baník and Gajdošová [4]	72 (35 men; 37 women)	Hematological (Non-Hodgkin lymphoma, Hodgkin lymphoma, myeloma, leukemia)  (Stage nr)	6 months-1 year: <i>N</i> = 19; 1-2 years: <i>N</i> = 10 2-5 years: <i>N</i> = 15; Over 5 years: <i>N</i> = 28	Cross-sectional	PTGI BFS -C <sup>110</sup>	nr	Age, type of cancer, tolerance to physical distress, positive findings, hope, optimism	DTS <sup>2</sup> AHTS <sup>3</sup> LOT-R <sup>4</sup>	Higher perceptions of BF and greater effort to regulate feelings of distress predict PTG.
Bellizzi and Blank [5]	224 women	Breast  (Stage I-IV)	Range = 1 year out from treatment to 4 years posttreatment	Cross-sectional	PTGI	nr	Age, education, employment, children, children at home, ethnicity, prior health, time since diagnosis, type of cancer, treatment, optimism, hope, coping, intensity-impact of cancer	LOT-R HS <sup>5</sup> Brief COPE <sup>6</sup>	Age, marital status, employment, education, perceived intensity of disease, and active coping were the main predictors of PTG.
Bellizzi et al. [6]	802 women	Breast  (Stage I-IIIa)	<i>M</i> = 6.1 months	Cross-sectional	PTGI	<i>M</i> = 47.4 <i>SD</i> = 28.1	Age, employment, race, optimism, religiosity, time since diagnosis, stage of disease, health-related quality of life, optimism, religiosity	SF-36 <sup>7</sup> LOT-R DRI <sup>8</sup>	Non-significant differences were found between ethnicity and PTG. PTG was inversely associated with HRQOL. Older age, being unemployed, lower disease stage was associated with lower PTG.
Bozo et al. [7]	104 women	Breast  (Stage I-IV)	<i>M</i> = 29.15 months <i>SD</i> = 49.88 months	Cross-sectional	PTGI	<i>M</i> = 21.39 <i>SD</i> = 7.54	Optimism, perceived social support	LOT-R MSPSS <sup>9</sup>	Higher dispositional optimism and greater social support were significant predictors of PTG.
Brix et al. [8]	1350 (684 women; 666 healthy control)	Breast  (Stage 0-III)	<i>M</i> = 6.9 years Range 0.5 to 15.5 years	Longitudinal T1 = Baseline; T2 = 13-17 years after T1	PTGI	<i>M</i> = 36.0 <i>SD</i> = 34.2	Age, education, time since operation, tumor size, number of positive lymph nodes, type of surgery, chemotherapy, radiotherapy, endocrine treatment		No statistically significant difference in overall PTG is observed between BC women and BC-free women. Among women with BC, time since operation, tumour size, number of positive lymph nodes, mastectomy were positively associated with overall PTG. Age was negatively associated with PTG.

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Bussell and Naus [9]	24 women	Breast (Stage nr)	Nr	Longitudinal  T1 = undergoing chemotherapy; T2 = 2 year after T1	PTGI (at T2)	Nr	Coping, distressed mood, depression, anxiety, fatigue, symptoms, perceived stress	Brief COPE PSS <sup>10</sup> BFI <sup>11</sup> BAI <sup>12</sup> BDI <sup>13</sup> POMS <sup>14</sup>	Use of religion (T1) predicts PTG (T2) At T2, using religion, positive reframing, and acceptance predicts PTG (T2). Instrumental and emotional support are associated to higher PTG. Lower perceived stress is marginally related to PTG.
Büyükaşık-Çolak et al. [10]	90 women	Breast (Stage I-IV)	<i>M</i> = 12.54 months Range = 2-60 months	Cross-sectional	PTGI	Nr	Optimism, coping	LOT-R WCI <sup>15</sup>	Problem-focused coping and emotion-focused coping were significant predictors of PTG.
Cavell et al. [12]	92 (68 men; 24 women)	Neck and head; Larynx; Pharynx; Oral; Other.  (Stage I-IV)	Range = 12-18 months	Cross-sectional	BFS	<i>M</i> = 52.13 <i>SD</i> = 19.06	Age, gender, ethnicity, disease stage, treatment, site of primary disease, time since diagnosis, baseline unmet needs, quality of life, depression, anxiety, fear of recurrence, coping	HNCQOLS <sup>16</sup> PHQ <sup>17</sup> Brief STAI <sup>18</sup> Brief COPE	European ethnicity, Maori/Pacific Island ethnicity and active coping strategies were significant predictors of BF.
Chan et al. [13]	170 women	Breast (Stage 0-III)	<i>M</i> = 15.59 months <i>SD</i> = 5.84 months	Cross-sectional	PTGI	nr	Positive and negative attention bias, rumination, PTSD symptoms	APNIS <sup>19</sup> CRRS <sup>20</sup> IES-R <sup>21</sup>	Positive attentional bias and positive cancer-related rumination were positively related to PTG. Negative attentional bias and negative cancer-related rumination were not related to PTG.
Cohen and Numa [14]	124 women (84 volunteers; 40 non-volunteers)	Breast (Stage nr)	Volunteers ( <i>M</i> = 12.5 years; <i>SD</i> = 7.3 years) Non-volunteers ( <i>M</i> = 7.4 years; <i>SD</i> = 5 years)  Range = 7 to 12 years	Cross-sectional	PTGI	Volunteers ( <i>M</i> = 69.86; <i>SD</i> = 19.73)  Non-volunteers ( <i>M</i> = 70.72; <i>SD</i> = 15.02)	Education, years since diagnosis, type of surgery, self-reported health, emotional expression and emotional processing, cognitive processing, perceived social support	EEPS <sup>22</sup> CPS <sup>23</sup> MSPSS	Participants in both groups reported similar and relatively high levels of PTG. PTG was not associated with education, years since diagnosis, and type of surgery. PTG was positively associated with: emotional processing, cognitive processing, and social support. In comparison with volunteer group, in the non-volunteer group, a high and significant correlation between self-reported health and PTG.
Cordova et al. [15]	65 women	Breast (Stage I-II)	<i>M</i> = 9.4 months <i>SD</i> = 6.4 months	Cross-sectional	PTGI	<i>M</i> = 57.8 <i>SD</i> = 25.4	Age, education, surgery, social constraints, PTSD symptoms, stressfulness of the cancer experience	PCL-C <sup>24</sup> SCS <sup>25</sup>	Younger age, higher education and perception of cancer as a traumatic event predict PTG.
Cormio et al. [16]	360 (57 men; 303 women)	Breast; Colorectal; Lymphomas; Genital; Others (Stage nr)	<i>M</i> = 11 years of survival Range = 5-32 months	Cross-sectional	PTGI	<i>M</i> = 36.63 <i>SD</i> = 25.64	Age, comorbidities, physical activity, coping, perceived social support, health behaviours	Brief COPE MSPSS	Predictors of PTG (positive association) were: physical activity, social support from family and friends, positive reframing, humour and religious coping. Age and comorbidities were negative significant predictors of PTG.
Crawford et al. [17]	621 women	Gynaecological (Ovarian, endometrial, cervical) (Stage nr)	<i>M</i> = 118 months <i>SD</i> = 77 months	Cross-sectional	PTGI BFS	Nr	Exercise, impact of cancer, benefit finding	IOC <sup>26</sup> GLTEQ <sup>27</sup> Strength exercise	Aerobic exercise and combined (strength and aerobic) were positively associated with the PTG.
Danhauer et al. [18]	544 women	Breast (Stage I-III)	Median = 4.37 months Range - 0.1 to 7.3 months	Longitudinal  T1 = 8 months of diagnosis; T2 = 6 months; T3 = 12 months; T4 = 18 months after T1	PTGI	nr	Age, education, stage of cancer, social support, spirituality, coping, general health-related quality of life, optimism, illness intrusiveness	RAND <sup>28</sup> FACIT-Spiritual Well-being <sup>29</sup> Brief COPE SF-36 LOT IIRS <sup>30</sup>	Higher PTG was associated with education level, longer time since diagnosis, greater baseline level of illness intrusiveness, increases in social support, spirituality, use of active-adaptive coping strategies, and mental health.
Danhauer et al. [19]	37	Leukemia (Stage nr)	nr	Longitudinal  T1 = week 0 or within 7 days of diagnosis and/or admission; T2	PTGI	T1 ( <i>M</i> = 53.2; <i>SD</i> = 26.8); T2 ( <i>M</i> = 66.3; <i>SD</i> = 22.5); T3 ( <i>M</i> = 73.1; <i>SD</i> = 20.4)	Current mood, severity and impact of cancer-related symptoms, sleep quality, spiritual well-being, social constraints, rumination,	POMS-SF MDASI <sup>31</sup> WHIRS <sup>32</sup> FACIT-Sp SCS CBI <sup>33</sup>	Greater number of days from baseline, younger age, greater deliberate rumination and greater challenge to core beliefs were associated with greater PTG over time.

				= weeks 5–6 or prior to discharge from the hospital if patient was discharged prior to week 5; T3 = approximately weeks 9–13 upon readmission for consolidation chemotherapy			perceived threat, core beliefs		
Danhauer et al. [20]	653 women	Breast (Stage I-III)	Median = 4.7 months; Range = .1–7.3	Longitudinal T1-within 8 months after diagnosis; T2 - 6 months; T3 - 12 months; T4-18 months after T1	PTGI	T1 ( <i>M</i> = 54.0; <i>SD</i> = 23.2) T2 ( <i>M</i> = 56.77; <i>SD</i> = 23.1) T3 ( <i>M</i> = 57.1; <i>SD</i> = 22.9) T4 ( <i>M</i> = 58.4; <i>SD</i> = 22.8)	Race, marital status, education, cancer stage, surgery, age, depressive symptoms, coping strategies, illness intrusiveness, social support	BDI Brief COPE IIRS RAND	Differences among trajectory groups were significantly associated with age, race, chemotherapy, illness intrusiveness, depressive symptoms, active-adaptive coping, and social support. Trajectory groups did not differ significantly by marital status, education, cancer stage, and passive coping strategies. In three trajectories PTG was stable over time. The groups of low and moderate PTG increased over the 2 years and one trajectory increased considerably PTG.
Diaz et al. [21]	99 women	Breast (Stage IV)	25 % = 30 months; 50% = 77 months; 75% = 116 months	Cross-sectional	PTGI	nr	Cortisol	Saliva samples	There was a significant correlation between PTG and diurnal cortisol slope.
Dunn et al. [22]	439 (121 men; 318 women)	Breast, haematological, skin, gastrointestinal, head and neck, respiratory, genitourinary, other (Stage nr)	<i>M</i> = 87.5 weeks <i>SD</i> = 97.4 weeks	Cross-sectional	BFS	Nr	Age, marital status, gender, time since diagnosis, education, public/private, anxiety and depression, quality of life, intrusion and avoidance, social support, social constraints	HADS SF-36 ENRICH <sup>34</sup> LOT-R SCS IES-R	BF was predicted by female gender, greater optimism, high intrusive thinking, high social support and social constraints. BF was marginally related to depression.
Garland et al. [23]	316 (112 men; 204 women)  (193 CAM use, 122 No CAM use)	Breast, Lung, Gastrointestinal, other (Stage nr)	≤ 12 months (141) ≥ 12 to 36 months (80) > 36 months (89)	Cross-sectional	BFS		Use of Complementary and Alternative Medicine (CAM), age, gender, race/ ethnicity, education, employment, cancer type, cancer stage, surgery, radiation, chemotherapy, time since diagnosis		Race, time from diagnosis, age and CAM use predicted BF. Special diet, herbal remedies, vitamin use, and massage saw a smaller increase in BF, while acupuncture, chiropractic, homeopathy, relaxation, yoga, and tai chi were not significantly associated with BF.
Harrington et al. [25]	76 (37 men; 39 women)	Head and neck (Stage I-IV)	Range = 0-24 months	Cross-sectional	BFS	<i>M</i> = 3.55 <i>SD</i> = .44	Type of treatment, stage of cancer, type of cancer, optimism, coping, anxiety and depression	LOT-R Brief COPE HADS	Optimism and positive reappraisal were predictors of BF.
Heidarzadeh et al. [27]	452 (185 men; 267 women)	Breast; Gastrointestinal; Hematology; Prostate; Lung; Uterus and ovaries; Others (Stage nr)	2 years (71) 3 years (34) 4 years (20) >5 years (72)  Range = 2 to 5 years	Cross-sectional	PTGI	<i>M</i> = 68.6 <i>SD</i> = 14.6	Age, gender, education, income, marital status, occupation, duration of cancer diagnosis, growth of cancer, type of cancer		Age is negatively correlated with PTG Educational status, income had a positive and significant correlation with PTG.
Ho et al. [28]	90 women	Breast (Stage 0-IV)	Range = 7-9 months	Cross-sectional	PTGI	nr	Explanatory styles, PTSD symptoms	ASCQ <sup>35</sup> IES-R	Explanatory style for good events, but not for bad events, was significantly associated with PTG. The tendency to globalise the causes of good events was the most important

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									predictors of PTG.
Ho et al. [29]	50 (21 men; 29 women)	Oral cavity (Stage nr)	NR	Cross-sectional	PTGI	$M = 51.76$ $SD = 11.18$	Age, time since diagnosis, religion, gender, economical status, education, marital status, stag of cancer, treatment, hope, optimism	HS LOT-R	Hope and optimism are strong predictors of PTG. Greater PTG showed significant relationship with higher income and being married. A negative correlation was found between stage of cancer and PTG.
Kangas et al. [31]	70 (16 men; 54 women) (27 early subgroup; 43 late subgroup)	Meningioma (Stage nr)	Early subgroup: $M = 11.3$ months; $SD = 6.3$ months  Late subgroup: $M = 79.9$ months; $SD = 54.5$ months	Cross-sectional	BFS	nr	Emotional well-being, intrusions and avoidance, perceived social support	POMS IES-R MSPSS	BF was significantly associated with elevated depression symptoms (early subgroup only). BF was positively correlated with intrusions and avoidance symptoms (late subgroup only).
Karanci and Erkam [32]	90 women	Breast (Stage I-IV)	Range = 1month to 8 years	Cross-sectional	SRGS	$M = 143$ $SD = 12.32$	Perceived social support, coping, depression	MSPSS WCI BDI	Social support, problem-solving coping (positive association), income level and depression (negative association) were significant predictors of stress-related growth.
Kent et al. [33]	604 women	Breast (Stage I-III A)	nr	Longitudinal  T1 = 2–12 months after diagnosis; T2 = 30 months; T3 = 39 months after diagnosis	PTGI (at T3)	$M = 48.8$ $SD = 27.4$	Support seeking, cancer-related support programs, religiosity	DRI	Race/ethnicity, age, stage at diagnosis (in situ/ localized/ regional), religiosity, support program participation, and confiding in a health care provider were all significantly associated with PTG. A negative correlation between PTG and age was found.
Kinsinger et al. [34]	250 men	Prostate (Stage I-II)	$M = 15.7$ months $SD = 6.9$ months	Cross-sectional	BFS	Nr	Age, education, income, ethnicity, months since diagnosis, months since treatment, surgery vs. radiation, medical comorbidities, quality of life, social support, coping	CCI <sup>36</sup> FACT-G <sup>37</sup> PCa index composite <sup>38</sup> UCLA-PCI <sup>39</sup> Brief COPE ENRICH D	Active coping and social support were significant predictors of BF.
Lechner et al. [36]	<u>Study 1</u> $n = 230$ and Long-Term Follow-Up ( $N = 96$ )  <u>Study 2</u> $n = 136$ Participants from a stress management training	Breast (Stage 0-II)	nr	<u>Study 1</u> Longitudinal (3, 6, or 12 months following surgery and then again at 5–8 years postdiagnosis)  <u>Study 2</u> Longitudinal (T1 = about 2 months after surgery; T2 = postintervention, 5 months postsurgery; T3 = 3 months postintervention, 8 months postsurgery; T4 = 9 months postintervention, 14 months postsurgery.	BFS	T1 ( $M = 2.15$ ; $SD = .63$ ) Follow-up ( $M = 2.33$ ; $SD = .93$ )	<u>Study 1</u> Perceived quality of life, distress, depressive symptoms, disruption of social and recreational activities, optimism, investment in body image, coping  <u>Study 2</u> Perceived quality of life, depressive symptoms, disruption of social and recreational activities, positive and negative affect	<u>Study 1</u> PQOL <sup>40</sup> CES-D <sup>41</sup> SIP <sup>42</sup> LOT-R MBA <sup>43</sup> Brief COPE  <u>Study 2</u> PQOL CES-D SIP ABS <sup>44</sup>	Women with low or high BF had better adjustment than those with intermediate BF. Long-term BF was associated with QoL, positive affect, negative affect and social disruption. There was found a quadratic relationship between BF and QoL.(Study 1) Quadratic relationships were found between BF and social disruption, avoidance, intrusion, negative emotion, QoL and positive affect. BF was associated with long-term positive affect (Study 2).
Lelorain et al. [37]	307 women	Breast (Stage I-III)	$M = 10$ years $SD = 2.8$ years	Cross-sectional	PTGI	$M = 59.9$ $SD = 20$	Chemotherapy, mental health, coping strategies, positive affectivity, long-term perceived sequelae of cancer	SF-36 Brief COPE PANAS <sup>45</sup>	Dispositional positive affectivity and adaptive coping of positive, active, relational, religious and denial coping have a strong effect on PTG. PTG is associated with mental QoL and happiness. Perceived ‘somewhat

							and treatment		troublesome sequelae' was positively associated with PTG whereas 'very troublesome sequelae' were inversely associated with PTG.
Li et al. [38]	200 (95 men; 105 women)	Lung; Lymphoma ; Leukemia (Stage nr)	$M = 35$ months $SD = 44.43$ months	Cross-sectional	PTGI BFS	$M = 37.14$ $SD = 18.44$	Time since diagnosis, type of cancer, existential distress, sense-making, benefit finding	DS <sup>46</sup>	BF is the strong predictor of PTG
Liu et al. [39]	120 women	Breast (Stage I-II)	nr	Longitudinal  T1= 3 months after diagnosis; T2= 6 months; T3= 9 months after T1	PTGI	T1 ( $M = 63.24$ ; $SD = 14.21$ ); T2 ( $M = 68.26$ ; $SD = 15.29$ ); T3 ( $M = 70.29$ ; $SD = 16.07$ )	Distress, several problems cancer-related (physical, practical, with relatives, emotional, philosophical)	Distress thermometer	PTG showed a significant negative correlation with psychological distress.
Llewellyn et al. [40]	103 (73 men; 30 women)	Head and neck (Stage nr)	nr	Longitudinal  T1 = period between confirmation of diagnosis and before treatment T2 = 6 months after treatment completion	BFS	T1 ( $M = 59.79$ ; $SD = 7.59$ ); T2 ( $M = 58.13$ ; $SD = 8.22$ )	Marital status, level of education, distress, optimism, coping, perceived quality of life	HADS LOT-R Brief COPE SF-12v2 EORTC QLQ-C30 <sup>47</sup>	BF was predicted by active coping strategies and use of emotional support. Optimism, living with a partner and higher educational attainment were also associated with higher BF and have a protective effect.
Martins da Silva et al. [41]	160 (71 breast cancer survivors (BC); 89 health controls (HC))	Breast (Stage nr)	$M = 13.5$ months $SD = 4.6$ months	Cross-sectional	PTGI	BC ( $M = 63.93$ ; $SD = 27.91$ ); HC ( $M = 40.63$ ; $SD = 26.56$ )	Emotional distress, quality of life, subjective perception of breast cancer as a traumatic experience	HADS WHOQOL – BREF <sup>48</sup>	The BC survivor group showed greater total PTG than the HC group. PTG was negatively associated with perception of trauma and depression.
McDonough et al. [42]	173 women	Breast (Stage I-III)	$M = 11.37$ months $SD = 4.36$ months	Longitudinal  T1 = baseline; T2 = 3-month; T3 = 6-month after T1	PTGI (at T2 and T3)	T2 ( $M = 2.97$ ; $SD = 1.00$ ); T3 ( $M = 2.97$ ; $SD = 1.04$ )	Social support, perceived stress, cancer worry, subjective well-being	SSS <sup>49</sup> PSS ASQ PWB <sup>50</sup>	BC-specific social support (T2) and cancer worry (T2) were significant predictors of PTG (T2).
Mols et al. [43]	183 women	Breast (Stage I-II)	NR	Cross-sectional	PTGI BFS	Mean of subscales between $M = 2.8$ ( $SD = 5.8$ ) to $M = 19.9$ ( $SD = 7.8$ )	Health status and subjective well-being, benefit finding	PDIS <sup>51</sup> Center data Health monitor	PTG showed a positive correlation with BF, higher satisfaction with life. PTG was negatively associated with Radiotherapy. Women with a higher tumour stage at diagnosis experienced less BF in comparison to women with a lower tumour stage at diagnosis.
Morris and Shakespeare-Finch [44]	335 (150 men; 185 women)	Breast; Prostate; Haematological; Colorectal (Stage nr)	nr	Cross-sectional	PTGI	$M = 59.29$ $SD = 22.36$	Gender, relationship status, ethnicity, education, cancer status, treatment status, time since diagnosis, PTSD symptoms, perception of trauma severity	IES-R	PTG was significantly and positively associated with type of cancer, trauma severity and distress. Breast cancer survivors reported significantly higher levels of PTG than those diagnosed with colorectal and hematological malignancies, but not significantly different from prostate cancer survivors.
Morris and Shakespeare-Finch [45]	313 (137 men; 176 women)	Breast; Prostate; Haematological; Colorectal (Stage nr)	$M = 2.92$ years $SD = 1.86$ years	Cross-sectional	PTGI	$M = 59.29$ $SD = 22.36$	Seeking social support, rumination, overall distress	IES-R COPE <sup>52</sup> RI <sup>53</sup>	Deliberately ruminating on benefits and social support were positively related to PTG.
Morris et al. [46]	335 (150 men; 185 women)	Breast, prostate, haematological, colorectal/rectal, gynaecological, lung, head/neck, gastric (Stage nr)	Range = 1.5 to 4 years since diagnosis	Cross-sectional	PTGI	$M = 59.29$ $SD = 22.36$	Coping	COPE	Positive reframing is positively correlated with all PTGI. Age is negatively associated with PTG. Focussing on venting emotions, social support engagement, and active coping are associated with two dimensions of PTG (New Possibilities and Relating to Others).

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Mystakidou et al. [47]	58 advanced cancer patients (16 men; 42 women)	Gastrointestinal, Lung, Urogenital, Breast, Other (Stage IV)	< 3 years: 32 ≥3 years: 26	Cross-sectional	PTGI	$M = 52.33$ $SD = 21.22$	PTSD symptoms	IES-R	IES-R total score and its domains did not predict PTG.
Mystakidou et al. [48]	100 women	Breast (Stage IV)	$M = 6.11$ years $SD = 5.0$ years	Cross-sectional	PTGI	$M = 43.76$ $SD = 16.21$	Age, marital status, education, metastasis time, number of metastasis, radiotherapy, anxiety and depression	HADS	Younger age and marital status were significant predictors of PTG. Moreover, age is a significant predictor of New Possibilities, Appreciation of Life and PTGI-Total, while marital status is a significant predictor of PTGI-Total.
Park et al. [49]	167 (59 men; 108 women)	Breast; Prostate; Colon/Rectal; Lymph; Cervix/Uterus (Stage nr)	$M = 3.5$ years $SD = 1.7$ years	Longitudinal T1 = Baseline; T2 = 1 year after T1	PBS	$M = 8.62$ $SD = 7.09$	Religiousness, hope/agency, religious and active coping	Brief MMRS <sup>54</sup> HS Brief COPE	Religious coping predicts perceived benefits.
Posluszny et al. [51]	69 women	Gynecologic (endometrial, ovarian, vulvar, benign) (Stage I-IV)	$M = 16$ months	Longitudinal T1 = 1 week before surgery; T2 = 16 months after T1	PTGI (at T2)	Range: $M = 12.4$ ; $SD = 25.6$ (no disease) to $M = 69.0$ to $SD = 25.3$ (advanced stage)	Age, education, employment, income, marital status, family history of cancer, perceived threat, PTSD symptoms	PCL-C	Higher PTSD symptoms presurgery, greater disease severity and lower income were significant predictors of PTG. The disease groups (Advanced stage; Early stage; Benign) reported higher levels of PTG than the no disease group.
Rahmani et al. [52]	450 (360 men; 90 women)	Mixed (Stage nr)	$M = 29.4$ months $SD = 30.4$ months	Cross-sectional	PTGI	$M = 76.1$ $SD = 18.3$	Gender, marital status, education, chemotherapy, radiotherapy, surgery		PTG had a significant negative association with age. Greater PTG is associated with education at university level and radiotherapy.
Rand et al. [53]	86 men	Gastrointestinal; Genitourinary; Sarcoma; Thoracic (Stage IV)	nr	Cross-sectional	PTGI	$M = 75.76$ $SD = 23.78$	Age, minority, education, partner status, disease status, prognosis (6 months), deceased at 6 months, illness appraisal, religious coping, psychological distress, marital adjustment	Oncologist prognosis (Death at 6 months) CMS <sup>55</sup> Brief RCOPE <sup>56</sup> HADS Mini MAC <sup>57</sup>	Religious coping predicts PTG.
Ruini et al. [54]	120 (60 breast cancer survivors (BC); 60 healthy subjects (HS))	Breast (Stage nr)	$M = 6.42$ years $SD = 4.06$ years	Cross-sectional	PTGI	BC with AO ( $M = 71.30$ ; $SD = 4.34$ ); BC without AO ( $M = 61.66$ ; $SD = 4.18$ ); HS with AO ( $M = 53.05$ ; $SD = 5.17$ ); HS without AO ( $M = 62.71$ ; $SD = 3.86$ )	Age, time since event, marital status, work status, life events, distress and well-being, psychological well-being, psychosocial problems	IRLE <sup>58</sup> SQ <sup>59</sup> PWB PSI <sup>60</sup>	Women with breast cancer had higher scores on PTG, than healthy women with allostatic overload (AO).
Ruini et al. [55]						BC ( $M = 66.74$ ; $SD = 20.98$ ) HS ( $M = 59.25$ ; $SD = 24.68$ )			BC survivors report higher levels of PTG when compared to HS. BC survivors with high levels of PTG report increased levels of physical well-being and decreased distress. PTG levels are related with decreased psychological distress and somatization.
Salsman, et al. [56]	55 (23 men; 32 women)	Colorectal (Stage 0-III)	$M = 1.07$ years $SD = .19$ years	Longitudinal T1 = 6-18 months post-diagnosis; T2 = 3 months after T1	PTGI	T1 ( $M = 43.8$ ; $SD = 29.6$ ); T2 ( $M = 51.5$ ; $SD = 30.1$ )	Age, education, social desirability, intrusive and avoidant cognition, repetitive thoughts, mental health, PTSD symptoms	MC-C <sup>61</sup> IES RS <sup>62</sup> MHI <sup>63</sup> PCL-C	PTG was not significant associated with PTSD symptoms, anxiety, depression, positive affectivity and social desirability. There was a trend for baseline cognitive rehearsal predicting 3-month PTG.
Schmidt et al. [57]	54 (14 men; 40 women)	Breast; Prostate; Other (Stage nr)	$M = 4.5$ years $SD = 2.8$ years	Cross-sectional	PTGI	nr	Age, gender, education, cancer type, months since diagnosis, attachment styles, coping, social support	MAQ <sup>64</sup> Brief COPE MOS <sup>65</sup>	Positive reframing and religious coping were predictors of PTG.

Schroevers et al. [58]	108 (39 men; 69 women)	Lymphoma , Breast, Leukemia, Colorectal, Lung, Prostate  (Stage I-IV)	$M = 7.3$ years	Cross-sectional	BFS	$M = 46.01$ $SD = 8.13$	Negative psychological changes, positive and negative affect, coping, goal engagement	NPC <sup>66</sup> PANAS CERQ <sup>67</sup> COPE GDGDS <sup>68</sup>	Positive reappraisal and goal reengagement were significant predictors of BF. A greater BF was significantly related only to more positive affect and not to negative affect.
Schroevers and Teo [59]	113 (38 men; 75 women)	Breast, Nasopharyngeal Carcinoma, Colorectal, Lung  (Stage I-IV)	$M = 45$ months $SD = 40.53$	Cross-sectional	PTGI	$M = 73.12$ $SD = 19.75$	Chemotherapy, coping, psychological distress	Brief COPE SCL-90-R <sup>69</sup>	Positive coping strategies were significantly related to PTG. Instrumental support, positive reframing, and humour were significant predictors of PTG.
Schulz and Mohamed [60]	105 (69 men; 41 women)	Colon; Stomach; Rectum; Esophagus; Liver and gall bladder; Pancreas  (Stage nr)	nr	Longitudinal  T1 = 1-3 days before surgery T2 = 5-7 days after surgery T3 = 1 months after surgery T4 = 6 months after surgery T5 = 12 months after surgery	BFS (at T5)	$M = 3.56$ $SD = .90$	Self- efficacy, social support, coping, depression, quality of life	GSES <sup>70</sup> BSSS <sup>71</sup> CSSS <sup>72</sup> CES-D EORTC-QLQ30	Social support is the strongest predictor of BF
Scrignano et al. [61]	T2 $n = 41$ (90% women, 10% men)	Breast and Gastroenteric  (Stages II-IV)	nr	Longitudinal  T1 = baseline; T2 = 6 months after T1	PTGI	T1 ( $M = 3.29$ ; $SD = 1.36$ ); T2 ( $M = 3.27$ ; $SD = 0.93$ )	Autonomy, support environment, social support, coping	NSRS <sup>73</sup> ISEL <sup>74</sup> Brief COPE	Autonomy-supportive caregivers (T1) and a problem-focused strategy of coping (T1) significantly predict greater PTG at T2. At T1, PTG was significantly correlated with positive reinterpretation, self-distraction, seeking instrumental support, active coping, turning to religion, humour, planning, perceived ability of support.
Silva et al. [62]	50 women	Breast  (Stage I-III)	$M = 1.36$ months $SD = .63$ months	Longitudinal  T1 = time of surgery ;T2 = during adjuvant treatment; T3 = 6 months after the end of treatment	PTGI (at T2 and T3)	T2 ( $M = 62.1$ ; $SD = 22.4$ ); T3 ( $M = 63.3$ ; $SD = 21.2$ )	Coping, psychological quality of life, anxiety and depression	Brief COPE WHOQOL – Bref HADS	The type of surgery and adjuvant treatment did not account for the course of PTG. Domains of PTGI were significantly correlated with coping, anxiety, depression and psychological QoL: Social support coping (T1) was associated with New Possibilities and Life Appreciation (T2), Strengthening of Social Relationships (T2) and Personal Resources and Skills (T2); Cognitive coping (T1) was associated with Personal Resources and Skills (T2); Personal Resources and Skills (T2) was associated with anxiety, depression and psychological QoL (T3); Strengthening of Social Relationships (T2) was associated with psychological QoL (T3);
Smith et al. [63]	173 (132 Non Hispanic White (NHW); 51 Hispanic (HISP))	Cervical  (Stage nr)	$M = 10.30$ years $SD = 5.01$ years	Cross-sectional	PTGI	$M = 2.30$ $SD = 1.40$	Age, education, income, cancer stage, years since diagnosis, optimism, spirituality	LOT-R DRI	Greater spirituality and more advanced cancer stage predicted more PTG, but optimism did not predict PTG. HISP women reported higher levels of PTG than NHW women.
Smith et al. [64]	886 (435 men; 451 women)	Non-Hodgkin lymphoma  (Stage I-IV)	$M = 10.2$ years $SD = 7.10$ years	Cross-sectional	PTGI	$M = 60.5$ $SD = 24.7$	Gender, race, income, education, age, years since diagnosis, stage, type of lymphoma, not currently receiving treatment, chemotherapy, transplant, comorbidity, psychological status,	MOS-SSS <sup>75</sup> ALTTIQ <sup>76</sup> PCL-C CCI	PTG was positively associated with social support and perceived life-threatening of cancer. Greater PTG was significant associated to female gender, non-Caucasian race, having less than a college degree, younger age and having stage of cancer > 1.

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							perceived life-threatening of cancer, PTSD symptoms		
Soo and Sherman [65]	185 women	Breast (Stage I-IV)	1-6 months: $N = 6$ 7 months-1 year: $N = 11$ 1-4 years: $N = 68$ 5-10 years: $N = 71$ 10 years plus: $N = 29$	Cross-sectional	PTGI	$M = 48.55$ $SD = 20.58$	Education, time since diagnosis, treatment, comorbid psychological, rumination, depressive, anxious and stress symptomatology, multiple dimensions of support	MDRIS <sup>77</sup> MOS-SS DASS <sup>78</sup>	Brooding was significant predictor of New Possibilities; Intrusion and Instrumentality were significant predictors of New Possibilities and Relating to Others; and Instrumentality for Personal strength and Appreciation of life. Brooding and instrumentality predicted spiritual change.
Strack et al. [67]	128 (51 men; 77 women)	Mixed (Stage nr)	NR	Cross-sectional	PTGI	$M = 5.09$ $SD = .88$	Openness to experience, cognitive reappraisal, gratitude, priorities in life	BFI <sup>79</sup> ERQ <sup>80</sup> GQ <sup>81</sup>	Openness to experience, gratitude and cognitive reappraisal of emotion were positively associated with PTG.
Svetina and Nastran [68]	190 women	Breast (Stage nr)	NR	Cross-sectional	PTGI	( PTG believers $M = 72.58$ ) (PTG non-believers $M = 70.15$ )	Education level, age, marital status, number of children, currently living with their family members, cancer in acute or remission state, length of treatment, religious affiliation, volunteering, family relationships, coping	FACES IV <sup>82</sup> CRI <sup>83</sup>	Approach related coping strategies and family related factors predict PTG.
Tang et al. [69]	313 (179 men; 134 women)	Stomach; Liver; Pancreas; Head and neck; Lung; Esophagus; Colon–rectum; Other (Stage IV)	$M = 19.28$ months $SD = 33.94$ months	Longitudinal  T1 – diagnosis of terminal status;  Next assessments were made approximately every 2 weeks from enrollment until they declined to participate or died.	PTGI	Range from $M = 26.13$ ; $SD = 21.54$ ; to $M = 40.33$ ; $SD = 27.71$	Time proximity to patient death, gender, age, educational level, marital status, with chronic disease, metastasis, post-diagnosis survival at enrollment, time since recognition of terminally ill status, distress, functional dependency, social support, coping strategies	SDS <sup>84</sup> ESDS <sup>85</sup> MOS-SSS	Patients reported higher PTG if they were female, have higher education, have a metastatic disease, and reported higher social support. PTG was lower in patients who had recently recognized their terminally ill status, have distress or have high functional dependence, were unaware or had low acceptance of their diagnosis.
Tanriverd et al. [70]	105 (46 men; 74 women)	Mixed (Stage nr)	nr	Cross-sectional	PTGI	$M = 57.14$ $SD = 16.52$	Perceived social support	MSPSS	Total perceived social support, support from family, and friends were significantly positive correlated with PTG.
Tanyi et al. [71]	91 (14 men; 77 women)	Breast; Prostate (Stage I-IV)	$M = 111.2$ days $SD = 77.5$ days	Longitudinal  T1 = one or two weeks before the start of Radiotherapy; T2 = fifth/sixth week of treatment T3 = four to six weeks post-treatment	PTGI	T1 ( $M = 63$ ; $SD = 23.3$ ); T2 ( $M = 67.5$ ; $SD = 22.3$ ); T3 ( $M = 64.9$ ; $SD = 23.9$ )	Health-related quality of life	FACT-G	A significant negative correlation was found between Physical Well-being and PTG, whereas a significant positive correlation was revealed between Social/Family Well-being and PTG.
Tanyi et al. [72]	152 (29 men; 113 women)	Breast; Prostate (Stage I-IV)	$M = 3.5$ months $SD = 2.2$ months	Cross-sectional	PTGI	$M = 65.53$ $SD = 22.07$	Adult attachment style, health-related quality of life, subjective severity and perceived aftermath of cancer	ECRS <sup>86</sup> FACT-G 2 questions	Younger age, subjective severity of cancer and social/family well-being were significant predictors of PTG. Dismissive attachment style predicted fewer score on the Personal Strength and Relating to Others subscales.
Thombre et al. [73]	59 (29 men; 30 women)	Breast; Lung; Head/Neck (Stage I-III)	$M = 11.3$ months $SD = 30$ months	Cross-sectional	PTGI	$M = 34.80$ $SD = 4.84$	Illness appraisals, meaning-based coping, core beliefs, fear of recurrence	two questions (Vinokur et al., 1990) two questions	Revaluation of worldviews (challenge of core beliefs) was the only significant predictor of PTG. PTG was positively related to disease recurrence.



								(Davis et al., 1998) CBI	
Thornton et al. [74]	118 (50 men; 68 women)	Lung (Stage I-IV)	$M = 16$ weeks $SD = 9.32$ weeks	Longitudinal  T1 = baseline T2 = 3 months after T1	PTGI	T1 ( $M = 55.30$ ; $SD = 28.22$ ); T2 ( $M = 52.95$ ; $SD = 26.22$ )	Gender, cancer type, coping, cancer-related stress	IES-R COPE EACP <sup>87</sup>	Greater growth was associated with having small cell lung cancer, higher cancer-related intrusions, lower perceived cancer-related stress, and greater approach-oriented coping. Positive reframing coping predicts growth (T1) and emotional approach coping predicts growth (T2).
Thuné-Boyle et al. [75]	202 women	Breast (Stage nr)	nr	Prospective	BFS	nr	Religious/spiritual beliefs, Private religious/spiritual practice, religiousness/spirituality, public religious/spiritual practice, religious coping, private spiritual involvement, perceived spiritual support, non-religious coping, optimism, social-support	MMR/S <sup>88</sup> RCOPE SIS <sup>89</sup> SSS <sup>90</sup> Brief COPE LOT MSPSS	Strength of faith at surgery and seeking emotional support predicts BF at three months. Relationship between BF and religious coping to achieve a life transformation was partially mediated by strength of faith.
Tomich and Helgeson [76]	62 (26 men; 36 women)	Colorectal; Lung (Stage II-IV)	nr	Longitudinal  T1 = on average 3-months postdiagnosis; T2 = 3 months after T1	PTGI	T1 ( $M = 3.37$ ; $SD = .82$ ); T2 ( $M = 3.34$ ; $SD = .75$ )	Health-related quality of life, depressive symptoms, stressfulness of cancer, intrusive thoughts, coping	SF-36 CES-D IES COPE	More PTG was related to worse mental health at T1 but was not related to physical health (T1) or depressive symptoms (T1) More PTG at T1 predicted better physical health at T2.
Wang et al. [77]	124 women	Breast (Stage 0-IV)	nr	Longitudinal  T1 = 1–2 days after they surgery; T2 = 3-month; T3 = 6-month; T4 = 12 months after T1	PTGI	TI ( $M = 59.27$ ; $SD = 24.67$ ); T2 ( $M = 55.71$ ; $SD = 26.71$ ); T3 ( $M = 54.01$ ; $SD = 27.42$ ); T4 ( $M = 52.47$ ; $SD = 28.24$ )	Anxiety and depression, positive and negative affect, health-related quality of life	HADS ABS SF-36	The relationship between PTG and positive affect was consistently positive, but the relationship between PTG and depression was consistently negative over the time.
Wang et al. [78]	1227 women	Breast (Stage 0-IV)	Median = 3.5 years Range = 4 months to 26 years	Cross-sectional	PTGI	$M = 70.18$ $SD = 15.85$	Age, time from diagnosis, number of children, occupation, education level, household income, marital status, exercise, work status, religion, TNM stage, breast cancer volunteer, breast cancer family history, surgery, comorbidity, current treatment		PTG was positively and significantly associated with household income, education and exercise. PTG was negatively associated with concomitant chronic disease.
Wang et al. [79]	404 women	Breast (Stage 0-III)	Range = 1 week to 6 weeks after diagnosis	Longitudinal  T1 = during the first week after the confirmation of the diagnosis; T2 = 6 weeks after diagnosis	BFS	T1 ( $M = 44.95$ ; $SD = 7.60$ ) T2 ( $M = 40.84$ ; $SD = 6.03$ )	Age, education, employment, stage of disease, optimism and pessimism, perceived social support, cognitive emotion regulation	OPS <sup>91</sup> MSPSS CERQ	BF (T2) was positively predicted by age, education level, social support from family, acceptance, positive reappraisal, BF (T1). Vocational status, adaptive and maladaptive coping emotion regulation strategies a negative significant predictor of BF (T2).
Wilson et al. [80]	514 men	Prostate (Stage nr)	$M = 7.50$ years $SD = 4.66$ years	Cross-sectional	PTGI	$M = 50.20$ ; $SD = 22.99$	Resilience, challenge appraisal, cancer related distress, core beliefs, rumination, peer support factors, social constraints	CDRS <sup>92</sup> SAM <sup>93</sup> IES CBI ERRI <sup>94</sup> MEIM <sup>95</sup> SCS	The variables with a direct effect on PTG were: challenge appraisal; examining core beliefs; intrusive rumination and peer support factors. Other variables (i.e. resilience, challenge appraisal, distress and examining core beliefs) have shown indirect effects on PTG.

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Yu et al. [81]	208 (80 men; 128 women)	Cervical; Ovarian; Esophagus; Lung; Breast; Nasopharyngeal carcinoma; Bladder; Hepatocellular  (Stage nr)	nr	Cross-sectional	PTGI	$M = 49.54$ ; $SD = 21.15$	Age, gender, education, emotion regulation, positive and negative affect, self-efficacy	ERS <sup>96</sup> PANAS GSES	PTG was positively associated with positive affect, effective emotion regulation (revealing and suppression), and general self-efficacy. No significant correlation could be found between negative affect and PTG.
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**Table 4.**  
Characteristics of studies with intervention

Study (Authors, date)	Sample	Cancer	Time since cancer	Design	Intervention	Measure of growth and scores	Other measures		Outcomes
Antoni et al. [3]	199 women (74 EG; 83 CG)	Breast (Stage 0-III)	nr	RCT  T1 = Baseline (4-8 weeks postsurgery); T2 = 6 months after T1 (3 months after end of intervention); T3 = 12 months after T1	Cognitive-Behavioral Stress Management (CBSM)	BFS  EG T1 ( $M = 3.16$ ; $SD = .20$ ); T2 ( $M = 3.51$ ; $SD = .10$ ); T3 ( $M = 3.59$ ; $SD = .10$ )  CG T1 ( $M = 3.32$ ; $SD = .09$ ); T2 ( $M = 3.40$ ; $SD = .08$ ); T3 ( $M = 3.42$ ; $SD = .10$ )	Illness-related interpersonal disruption, positive states of mind, positive emotional experience, perceived stress management skills,	SIP PSOM <sup>97</sup> MOCS <sup>98</sup> ABS	The participants of the intervention increased benefit finding for up to T2 and T3.
Cameron et al. [11]	154 (54 EG; 56 DG; 44 CG)	Breast (Stage nr)	nr	Quasi-Experimental  T1 = Baseline (following diagnosis); T2 = 4 months (post-intervention); T3 = 6 month (follow-up); T4 = 12 months (follow-up)	Psychosocial Support Program	BFS  EG T3 ( $M = 61.63$ ; $SD = 12.39$ ); T4 ( $M = 65.63$ ; $SD = 12.24$ )  CG T3 ( $M = 60.99$ ; $SD = 14.45$ ); T4 ( $M = 59.96$ ; $SD = 18.15$ )  DG T3 ( $M = 53.21$ ; $SD = 16.85$ ); T4 ( $M = 53.31$ ; $SD = 18.59$ )	Use of relaxation-related techniques, emotional suppression, perceived control, perceived risk of recurrence, emotional well-being, cancer worry, state anxiety, coping efficacy	CECS <sup>99</sup> IPQ <sup>100</sup> FACT-G STAI-SF CEM <sup>101</sup>	EG reported higher BF, at T3 and T4, when comparing with DG.  CG reported greater BF relative to DG at T3, although these two groups did not differ significantly at T4.
Garlick et al. [24]	24 women	Breast (Stage 0-III)	$M = 20.7$ months $SD = 27.03$ months	Quasi-experimental T1 = baseline (first day of intervention); T2 = 1 week post-intervention; T3 = follow-up (4 weeks after treatment)	Psycho-spiritual integrative therapy	PTGI  T1 Range sub-scales $M = 4.5$ ; $SD = 3.3$ . to $M = 20.8$ ; $SD = 9.2$ . T2 Range sub-scales $M = 5.3$ ; $SD = 3.2$ . to $M = 23.3$ ; $SD = 8.8$ . T3 Range sub-scales $M = 5.0$ ; $SD = 3.0$ . to $M = 21.5$ ; $SD = 6.5$ .	Quality of life, affective and physical states, spiritual well-being	FACT-B POMS FACIT-Sp-Ex	A significant main effect for time was found between the T1 and T2, on New Possibilities. A significant main effect for time was found between T1, T2 and T3, on Personal Strength. No significant differences were found on Relating to Others, Spiritual Change or Appreciation of Life Subscale.
Hawkes et al. [26]	410 (221 men; 189 women)	Colorectal (Stage nr)	nr	Longitudinal  T1 = baseline; T2 = 6 months; T3 = 12 months	Multiple Health Behavior Change Intervention	PTGI  Health coaching T1 ( $M = 53.1$ ; $SD = 23.1$ )  Usual care T1 ( $M = 56.2$ ; $SD = 23.8$ )	Spirituality, acceptance, Mindfulness, distress, cancer-specific quality of life	FACIT-Sp AAQ <sup>102</sup> MAAS <sup>103</sup> BSI-18 <sup>104</sup> FACT-C <sup>105</sup>	Significant intervention effects were observed for PTG at T2 and T3, in the following subscales: New Possibilities and Relating to Others. Significant effects of intervention were found at T2 on Appreciation of Life and Personal Strength.
Kállay and Baban [30]	45	Breast, Cervical, Pulmonary and Stomach (Stage nr)	$M = 8.12$ months Range 4 to 16 months	Exploratory  T1 = Baseline; T2 = 4 weeks post-intervention	Expressive Writing Program	SRGS  T1 ( $M = 20.68$ ; $SD = 7.5613$ ); T2 ( $M = 21.97$ ; $SD = 6.6691$ )	Depression, mood states and emotions, positive and negative life regard	BDI POMS LRI <sup>106</sup>	The participants of the intervention reported significantly higher levels of growth at T2.
Labelle et al. [35]	136 women (75 EG; 61 CG)	Breast, genitourinary, and gynecological (Stage nr)	$M = 23.5$ months $SD = 43$	Longitudinal  T1 = 4 weeks;	Mindfulness-Based Stress	PTGI  MBSR group	Spirituality, facets of mindfulness	FACIT-Sp FFMQ <sup>10</sup>	MBSR participants demonstrated increased PTG, relative to CG.

	61 CG)	gastrointestinal, lymphoma/m yeloma, head/neck, gynaecologic al, kung, thyroid, melanoma, adrenocortica l, abdominal teratoma adenocarcino ma	months	T2 = 8 weeks after T1	Reduction (MBSR)	T1 ( <i>M</i> = 64.87; <i>SD</i> = 19.25); T2 ( <i>M</i> = 75.25; <i>SD</i> = 19.80)  Control group T1 ( <i>M</i> =57.13; <i>SD</i> = 24.65); T2 ( <i>M</i> = 58.72; <i>SD</i> = 23.58)		7	Increased in mindfulness mediated the effect of MBSR on PTG.
		(Stage nr)							
Pat-Horenczyk et al. [50]	94 women (49 EG; 45 CG)	Breast (Stage I-III)	nr	Longitudinal  T1 = Baseline (before the group started); T2 = 6 months after T1	Cognitive-Behaviour Group Intervention	PTGI  EG T1 ( <i>M</i> = 3.10; <i>SD</i> = 1.08); T2 ( <i>M</i> = 3.45; <i>SD</i> = .79)  CG T1 ( <i>M</i> = 3.25; <i>SD</i> = 1.07); T2 ( <i>M</i> = 3.33; <i>SD</i> = 1.06)	PTSD symptoms, cognitive emotion regulation,	PDS <sup>108</sup> CERQ	The increase on PTG was significantly greater in the EG than the CG.  The intervention participants reported more constructive growth (a rise in PTG and improved coping) and less illusory growth (a rise in PTG, but no improvement in coping) than the nonparticipants.
Stafford et al. [66]	42 women	Breast, gynecologic cancer (cervical, ovarian, vaginal, endometrial)	<i>M</i> = 48.2 weeks <i>SD</i> = 47.0 weeks	Longitudinal  T1 = baseline; T2 = post-intervention; T3 = 3 months after end of intervention (follow-up)	mindfulness -based cognitive therapy (MBCT)	PTGI  T1 ( <i>M</i> = 53.50; <i>SD</i> = 22.31); T2 ( <i>M</i> = 68.22; <i>SD</i> =16.16); T3 ( <i>M</i> = 62.08; <i>SD</i> =22.75)	Distress, quality of life, mindfulness	DASS - SF FACT-G FMI – SF <sup>109</sup>	PTG improved significantly from T1 to T2 and from T1 to T3.
		(Stage nr)							

RESULTS

In total, 81 studies (8 entailing an intervention) were included evidencing an association of socio-demographic, health and treatment, and lifestyle characteristics with growth. Moreover, psychosocial variables (such as anxiety, depression, illness intrusiveness, positive reframing, etc.) were also found to be associated. Furthermore, studies with and without intervention will be reported separately, as well as studies that assessed PTG or BF.

Empirical Studies Without Intervention

The main characteristics and outcomes of the 73 studies are shown in table. It is important to note that the reported results focus on the main outcomes outlined by the authors and considering the more complex and comprehensive level of analysis; that is, if only univariate analysis was done, the results will mirror this information; however, if after a univariate analysis the study presents a multivariate analysis, the latter will be the only one being reported.

Socio-demographic factors associated with PTG.

The majority of studies found a significant association between age and PTG (e.g. Bellizzi et al., 2010; Brix et al., 2013; Cormio et al., 2015; Cordova et al., 2007; Danhauer et al., 2015; Danhauer et al., 2013b; Heidarzadeh et al., 2014; Kent et al., 2013; Morris et al., 2007; Mystakidou et al., 2008; Rahmani et al., 2012; Smith et al., 2014; Tanyi et al., 2015); however, other studies found an absence of correlation between both variables (Baník & Gajdošová, 2014; Ho et al., 2011; Svetina & Nastran, 2012). According to the findings from most studies, younger age is correlated with higher PTG (e.g. Cordova et al., 2007; Cormio et al., 2015; Danhauer et al., 2013b). Given that only few studies evaluated the relationship between PTG and gender and the results were not unanimous - some report an association with female gender (Smith et al., 2014; Tang et al., 2015) while others report an absence of association (Cormio et al., 2015; Ho et al., 2011) – this relationship remains unclear.

A higher education level is also associated with higher PTG according to most studies (e.g. Bellizzi & Blank, 2006; Cordova et al., 2007; Danhauer et al., 2013a; Heidarzadeh et al., 2014; Rahmani et al., 2012; Smith et al., 2014; Tang et al., 2015; Wang et al., 2014); yet, a few number did not find a significant association (Cohen & Numa, 2011; Ho et al., 2011; Mystakidou et al., 2008; Svetina & Nastran, 2012). In what regards race or ethnicity, most studies support that this variable is associated with growth (e.g. Danhauer et al., 2015; Kent et al., 2013; Smith et al., 2008; 2014). Although there is a lack of unanimity, there is strong evidence that being married (Bellizzi & Blank, 2006; Mystakidou et al., 2008; Ho et al., 2011); higher household income (Heidarzadeh et al., 2014; Ho et al., 2011; Wang et al., 2014); and being unemployed (Bellizzi et al., 2010) are significantly correlated with PTG.

Cancer-related factors associated with PTG.

Regarding disease-related variables, stage of cancer at diagnosis (Bellizzi et al., 2010; Ho et al., 2011; Kent et al., 2013; Smith et al., 2008; 2014), and disease/trauma severity (Morris and Shakespeare-Finch, 2011a; Posluszny et al., 2011) were positively associated with PTG.

Otherwise, a number of studies failed to find any significant association between PTG and time since diagnosis (Cohen & Numa, 2011; Cordova et al., 2007; Cormio et al., 2015; Heidarzadeh et al., 2014; Li et al., 2015; Rahmani et al., 2012; Thombre et al., 2010); time since treatment (Cordova et al., 2007; Ho et al., 2011; Morris et al., 2007); type of treatment received (Baník & Gajdošová, 2014; Cormio et al., 2015; Ho et al., 2011); and type of surgery (Cohen & Numa, 2011; Silva et al., 2012; Thombre et al., 2010). Moreover, the effect of several clinical variables on PTG remains unclear, such as, type of cancer, chemotherapy, radiotherapy, hormoneotherapy, comorbidities, presence/absence of metastasis and disease recurrence.

Additionally, it is important to note that very few studies with metastatic cancer patients (a sample that is difficult to invite to participate) were found, which can compromise the consistency and the generalization of the results.

#### Physical factors associated with PTG.

In what regards physical variables, only one study had found a negative and significant correlation between PTG and cortisol slope, indicating an association between a healthier endocrine functioning and positive psychological changes (Diaz et al., 2014).

#### Psychosocial factors associated with PTG.

The major part of the studies showed a significant association with growth, particularly, with a higher perception of cancer as a life-threatening/traumatic event (Cordova et al., 2007; Smith et al., 2014) and higher perceived intensity/severity of cancer (Bellizzi & Blank, 2006) leads to positive changes (i.e. PTG). Cancer-related intrusions or intrusive rumination were associated with higher PTG (e.g. Danhauer et al., 2013a; 2015; Soo & Sherman, 2015; Thornton et al., 2012), which reinforces the positive association that has already been found in other studies (e.g. Cann et al., 2011).

Moreover, among mental health variables, the relationship between PTG and some factors remains unclear or inconsistent, such as depressive symptoms, distress, and PTSD symptoms, since a similar number of studies reported contrary results. Also, three studies failed to find any significant association between anxiety and PTG (Abdullah et al., 2015; Mystakidou et al., 2008; Salsman et al., 2009).

Several studies have examined the relations between growth and positive efforts or strategies to lead with a stressful traumatic event such as cancer. In fact, from the 25 studies that investigated PTG and coping, 12 of them showed that PTG is significantly associated with the following coping-related variables: positive active-adaptive coping (Bellizzi & Blank, 2006; Danhauer et al., 2013a; Danhauer et al., 2015; Leloirain et al., 2010; Morris et al., 2007; Scignaro et al., 2011); prognosis' acceptance-coping (Tang et al., 2015); problem-focused coping (Büyükaşık-Çolak et al., 2012; Scignaro et al., 2011) and emotional-focused coping (Büyükaşık-Çolak et al., 2012; Thornton et al., 2012). Among all coping-related variables, many studies showed a significant positive association with positive reframing/reappraisal and growth (Bussell & Naus, 2010; Cormio et al., 2015; Morris et al., 2007; Schmidt et al., 2011; Scignaro et al., 2011; Thornton et al., 2012). This result is in accordance with findings from Shand and colleagues (2015). Additionally, five studies showed a positive association between religious coping and growth (Cormio et al., 2015; Leloirain et al., 2010; Rand et al., 2012; Schmidt et al., 2012). The only two studies that investigated the relationship between spirituality and growth, proved the initial hypothesis of positive correlation between both variables (Danhauer et al., 2013a; Smith et al., 2008)

PTG was significantly and positively associated with perceived social support (Bozo et al., 2009; Cohen & Numa, 2011; Danhauer et al., 2013a; Morris and Shakespeare-Finch, 2011b; Smith et al., 2014; Tang et al., 2015; Tanriverd et al., 2012). However, two studies failed to find a significant association (Cohen & Numa, 2011; Schmidt et al., 2012).

In recent years, and as confirmed by our results, growth has been positively associated with other positive/empowerment variables, such as happiness (Leloirain et al., 2010); satisfaction with life (Mols et al., 2009); hope (Ho et al., 2011); optimism (Bozo et al. 2009; Ho et al., 2011); openness to experience (Strack et al., 2010); and gratitude (Strack et al., 2010). Nevertheless, other two studies failed to find a relation between PTG and optimism (Bellizzi & Blank, 2006; Smith et al., 2008) and hope (Bellizzi & Blank, 2006).

#### Sociodemographic factors associated with BF.

Regarding sociodemographic features, studies failed to find significant correlations between BF and gender (Cavell et al., 2015; Harrington et al., 2008), employment status (Garland et al., 2013; Harrington et al., 2008) and marital status (Harrington et al., 2008). Alike studies with PTG, there are inconsistent findings regarding the association between BF and age and educational level.

#### Clinical factors associated with BF.

Most of the studies did not find a significant correlation between BF and time since diagnosis (Cavell et al., 2015); type of cancer (Garland et al., 2013); type of treatment (Harrington et al., 2008); and stage of cancer (Garland et al., 2013; Harrington et al., 2008; Wang et al., 2015). Though, Garland et al. (2013) and Mols et al. (2009) found significant associations between BF and time since diagnosis and stage of cancer at diagnosis, respectively.

#### Psychosocial factors associated with BF.

Concerning psychosocial factors the following variables were significant predictors of BF: positive active coping (Cavell et al., 2015; Kinsinger et al., 2006; Llewellyn et al., 2013); positive reappraisal (Harrington et al., 2008; Schroevers et al., 2011; Wang et al., 2015); social support (Dunn et al., 2010; Kinsinger et al., 2006; Schultz & Mohamed, 2004); and optimism (Dunn et al., 2010; Harrington et al., 2008; Llewellyn et al., 2013). These results are in accordance with studies on PTG. Furthermore, Park et al. (2009) showed a significantly positive association between perceived benefits and religious coping, but not with religiousness. In addition, Thuné-Boyle and colleagues (2011) found that the relationship between BF and religious coping to achieve a life transformation was partially mediated by strength of faith.

Nevertheless, some studies did not find a significant correlation between BF and quality of life (Dunn et al., 2010; Kinsinger et al., 2006; Llewellyn et al., 2013), anxiety (Cavell et al., 2015; Dunn et al., 2010; Harrington et al., 2008; Llewellyn et al., 2013), and depression (Cavell et al., 2015; Harrington et al., 2008; Llewellyn et al., 2013).

#### Comparison between groups.

Some studies have made the comparison between patients with cancer and healthy controls regarding PTG. Most studies showed that women with breast cancer (Poslusny et al., 2011; Ruini et al., 2013; 2014; Martins da Silva et al., 2011) have higher PTG levels comparing with healthy counterparts. In contrast, a study from Brix et al. (2013) found no significant differences in PTG reported by women with breast cancer and healthy women.

Other comparisons were made between groups. As an example, in a study with women with breast cancer, Cohen and Numa (2011) found that participants who were volunteers reported similarly high levels of PTG, in comparison with non-volunteers. Also, Caucasian American women with breast cancer displayed higher PTG than African American counterparts (Bellizzi et al., 2010).

#### PTG mediators.

Besides the direct effects of distinct variables on PTG model, as shown by several studies, other variables have shown indirect effects on PTG, such as resilience, challenge appraisal, distress and challenge to core beliefs (e.g. Wilson et al., 2014).

Several studies have found different PTG mediators: positive affect partially mediated the effects of general self-efficacy and expressive revealing on PTG and totally mediated the effects of emotional suppression on growth (Yu et al., 2014); cancer-related rumination partially mediated the relation between positive attentional bias and PTG (Chan et al., 2011); religiosity mediated the effect of ethnicity on PTG (Bellizzi et al., 2010); spirituality partially mediated the association between ethnicity and PTG (Smith et al., 2008); problem-focused coping fully mediated the relationship between dispositional optimism and PTG (Büyükaşık-Çolak et al., 2012); marital status moderated the relationship between the using of the combined exercise guidelines and PTG and BF (Crawford et al., 2015); trauma severity and seeking social support had a significant indirect effect on PTG (Morris & Shakespeare-Finch, 2011b); social support given by a close person has a moderator effect in the relationship between dispositional optimism and PTG (Bozo et al., 2009); positive reframing and religious coping mediated the relationship between secure attachment and PTG (Schmidt et al., 2012).

### Empirical Studies with Intervention

The support group participation has, in fact, significant effect on the increase of growth report, in accordance with some studies (e.g. Kent et al., 2013; Roepke, 2014). In this systematic review studies with interventions have been included, with the specific purpose of assessing whether the implemented programs had a significant impact on growth scores, over time.

In what regards the empirical studies with interventions, Labelle et al. (2015) (Mindfulness-Based Stress Reduction) and Pat-Horenczyk and colleagues (2015) (a cognitive-behaviour group intervention) found that the intervention group reported higher PTG than the control group. In addition, several studies found that the effect of the intervention group was significant in the post-intervention assessment (i.e. immediately after completion of the program), both on BF - Antoni et al. (2006) (Cognitive-Behavioral Stress Management) and on PTG – Hawkes et al. (2014) (Multiple Health Behaviour Change Intervention) and Stafford et al. (2013) (Mindfulness-Based Cognitive Therapy).

Moreover, the effects of the group intervention on growth were showed also longitudinally. The intervention group showed higher levels of growth at follow-up assessments, namely 4 weeks (Kállay & Baban (2008) (Expressive Writing Program); 3 months (Stafford et al., 2013); 6 months (Cameron et al. 2007) (Psychosocial Support Program); and 12 months (Antoni et al., 2006; Cameron et al., 2007; Hawkes et al., 2014). Other study did not show a significant effect of group intervention on PTGI total score, but showed on some PTGI domains (Garlick et al., 2011) (Psycho-Spiritual Integrative Therapy).

## DISCUSSION

The primary aim of this systematic review was to identify the variables associated with growth in patients with cancer diagnosis. Other systematic reviews were performed in the field of PTG and cancer; however, the objectives were different from this one. A previous systematic review entailed the psychosocial factors associated with PTG in breast cancer survivors (Kolokotroni et al., 2014) and other study reviewed PTG and PTSD among breast cancer patients (Koutroli et al., 2012). With a more comprehensive sample of participants with diverse types of cancer, Stanton and colleagues (2006) presented a systematic review about the perception of growth among cancer patients. In this study, authors selected cross-sectional and longitudinal studies and used both constructs to define growth: BF and PTG. However, the papers selected were published until 2005 and the intervention studies that have assessed PTG as an intervention outcome were not included in that review. Other systematic review and meta-analysis from Shand and colleagues (2015) analyzed, specifically, the correlations between PTG/PTSD and psychosocial and socio-demographic variables without assessing studies with intervention programs and with statistical analyses besides correlation analysis. Moreover, Roepke (2014) presented a systematic review of studies that assessed PTG as a result (primary or secondary) of a group intervention, without including other empirical studies (without intervention). Thus, the strengths of the current systematic review are: a) the inclusion of empirical studies with and without intervention and across all types of cancer; b) the inclusion of PTG, as well as similar constructs to define growth (BF, positive life changes, adversarial growth, stress-related growth); c) the identification of both correlated and predicted variables (socio-demographic, clinical and psychosocial) of growth; d) assessment of the overall quality of the studies with and without intervention with a jury of five researchers and inter-rater agreement coefficient calculation for 80% of the studies. Therefore, the inclusion of all constructs representative of growth and all types of cancer as well as the diversity of study design will allow a wider and more informed conclusion about the correlates/predictors of growth in cancer patients.

The results of the analyzed studies indicated that PTG is associated with age, educational level, household income, stage of cancer and physical activity/exercise; is not associated with gender, number of children, type of treatment, time since treatment, time since diagnosis, and type of surgery. Despite the majority of studies confirmed the relations with these variables, some associations remained incongruent, such as the relation of PTG and marital and professional status, type of cancer as well as type, quality, and efficacy of medical treatments, as mentioned by Casellas-Grau et al. (2017).

In what regards the psychosocial variables, the majority of studies confirmed that PTG was associated with the perception of cancer as a life-threatening event. This assumption is in accordance with the theoretical model of PTG from Tedeschi and Calhoun (1996; 2004), in which a traumatic event has to be perceived as stressfulness to trigger the challenge of core beliefs and the cognitive processing (i.e. intrusive and deliberate rumination), which in turn leads to PTG (Taku & Oshio, 2015). Moreover, a study from Taku and Oshio (2015) supported this perspective by showing that PTG can be raised in persons that perceived low to middle levels of stress in the aftermath of the traumatic event.

In addition, PTG is associated with positive adaptive coping, problem-focused coping, emotional-focused coping, positive reframing and religious coping. In the context of cognitive processing related variables, PTG was positively associated with intrusiveness, deliberate rumination and challenge to core beliefs. Contrary to other systematic review (Kolokotroni et al., 2014), PTG seemed to be associated with both sides (intrusive vs. deliberate) of cognitive processing. However, it is noteworthy that the challenge to core beliefs, deliberate and intrusive rumination have been barely explored in the literature, since only recently these variables have been included in studies about PTG in cancer patients. Thus, we suggest the analysis of the relationship between PTG and the cognitive process in further studies. Intrusiveness (not intrusive rumination) has been evaluated in a large number of studies, proving to be positively associated with PTG (Danhauer et al., 2013a; 2015; Dunn et al., 2010; Wilson et al., 2014).

Additionally, other variables related to positive psychology were significantly associated with PTG, such as optimism, gratitude, happiness, openness to experience, hope and spirituality. However, only a reduced number of studies have explored the relations of PTG and these variables. Furthermore, findings from a systematic review of 12 studies that assessed the relationship between PTG and optimism indicated that this relationship remains unclear (Bostock et al., 2009). In this sense, more studies relating PTG and spiritual or positive outcomes are strongly suggested in order to enhance the understanding about these correlations.

Consistent to previous systematic review with a sample of breast cancer patients (Kolokotroni et al., 2014), perceived social support was positively associated with PTG, among the majority of studies (Bozo et al., 2009; Cohen & Numa, 2011, etc). Among the types of social support, marital and family relationships have a strong influence on cancer patients' reports of growth, but only two studies (Cormio et al., 2015; Tanriverd et al., 2012) have reported significant associations between these particular type of social support and PTG. In fact, satisfactory social support provided from family members or close friends may facilitate the emotional disclosure and the cognitive processing about the traumatic experience, which in turn may potentiate higher levels of growth (Cormio et al., 2015).

Physical variables were also barely studied. Only one study reported a significant association between PTG and cortisol slope (Diaz et al., 2014). Moreover, some variables remain incongruent such as depression, distress and PTSD symptoms. The relationship between PTG and these variables was significant in some studies but not significant in others.

A minor number of studies ( $n = 17$ ) that assessed growth as BF were found in this review. Regarding socio-demographic and clinical variables, gender, marital status, stage of cancer, type of cancer, and type of treatment were not significantly associated with BF in the most of the studies. However, it is not clear if age, educational level and time since diagnosis were significantly associated with BF, since contrary results among studies were found. In what concerns psychosocial variables, BF was associated with positive active coping, positive reappraisal, social support and optimism; and not significantly associated with quality of life, anxiety, and depression.

A comment about the differences between PTG and BF seems necessary. In this review, three studies found a positive association between BF and PTG (Baník & Gajdošová, 2014; Li et al., 2015; Mols et al., 2009). In fact, these are two similar constructs but whose reports suggested significant content differences between them. Thus, “Reports of benefit finding might serve a more avoidant and self-protective function for individual with low personal resources (e.g. low optimism or self-efficacy) and might indicate more tangible positive change for those with more substantial resources, with distinct adaptive consequences” (Stanton et al., 2006, p.169). In addition, it is important to note that some studies have reported a specific variable (e.g. BF) but used a measurement scale that does not match the specific concept (e.g. PTGI) (e.g. Kallay & Baban, 2008; Thornton et al., 2012). This fact confirms the difficulties encountered in the literature to define the conceptual boundaries between concepts related to growth (Stanton et al., 2006).

Regarding studies with intervention, the results suggested that the participation in group interventions may increase the report of growth. These results should be interpreted with caution, since we found a small number of studies that assessed growth as primary or secondary outcome ( $n = 8$ ) and none of those interventions has designed an intervention to promote growth, which certainly may potentiate other conditions to facilitate the development of growth.

### Limitations

This study has several limitations that need to be taken into consideration when interpreting the results. First of all, this review included only published studies, which might have affected the results obtained, since some studies that might be in course but not published may produce some interesting results that were not comprised in this review. Also, this review was limited in that only quantitative studies were included and studies that used a qualitative or mixed design were excluded. Thus, the understanding of growth in the aftermath of a trauma such as cancer may be incomplete without the reports that could be obtain with studies with qualitative methodology.

In this review, we found a small number of studies assessing BF, which may limit the comparison of predictors of PTG and BF. Also, the review of moderator analysis was based on a limited number of studies, restraining our confidence in these findings. Future research focused on mediation and moderation effects is needed.

In what regards the studies with group interventions, studies that published self-help group interventions that were moderated by a cancer patient or survivor and not by a psychologist, a nurse or a therapist, were excluded. We intended to analyze the results of interventions with a psychotherapeutic nature and objectives; however, self-help groups may also promote PTG through the modeling, “helper therapy principle” and other group processes such as self-disclosure about experiences related to cancer. Although several different constructs were included to assess growth, the amount of variables that were assessed was limited and constricted to the variables used in the studies. In this sense, psychological, cognitive and clinical variables were presented in a larger number of studies when comparing with other social or environmental variables. Further research is required to evaluate other social variables that may have impact on the level of perceived growth (e.g. health care conditions; instrumental support; number of previous traumatic events). Positive variables such as optimism, gratitude or openness to experience should also be included in further studies, since only a few studies selected in this review showed the associations of PTG and these variables. To conclude, more studies that assess growth as a result of an intervention are recommended, in order to support the evidence of the impact of group programs in the perception of positive changes after cancer.

### FUNDING

This research was funded by Portuguese Foundation for Science and Technology [FCT – Fundação para a Ciência e Tecnologia], Grant/Award Number: SFRH/BD/81515/2011 and by WJCR – William James Center for Research, which is funded by FCT (grant UID/PSI/04810/2013).

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