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# Psychological well-being Model Based on Post-Traumatic Growth Components in Cancer Patients

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**Abstract**

**Objective:** Researchers have considered the components of positive psychology as predictors of psychological well-being. This study aimed to investigate the psychological well-being model based on rumination and the meaning of life with the mediating role of post-traumatic growth and resilience in cancer patients.

**Method:** The present study was conducted by correlation method and structural equation modeling. The statistical population consisted of all the cancer patients referred to hospitals in Tehran in 2020, among whom 300 individuals (218 women and 82 men) were selected by purposive sampling. Participants received psychological well-being questionnaires, rumination-reflection, the meaning of life, post-traumatic growth, and resilience.

**Results:** Findings demonstrated that this model fits well in cancer patients, and the relationship between mediating variables with endogenous and exogenous variables was significant (df2$\chi$ =2.14, GFI=0.92, and CFI= 0.93 and RMSEA =0.05, P=0.01). The variables studied by the model explained 51% of the psychological well-being variance in these patients.

**Conclusion:** The Psychological well-being of cancer patients is affected by variables related to positive psychology such as the meaning of life, post-traumatic growth, and resilience. Rumination, if leading to meaning-making and post-traumatic growth, can potentially positively affect psychological well-being.

**Keywords:** Psychological Well-being, The Meaning of life, Post-traumatic Growth, Resilience, Cancer.

## Introduction

Cancer is a disease characterized by an abnormal transformation of cells and loss of cellular distinction (Hassanpour & Dehghani, 2017). Cancer-affected patients suffer from many physical, emotional, and social problems that profoundly affect their psychological and social health, life expectancy, and well-being. Researchers who have studied the cancer-oriented negative psychological repercussions believe that cancer patients, following their dysfunction, fear, and anxiety, may experience physical and mental problems that lead to a decline in their psychological well-being (Williams, Jackson, Beeken, Steptoe & Wardle, 2016). Well-being is a hierarchical and multidimensional concept that is comprised of two cognitive and affective aspects (Keyes, Shmotkin & Ryff, 2000). Life satisfaction forms the cognitive aspect; positive affect and absence of negative affect form the affective dimension (Ryff & Singer, 2006). Research studies have shown that psychological well-being is significantly and positively associated with post-traumatic growth (Cann, Calhoun, Tedeschi & Solomon, 2010; Holtmaat, Van der Spek, Lissenberg-Witte, Cuijpers, & Verdonck-de Leeuw, 2019; Salehi & Dehshiri,

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2018). Results of a meta-analysis demonstrated that cancer patients who experience post-traumatic growth are more successful in responding to their illness, enjoy better physical and mental health, and show fewer signs of distress and post-traumatic stress (Sawyer, Ayers & Field., 2010). Also, Salehi and Dehshiri (2018) found that post-traumatic growth has a significant and positive relationship with variables of psychological, spiritual, and mental well-being and also with hopefulness.

Coined by Tedeschi and Calhoun (1996), post-traumatic growth refers to positive psychological changes that people experience due to coping with big challenges and harmful life incidents. Post-traumatic growth is often thought to consist of five major categories of better understanding of life and feeling of change in priorities, warmth, and more intimate relationship with others, with a feeling greater than personal power, grown spirituality, and new abilities (Ramos & Leal, 2013). According to the functional-descriptive model, proposed by Tedeschi (1999) and revised by him in 2004, traumatic incidents cause a collapse of pre-traumatic schemata, change in previous goals and the ways intense emotions were given meaning. This, initially, brings about mental turbulence. Then, in response to this condition, mechanisms like rumination are activated to prevent the continuation of the situation (Tedeschi & Calhoun, 2004). Thus, cancer patients get along with the trauma through mental ruminations and frequent cognitive reappraisals.

Rumination is comprised of conscious thoughts that revolve around a single important issue and keep emerging even when urgent and necessary environmental demands for them is nonexistent (Manavipour & Shahhosseini, 2015). Trapanell and Campbell (1999) differentiate between adaptive and maladaptive components of rumination. Newman and Nezlek (2019) have demonstrated that the sub-scale of reflection has a significant and positive connection with psychological well-being. The findings of Harrington and Loffredo (2010) showed that rumination has a significant and negative relationship with psychological well-being while reflection (philosophical rumination) is positively connected to psychological well-being. Both variables can effectively predict psychological well-being. After examining the role of rumination in psychological well-being and anxiety of cancer patients' spouses, Aghayousefi et al. (2015) found a meaningful and negative relationship between rumination and psychological well-being. Research has indicated a positive correlation between rumination, reappraisal, and post-traumatic growth (Shi, Yu, Peng, Liu, Miao, Li, 2015). According to Tedeschi's functional-descriptive model and in line with Joseph's (2003) meta-theoretical person-centered perspective, effort-based rumination can lead to meaning-making by way of story-telling. After the damage experience, people look for a new understanding of the meaning and goal in life. Newman and Nezlek (2019) have shown that rumination/reflection is positively related to finding the meaning of life and can potentially lead to increased positive affect, tranquility, and also, search for the meaning of life.

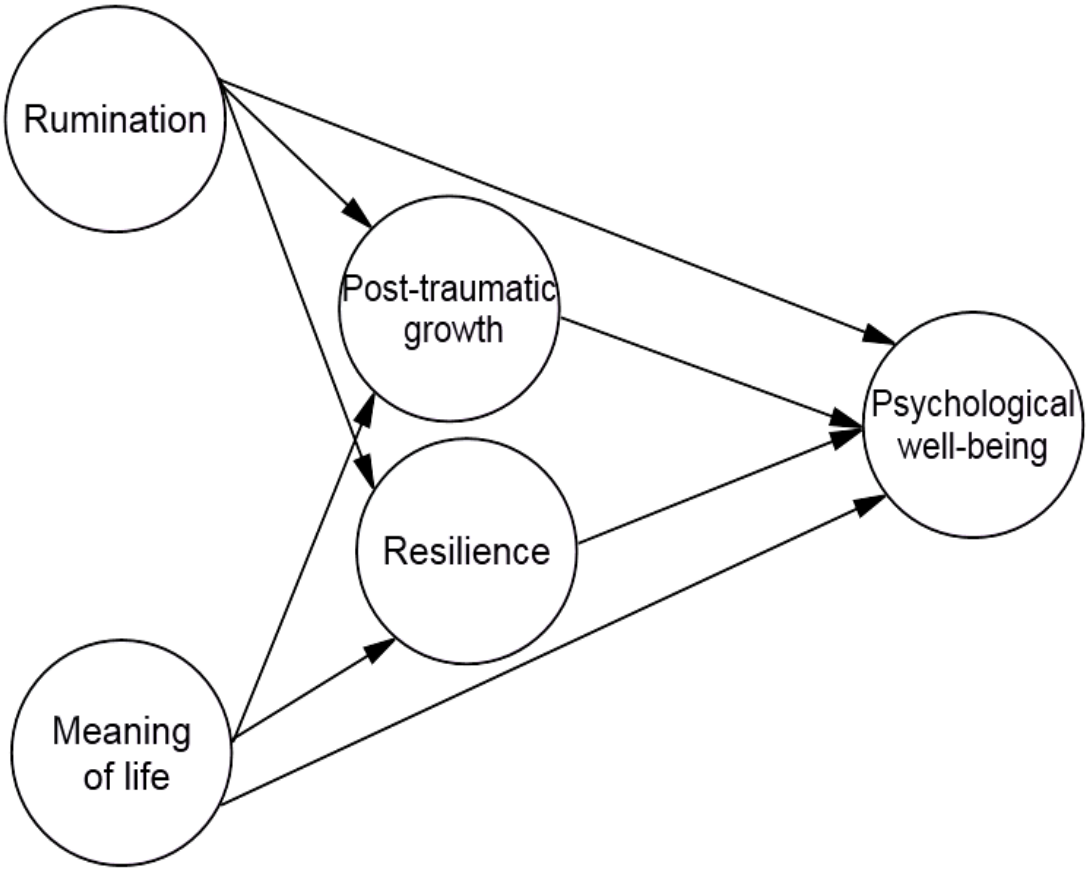
Meaning of life refers to a feeling of existential integrity that looks for philosophy of life, seeks the goal of life, and strives to achieve valuable objectives hence, a sense of completeness and usefulness (Ho, Cheung & Cheung., 2010). Some research studies have suggested that the meaning of life is positively associated with psychological well-being, life quality, self-esteem, hope, optimism, and self-efficacy (Dezutter, Luyckx, & Wachholtz, 2015; Ho et al., 2010). Moreover, some experimental studies confirmed that instruction on the meaning of life has proved to be effective in improving psychological indexes such as psychological well-being, life expectancy, mental health, and even physical indexes (Kang, Im, Kim, Kim, Song, & Sim, 2009). Similarly, Holtmaat et al. (2019) revealed a strong correlation between psychological well-being and personal meaning. In addition, they found a

medium-significant correlation between post-traumatic growth and personal meaning. Studying the meaning of life, Dezutter et al. (2015), too, found that meaning is a robust predictor of patients' psychological well-being.

Researchers believe that rumination/reflection (Crane, Searle, Kangas & Nwiran, 2019; Öcalan & Özçetin, 2020) and meaning of life (Balouchi, Bozorgmanesh, Amirfakhraee & Shafa'at, 2017; Kouchakizadeh & Dehghanzadeh, 2017) are in a significant and positive relationship with resilience. Having stabilized meanings and goals of one's self or the future can help individuals to enhance concentration on the personal problem when encountering daily issues, hence leading to increased resilience and capacity to face challenging situations. Values and goals from the component of the meaning of life can improve the mental health of patients with colorectal cancer through increasing resilience (Balouchi, et al., 2017). Resilience is an individual's capacity to make a psychological-biological balance in the face of jeopardies (Conner & Davidson, 2003). As previous research suggests, heightened resilience causes psychological well-being to increase (Beri & Dorji, 2021; Booth et al., 2021; Brown & Shi, 2021; Hassanzadeh naming, Peymani, Ranjbaripour & Abolma'ali Alhosseini, 2019; Walsh et al., 2019). Also, Walsh et al. (2019) indicated that post-traumatic growth might have a central role in the link between resilience and mental health consequences of cancer patients.

Considering the interconnections among the research variables of the present study, the design, and examination of this model, apart from determining

*Figure 1*. The Proposed Model



the direct and indirect effects of variables related to psychological well-being, can empirically test both the functional-descriptive model and the meta-theoretical person-centered perspective. A review of the literature suggests that scholars have never investigated the interactive and causative relationships and effects of rumination, the meaning of life, post-traumatic growth, resilience, and psychological well-being together and in a single conceptual model. Thus, the present research study seeks to answer the following questions:

Do the mediating roles of post-traumatic growth and resilience enjoy the goodness of fit with the data in the structural model of psychological well-being based on rumination and meaning of life in cancer patients? Do post-traumatic growth and resilience have a mediating role in the relationship between psychological well-being and rumination and meaning of life in cancer patients?

## Method

The present study is descriptive-correlational in terms of method (using structural equation modeling (SEM). The statistical population contained all 30-65-year-old cancer patients (all types of cancer) (women and men) who visited one of the Hospitals in Tehran in the winter and spring of 2020. Samples were selected from patients referred to Imam Hossein, Shohadaye Tajrish, and Imam Khomeini hospitals. Some researchers consider 100 to be the minimum sample size and take 200 or higher as desirable (Meyers et al., 2006). The method of the ratio of the subject to the estimated parameters is used among SEM researchers) Schumacker & Lomax, 2004). Considering that the number of free parameters for estimation in the present model was 54, thus, taking precaution for the mortality effect, a sample of 300 individuals was recruited through purposive sampling. Entry criteria for participants included a diagnosis of cancer (According to the medical record and Diagnosis of the attending physician), the ability to complete the instruments, having a high school diploma or a higher degree, more than three months past the diagnosis, the age range of 30-65. Exclusion criteria are: being treated for another physical or psychological illness, cognitive impairment, acute, and severe symptoms of the disease that make it difficult or almost impossible for the patient to participate in the study. Participants completed the questionnaires individually and in one session.

**Ethical statement**

The purpose of the study was clarified for each participant and all of them were assured about the privacy and confidentiality of the data. They also felt free to quit the study at any time they would like during the study.

## Measures

**Ryff's Psychological Well-being Questionnaire:** psychological well-being questionnaire was developed by Ryff (1989) to measure and assess psychological well-being from various perspectives (independence, dominance over the environment, personal growth, positive relationship with others, purposefulness of life, acceptance of self). The version used in the present study contained 18 items that covered six dimensions. This short version achieved acceptable correlation coefficients ranging from 0.70 to 0.89 to the original version (Ryff & Singer, 2006). To validate the instrument, Ryff utilized different measures such as Bradburn emotional balance scale (1969), Neugarten life satisfaction (1965), and Rosenberg self-esteem scale (1965). Cronbach's alpha for this questionnaire in Ryff's (1998) study lay somewhere between 0.79 to 0.85. Furthermore, Khanjani et al. (2014) investigated the psychometric characteristics of the 18-item version of the psychological well-being questionnaire and confirmed its six-factor structure. Internal consistency of the questionnaire, using Cronbach's alpha, was estimated to fall between 0.51 to 0.76 and for the whole scale, it was 0.71. Pearson correlation coefficient between questionnaire factors with Rashid and Seligman's (2013) positive

psychotherapy, too, confirmed the convergent validity of the instrument. Additionally, the negative correlation between this questionnaire and scales of depression, stress, and anxiety verifies its validity. In the present study, reliability of self-acceptance, environmental dominance, positive relationship with others, having a goal in life, personal growth, and independence was calculated to be 0.78, 0.72, 0.89, 0.75, 0.84, 0.76 respectively, and 0.72 for the whole scale.

**Rumination/Reflection Questionnaire (RRQ):** This questionnaire was originally devised by Trapnell and Campbell (1999) in an effort to differentiate adaptive and maladaptive components of rumination. The final version of the scale includes 24 items, 12 of which focus on self-rumination and the other half measures corresponding reflective thinking. The items are answered on a 5-point Likert scale from completely disagree (1) to completely agree (5). Trapanell and Campbell inspected the validity of the scale and reported a strong and positive relationship between the sub-scale of rumination and symptoms of neuroticism whereas reflection demonstrated the strongest association with an opening to experience. Using Cronbach's alpha, Trapnell and Campbell calculated the internal consistency of reflection to be 0.91 and 0.90 in the case of rumination. These two factors showed the minimum correlation with one another (0.22). In addition, in Ghorbani et al.'s (2008) study, the questionnaire was confirmed to possess good psychometric characteristics so that the internal consistency of the scale was estimated to be 0.84 in Iran and 0.80 in the US. In the current research study, the reliability of self-rumination and corresponding reflective thinking were 0.84, and 0.74 respectively and 0.76 for the whole scale.

**Meaning in Life Questionnaire (MLQ):** meaning of life questionnaire (Steger, 2010) measures two dimensions of meaning in life, i.e., presence of meaning and search for meaning, by using ten items on a 7-point Likert scale from totally incorrect (1) to totally correct (7). The Range of scores stretches from 5 to 35. Previous studies indicate reliability and consistency of scores and also convergent and divergent validity of the questionnaire (Steger & Sheen, 2010). For instance, for both scales, excellent indexes of internal consistency (alpha coefficient between 0.82 to 0.87) have been reported (Steger et al., 2010). Furthermore, test-retest reliability with a one-month interval yielded acceptable results (0.70 for presence and 0.73 for the search of meaning) (Steger et al., 2006). In Iran, Mesrabadi et al. (2013) investigated the construct and diagnostic validity of the questionnaire among college students. The findings of confirmatory factor analysis culminated in a two-factor model (presence of meaning and search for meaning in life) with the acceptable fit. Moreover, findings suggested that the questionnaire is well capable of identifying healthy individuals. In the present study, the reliability indexes were estimated to be 0.76 for the presence of meaning, and 0.80 for the search for meaning, and 0.75 for the whole scale.

**Post-traumatic Growth Inventory:** This questionnaire was designed by Tedeschi and Calhoun (1996) for measuring post-traumatic growth. The self-report instrument includes 21 items and respondents must give answers on a six-point Likert scale. The original format consisted of five multi-item sub-scales including 1) relationship with others, 2) new possibilities, 3) individual power, 4) spiritual changes, and 5) value of life. In Tedeschi and Calhoun's (1996) study, the coefficients of correlation between the sub-scales and the overall measure were significantly positive (0.88) and Cronbach's alpha coefficient for the whole questionnaire was 0.92. The findings of Tedeschi and Calhoun (1996) suggest that people who had been inflicted by an affective blow got higher scores compared with normal ones. Heydarzadeh et al. (2015) examined the psychometric characteristics of the Persian version of the post-traumatic growth questionnaire among cancer patients and reported that confirmatory factor analysis produced

acceptable goodness of fit. Additionally, the five-factor structure of the instrument was verified. Cronbach's alpha for the whole questionnaire was estimated at about 0.87 and the obtained coefficients for the main five-factor components fell between 0.57 and 0.77. Also, the correlation between the two administrations of the inventory with a 30-day interval in 18 samples was calculated to be 0.75. In the current study, the reliability indexes of the scales were calculated to be 0.78 for the relationship with others, 0.70 for new possibilities, 0.74 for individual power, 0.77 for spiritual changes, and 0.70 for the value of life, and 0.70 for the overall questionnaire.

**Connor-Davidson Resilience Scale:** This questionnaire was developed by Connor and Davidson (2003). It contains 25 items on a five-point Likert scale from 1 (completely incorrect) to 5 (completely correct). Therefore, the range of possible scores stretches from 0 to 100. Higher scores indicate higher resilience. Factor analysis results suggest that the scale is constituted of five major factors: personal competence, trust in one's instincts, tolerance of negative affect, positive acceptance of change and secure relationships, control, and spiritual influences. Connor and Davidson (2003) reported a Cronbach's alpha index of 0.89 for the resilience scale. Moreover, the reliability coefficient obtained from the test-retest with a four-week interval was estimated to be 087. There is a meaningful and positive correlation between scores obtained from the Connor-Davidson questionnaire and those from the Kobasa hardiness scale. Furthermore, Connor-Davidson questionnaire scores are negatively correlated with scores of perceived stress and Sheahan's vulnerability to stress scale. These results confirm the concurrent validity of the scale. Connor-Davidson scores did not demonstrate any significant correlation with Arizona sexual experience scale either at the beginning or at the end of the experiment, confirming the divergent validity of the scale. In a study by Samani et al. (2007) on students, the reliability of the scale was reported to be 0.93, while its validity was affirmed among various normal and at-risk groups (via factor analysis and convergent and divergent validity). In the present study, the reliability of the questionnaire for scales of personal competence, trust in one's instincts, tolerance of negative affect, positive acceptance of change and secure relationships, control, and spiritual influences were estimated as 0.87, 0.85, 0.81, 0.80, 0.71, respectively and 0.76 for the overall scale taken together.

The data were analyzed by conducting structural equation modeling and Sobel test (to determine the unique role of mediating variables) using SPSS and Amos version 21.

## Results

The present research study was conducted on a

**Table 1.** Demographic characteristics of the studied sample

| variable | | mean | Standard deviation |
|---|---|---|---|
| age | | 42.89 | 7.34 |
| gender | | Frequency | Frequency percent |
| | male | 82 | 27.3 |
| | female | 218 | 72.7 |
| Duration of infection | Less than a year | 77 | 25.7 |
| | 1 to 5 years | 196 | 65.3 |
| | 6 to 10 years | 27 | 9.0 |
| stage | 0 | 75 | 25.0 |
| | 1 | 112 | 37.3 |
| | 2 | 97 | 32.3 |
| | 3 | 16 | 5.3 |

sample including 300 cancer patients (male= 27.3% and female= 72.7%) of 30 to 65 years of age (mean= 42.89, SD= 7.34). (table 1) Table 2 presents the means, standard deviations, kurtosis, and skewness of the raw data. None of the variables appeared to seriously deviate from a normal distribution. According to the majority of related sources, kurtosis and skewness of scores between -2 and 2 can be assumed normal (Gravetter & Wallnau, 2014).

The Pearson correlation matrix is presented in Table 3, which shows that there is a positive and significant correlation between the variables (P<0.001).

Table 4 shows the standardized estimates and other measured variables. According to Table 4, the direct effect of rumination, meaning of life, post-traumatic growth, and resilience on psychological well-being was significant (P<0.05). The indirect effects of rumination and meaning of life through mediation of post-traumatic growth and resilience were significant (P<0.05).

**Table 2.** Descriptive Statistics

| Variables | Mean | Standard deviation | Kurtosis | Skewness |
|---|---|---|---|---|
| Psychological well-being | 369.42 | 40.47 | -0.46 | -0.32 |
| Post-traumatic growth | 83.31 | 13.50 | -0.91 | 1.04 |
| Resilience | 83.78 | 19.83 | -1.72 | 1.58 |
| Rumination | 86.63 | 12.82 | -0.44 | 0.50 |
| Meaning of life | 55.73 | 7.34 | -0.38 | -0.91 |

**Table 3.** Pearson Correlation Matrix

| | Variable | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1 | Psychological well-being | 1 | | | | |
| 2 | Post-traumatic growth | 0.68** | 1 | | | |
| 3 | Resilience | 0.78** | 0.57** | 1 | | |
| 4 | Rumination | 0.73** | 0.71** | 0.49** | 1 | |
| 5 | Meaning of life | 0.77** | 0.51** | 0.65** | 0.68** | 1 |

**P<0.001

**Table 4.** Coefficients of the Structural Model paths

| Path | Standard parameter β | Critical value | P value |
|---|---|---|---|
| Rumination → Psychological well-being | 0.38 | 3.38 | <0.01 |
| Rumination → Post-traumatic growth | 0.88 | 8.338 | <0.01 |
| Rumination→ Resilience | 0.50 | 7.626 | <0.01 |
| Meaning of life→ Psychological well-being | 0.43 | 3.69 | <0.01 |
| Meaning of life→ Post-traumatic growth | 0.25 | 6.065 | <0.01 |
| Meaning of life→ Resilience | 0.35 | 3.04 | <0.05 |
| Post-traumatic growth→ Psychological well-being | 0.31 | 4.15 | <0.01 |
| Resilience→ Psychological well-being | 0.36 | 9.53 | <0.01 |
| Rumination → Post-traumatic growth→ Psychological well-being | 0.27 | 6.18 | <0.01 |
| Rumination → Resilience → Psychological well-being | 0.18 | 7.04 | <0.01 |
| Meaning of life→ Post-traumatic growth → Psychological well-being | 0.08 | 3.43 | <0.01 |
| Meaning of life → Resilience → Psychological well-being | 0.13 | 2.89 | <0.03 |

**Table 5.** Indexes of Goodness of Fit of the Model

| model | $\chi 2$/df | P | GFI | CFI | NFI | RMSEA |
|---|---|---|---|---|---|---|
| Proposed model | 2.14 | 0.001 | 0.92 | 0.93 | 0.92 | 0.05 |

As Table 5 demonstrates, $\chi^2$/df reached 2.14 which is less than three and indicates proper goodness of fit (according to Kline, 2016). Also, indexes of GFI (0.92), CFI (0.93), and NFI (0.92) were all above the value of 0.90 which affirms the goodness of fit of the model and the data as well. Similarly, the residuals index is less than 0.08 (RMSEA= 0.05) which is a promising index for the goodness of fit. This model explains about 51% of the variance in psychological well-being. Rumination and meaning of life explain 31% of the variance in post-traumatic growth and 42% of the variance in resilience.

## Discussion and Conclusion

Calculation and analysis of different goodness of fit indexes showed that the structural model of psychological well-being based on rumination and the meaning of life with the mediating role of post-traumatic growth and resilience in cancer patients enjoys a good fit with the collected data and is in line with the functional-descriptive model (Tedeschi, 1999, 2004) and the meta-theoretical person-centered perspective (Joseph, 2003). According to findings of the current study consistent with post-traumatic growth models such as the functional-descriptive model (Tedeschi, 1999, 2004), experiencing the state of suffering from cancer, initially, causes mental agitation, challenges ways of giving meaning to excitements and emotions and results in rumination. Effort-based rumination

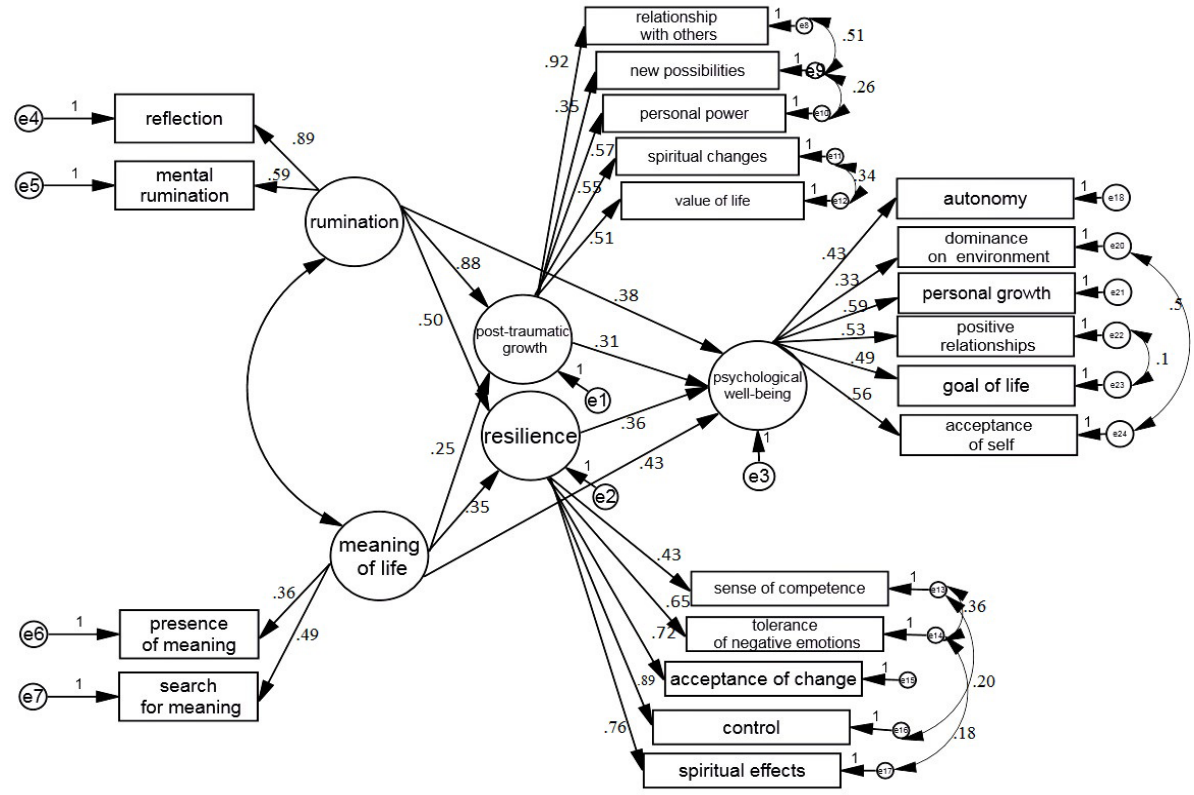



*Figure 2*. The Experimental Model with Standardized Path Coefficients

brings about meaning-making. According to the meta-theoretical person-centered perspective, if individuals try to externalize their inner structures positively while they internalize the incident-related information after encountering stress-producing events and trauma, they would be able to attain post-traumatic growth (Joseph & Linley, 2008; as cited in Zargham Hajebi, 2009). Results of the present study revealed that rumination/reflection has a significant and direct impact on cancer patients' psychological well-being. Some other studies are consistent with these findings (Aghayousefi et al., 2015; Harrington & Loffredo, 2010; Newman & Nezlek, 2019). According to Calhoun et (2000), positive rumination is a key factor in the appearance of the constructive dimension of post-traumatic growth, so people who use positive and constructive rumination from the earliest moments of their encounter with the trauma would more probably show signs of post-traumatic growth within six to 24 months after the crisis. Some scholars confirmed the positive association between reflection and psychological well-being (Harrington & Loffredo, 2010; Newman & Nezlek, 2019). Other findings have indicated that rumination has a negative and significant relationship with psychological well-being (Aghayousefi et al., 2015; Harrington & Loffredo), which is in disagreement with the present results. This observed discrepancy can be explained based on the post-traumatic growth theory. Rumination, if leading to meaning-making and post-traumatic growth, can potentially positively affect psychological well-being. It seems that reflection can increase the psychological well-being of cancer patients by increasing their willingness to self-focus, and self-acceptance. Rumination about stressful experiences is an important factor in meaning-making because it re-evaluates the accident or revises schemas (Park & George, 2013). Engagement with cancer entails major concerns about health, the experience of pain, death, etc. Recurring thoughts regarding the disease and experiences related to it lead to rumination. If rumination is accompanied by curiosity and interest in abstract thinking, concentration on and acceptance of self, it can culminate in the psychological well-being of cancer patients via improving meaning-making. Concentration on and attention to self, which bring about acceptance and a non-judgmental attitude toward individuals' inner experiences, can enhance and increase positive emotions and lessen negative ones through changing attitudes and contribute to their psychological well-being. As research findings suggest, mindfulness, also, can improve psychological well-being by increasing concentration and acceptance (Blanke et al., 2019; Lianchao & Tingting, 2020).

Moreover, the findings of the present study corroborate those of some other studies and highlight the link between the meaning of life and psychological well-being (Dezutter et al., 2015; Holtmaat et al., 2019; Popa-Velea et al., 2021). It seems that the cognitive component of meaning contributes to a sense of coherence and integrity in life and also, to a clear understanding of the meaning of life whereas, motivational and affective elements facilitate the achievement of positive goals and emotions. Any of these components can potentially impact cancer patients' psychological well-being by enhancing understanding of the meaning of life, integrity, goal-orientedness, and positive emotions. The meaning of life influences cancer patients' psychological well-being through creating happiness (Popa-Velea et al., 2021), life satisfaction (Yilmaz et al., 2019), optimism (Mohammadi et al., 2019), and resilience (Ostafin & Proulx, 2020). Meaning of life, through creating relationships and strengthening values like cooperation and altruism, can result in the establishment of positive connections with others, empathy, and improved social support, which by themselves lead to the enhancement of people's psychological well-being (Bapiri et al., 2020; Damreyhani et al., 2017).

Additionally, the observed results, in line with some other studies (Holtmaat et al., 2019; Ken et al.,

2010; Salehi & Dehshiri et al., 2018), indicate that post-traumatic growth has a direct and significant impact on cancer patients' psychological well-being. Salehi and Dehshiri (2018) confirmed the link between post-traumatic growth and variables of psychological, spiritual, and mental well-being and hopefulness. Also, they showed that variables of psychological well-being, existential well-being, and hopefulness play significant roles in predicting post-traumatic growth. Positive changes in interpersonal connections (appreciating family members and friends, intimacy, and altruism), attitude to oneself (accepting weaknesses and limitations of self, sense of wisdom, and strength), and philosophy of life (sense of meaning, understanding life, the world as perishable entities, and the freshness of every day of life), as observed in grown individuals, can influence cancer patients' psychological well-being through raising positive emotions, reducing negative emotions, and improving life satisfaction.

The findings of the present study are in line with some previous studies (Beri & Dorji, 2021; Brown & Shi, 2021; Booth et al., 2021; Hassanzadeh et al., 2019; Walsh et al., 2019) in highlighting the effect of resilience on psychological well-being. Resilience affects patients' encounters with stressful events and negative experiences of cancer by increasing positive emotions. In the same vein, positive emotions and successful encounters with disease-oriented stress can, by themselves, lead to psychological well-being. Various characteristics of resilient individuals impact their psychological well-being in different ways; for example, maintaining an appropriate relationship with close friends, family members and other people escalates social support, which in its own right, brings about enhanced psychological well-being (Poudel et al., 2020). Other traits of resilient individuals that affect positive emotions and psychological well-being include acceptance, developing realistic goals and moving towards them, looking for opportunities for self-actualization and self-identification, raising self-confidence, maintaining balance and flexibility, keeping a long-term vision, seeing stressful events in the bigger picture, hopefulness, protecting one's body and mind, and learning from the past (Davidson, 2006; as cited in Mozaffari et al., 2011, Garcia, Al Nima, Lindskär, Jimmefors, Archer & MacDonald, 2018).

Other results of the current study demonstrated that rumination and the meaning of life, mediated by post-traumatic growth and resilience, affect cancer patients' psychological well-being significantly and indirectly. Thus, according to what has been stated, experiencing stressful and life-threatening events causes activation of rumination/reflection in individuals; rumination/reflection leads to meaning-making, and then, both of them influence post-traumatic growth, resilience, and psychological well-being. This interpretation is consistent with these results. It seems that rumination/reflection impacts post-traumatic growth and resilience via affecting coping resources (social, cognitive, motivational, and practical) and the application of emotion regulation the methods. Consistent with these findings, previous studies have suggested that meaning-making through goal setting and stabilized meaning of self and future results in enhanced concentration on personal problems when facing challenging events and enables the individual to deal with the difficult situation, culminating in improved post-traumatic growth, and resilience. The impact of rumination and the meaning of life mediated by post-traumatic growth and resilience bears its effect on psychological well-being through several cognitive and emotional mechanisms: increased personal potentials, a sense of inner power, self-efficacy, optimism, problem-solving ability, looking for social support, acceptance of suffering, commitment to change, appreciating life, changing attitudes, using new opportunities, reappraisal and prioritizing values, and setting goals. This explanation substantiates the findings of previous studies such as one done by Fazel et al. (2017), who found that disease and death encounter activates rumination in

cancer patients. Rumination, sometimes, invokes patients' reappraisal of life and challenges their ideology. In this situation, some factors are more frequent ingrown patients than under-grown patients: spirituality, meaning-making, life satisfaction, goals (specific goals and taking action to attain them), needs and superior expectations (like continuing education), optimism, patience, etc. Those who possess such factors demonstrate more post-traumatic growth, mental health, and psychological well-being. Tranquility, acceptance, finding new goals, and change of attitudes result from dealing with cancer among people with such qualities.

## Limitations

It seems warranted to interpret the results of the present study in the face of some limitations: This study was cross-sectional; therefore, a configuration of the results without taking the effect of time on variables and their relationships is a severe limitation. Also, the results are drawn from a sample of cancer patients in Tehran province. Thus generalizing the findings to other different research groups or populations such as cancer patients in other cities, patients affected by other chronic illnesses, etc. should be done with great caution.

**Suggestion:**It is recommended that the moderating role of stages of disease should be considered in predicting the consequences of dealing with stressful experiences among cancer patients. Finally, it can be suggested to therapists to consider resilience enhancement and meaning therapy interventions as effective methods of improving mental health and psychological well-being in cancer patients.

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