

The Effect of Logotherapy and Positive Psychology Based Group Intervention on Intolerance of Uncertainty*

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ABSTRACT

This study aims to examine the effect of logotherapy and positive psychology-based group intervention developed by the researchers on intolerance of uncertainty and psychological well-being. A true experimental design with experimental and control groups was used in the study. The participants of the study consisted of volunteer university students with intolerance of uncertainty and anxiety problems. Participants were randomly assigned to the experimental and control groups. The experimental group received a 12-session logotherapy and positive psychology-based group intervention program aimed at coping with intolerance of uncertainty and increasing psychological well-being. The control group did not receive any intervention. In the study, pre-test and post-test measurements were taken using the Intolerance of Uncertainty (IUS-12) and the Flourishing Scales. Mann-Whitney U and Wilcoxon Signed Ranks tests were used for data analysis. As a result of the study, while there was no difference between the pre-test scores of the control group and the experimental group, it was observed that the intolerance of uncertainty scores of the experimental group were significantly lower than the control group as a result of the intervention. In addition, while there was no significant difference between the pretest and posttest intolerance of uncertainty scores of the control group, the posttest scores of the experimental group were significantly lower than the pretest scores. The results of the study showed that the psychological well-being scores of the participants in the experimental group increased significantly, while there was no significant difference in the control group. These results show that the group program was effective on intolerance of uncertainty and psychological well-being in university students.

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Keywords:

Logotherapy, positive psychology, intolerance of uncertainty, psychological well-being, group intervention

INTRODUCTION

Knowledge, defined as knowing the answer to a given situation (Gigerenzer & Garcia-Retamero, 2017), and the desire to access this knowledge is a powerful motivator. People want to access knowledge (Lyotard, 1997), but they face a wide range of uncertainties ranging from everyday issues to business life, from personal relationships to future decision-making processes, from life span to the behavior of others (Anderson et al., 2019; Lauriola & Levin, 2001). Knowledge and the process of accessing knowledge inherently involve uncertainties (Lyotard, 1997). Uncertainty is defined as the lack of knowledge or inability to predict the outcome of a situation (Anderson et al., 2019; Tanovic et al., 2018). Lovecraft (1927) stated that the oldest and most intense emotion of humanity regarding uncertainty is fear, and this fear is related to the unknown (as cited in Carleton, 2012). Budner (1962) categorized the concept of uncertainty under three headings: a situation that the individual has not experienced before (novelty), experiencing complexity in the face of a situation or event (complexity), and the presence of contradictions and a large number of clues in the solution process (insolubility). Uncertainty includes both the present moment and the future, especially lack of information and variability. People may experience different effects depending on how they respond to or cope with uncertainty (Anderson et al., 2019). These effects can permeate many issues such as individuals' attitudes, decision-making processes, emotional reactions, and life satisfaction (Anderson et al., 2019; Lauriola & Levin, 2001). For the same uncertain situation or event, two individuals may have different tolerance thresholds. A person with a lower tolerance for uncertainty may find the situation uncomfortable or even unacceptable, whereas a person with a higher tolerance for uncertainty may find the situation less uncomfortable. This explanation emphasizes the subjective evaluation of uncertainty by the individual (Ladouceur et al., 2000). Intolerance of uncertainty is regarded as a cognitive bias that shapes an individual's thoughts, feelings, and actions in response to uncertain situations or events (Laugesen et al., 2003). Carleton (2012) describes intolerance of uncertainty as a tendency in individuals to experience stress, anxiety, and negative emotions stemming from the anticipation of uncertain or adverse events that might occur in the future. Carleton (2012)

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considers intolerance of uncertainty in two dimensions: The first dimension is prospective intolerance of uncertainty. Prospective uncertainty intolerance may cause individuals to think and worry intensely about the possibility of negative events that may occur in the future. The second is inhibitory uncertainty intolerance. In this dimension, individuals have difficulty in taking action or remain completely inactive when faced with uncertainty. In the face of uncertainty, individuals have difficulty in making decisions and may experience hesitation (Carleton, 2012).

It is seen that intolerance of uncertainty is evaluated with many psychopathological problems. Low tolerance for uncertainty causes individuals to make excessive efforts to control uncertainty and increase their anxiety levels when they feel that these efforts are insufficient (Carleton, 2012). Many studies reveal that intolerance of uncertainty is a risk factor for anxiety disorders (Çırak, 2021; Dugas et al., 2004; Gentes & Ruscio, 2011; Norton & Mehta, 2007). In addition, there are studies showing that it is associated with many mental health problems such as depression (Korkmaz & Güloğlu, 2021; Miranda et al., 2008a; Saulnier et al., 2019); eating disorders (Renjan et al., 2016); somatization (Wright et al., 2016). Individuals with low tolerance for uncertainty may perceive high risk in uncertain situations or events. According to Carleton (2012), intolerance of uncertainty has a transdiagnostic characteristic as a common factor in anxiety problems and depression. While transdiagnostic factors are generally considered as both risk and sustaining factors for disorders, they are common to many clinical pictures and are associated with changes in symptoms (Yığman & Fidan, 2021). Instead of disorder-specific methods, the transdiagnostic approach advocates identifying common processes underlying psychopathological symptoms and making these processes the target of treatment (Oğuz & Batmaz, 2020). In this context, it is important to develop interventions for intolerance of uncertainty, which has been shown to have a fundamental effect on many psychopathologies (e.g. Buhr & Dugas, 2009; Miranda et al., 2008b).

Logotherapy is a well-established approach with proven effectiveness in dealing with a wide range of mental health problems (Frankl, 2009). Logotherapy, defined as the third Viennese school of psychotherapy based on Frankl's humanistic and existentialist perspective, is a meaning-centered therapy approach (Frankl, 2009; Wong, 2012). Meaning helps individuals evaluate their lives as important and feel coherence (Steger, 2012). In the literature, many studies have shown that lack of meaning in life is a clinical problem (Frankl, 2009; Yalom, 2011). In addition, having meaning in life is associated with life satisfaction (Chamberlain & Zika, 1988; Pan et al., 2008; Steger et al., 2011; Yıkılmaz & Güdül, 2015), happiness (Debats et al., 1993), well-being (Bonebright et al., 2000; Fry, 2000; García-Alandete, 2015; Reker & Wong, 1983; Vilchinsky & Kravetz, 2005), self-compassion (Altıparmak, 2019; Deniz et al., 2017) and hope (Feldman & Snyder, 2005; Mascaro & Rosen, 2005). Logotherapy sees the individual in a central, responsible position that determines his/her own value system and gives meaning to his/her life (Frankl, 2009; Frankl, 2019). It helps individuals to determine an attitude towards difficulties. It develops coping mechanisms and shows the individual that their life is their responsibility (Frankl, 2009). According to existential analysis and logotherapy, people are not completely subject to conditions, they take a stance according to conditions and situations. The individual has the freedom to shape his/her own life within certain limits (Schulenberg et al., 2008). Logotherapy not only offers an effective treatment for many anxiety disorders but also focuses on the already uncertain issues of the future and death (Yalom, 2011; Frankl, 2009). In the literature, Logotherapy interventions are integrated with different approaches (Ameli, 2016; Batthyany & Russo-Netzer, 2014; Wong, 2016). In Integrative Meaning Therapy, Wong (2016) combined Logotherapy with Positive Psychology and thus strengthened the interventions. In addition, it is seen that integrative group interventions are effective in terms of positive psychology (Eryılmaz & Altınsay, 2021; Uzun & Deniz, 2024). In psychological interventions, in order to improve the quality of life of individuals, it is not only sufficient to deal with negative feelings and thoughts, but it is also important to reveal the potential of the person, to give meaning to his/her life, to improve social relations and to achieve a more comprehensive well-being (Ryff, 1995). Research in the field of positive psychology has shown that individuals can be offered systematic and effective help. The aim of positive psychology is to bring the mental health of individuals to a more positive point (Eryılmaz, 2017). Positive psychology seeks to assist individuals in building their strengths and unlocking their potential. Based on the World Health Organization's definition of health, it is stated that well-being is not only the absence of disease, but should also be achieved within a biopsychosocial integrity (Eryılmaz, 2021). Positive psychology focuses on many concepts. One of the most important concepts is well-being (Seligman, 2012). Well-being is discussed under two sub-headings as subjective well-being and psychological well-being (Ryff, 1995). Subjective well-

being is evaluated in hedonic structure, while psychological well-being is evaluated in eudaimonic structure. Subjective well-being includes the individual's emotional and cognitive evaluation of his/her life and expresses that he/she is generally satisfied with life (Diener, 1984). Ryff (1989) defined psychological well-being as multidimensional. In Ryff's conceptual framework, psychological well-being includes six dimensions: self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life and personal growth in order for the individual to lead a satisfactory life (Ryff & Keyes, 1995). Self-acceptance means that the individual accepts himself/herself as he/she is, recognizes both his/her positive and negative aspects, and is at peace with his/her past. The positive relationships dimension refers to establishing quality relationships with others that include empathy, sincerity, trust and compassion. Autonomy is the individual's ability to be decisive by making independent decisions in his/her life according to his/her wants and needs. Environmental mastery emphasizes the individual's capacity to effectively evaluate and manage his/her environment. Life purpose includes having goals that give meaning to one's life and having an orientation in this direction. Finally, the personal growth dimension is related to the individual's continuous self-improvement, openness to new experiences and efforts to realize his/her potential (Ryff & Keyes, 1995). Well-being psychotherapy, based on Ryff's six-dimensional model of psychological well-being, is a short-term, structured process that aims to increase psychological well-being, addresses existing problems and relies on clients' self-observation and management skills (Fava & Tomba, 2009). It involves self-observation, structured diary use and cognitive restructuring through interaction between the client and therapist (Fava & Ruini, 2003).

The COVID-19 pandemic in recent years has negatively affected the mental health of individuals. It has been a concern for higher education institutions around the world, especially in terms of its impact on the mental health of university students. There are findings that university students are affected by the COVID-19 pandemic in many areas in terms of mental health (Altıparmak, Çanakçı & Deniz, 2021; Çamur et al., 2022; Çanakçı Uğur et al., 2024), therefore interventions for this group are extremely important. In fact, in an empirical study with university students, uncertainty was found to have a strong relationship with suicide intention (Wu et al., 2020). It has been observed that intolerance of uncertainty has been intensively studied in Türkiye, especially with the COVID-19 pandemic e.g. Coşkun, 2019; Deniz, 2021; Duman, 2020; Erol, 2020; Kasapoğlu, 2020; Satıcı et al., 2022; Ümmet & Çetintaş, 2022) but a limited number of intervention programs (e.g., Arslan, 2013; Özgöl, 2023; Yıldız, 2017) have been developed. It is recommended to develop more intervention programs for intolerance of uncertainty (Satıcı et al., 2022). On the other hand, earthquake-related studies (e. g. Xiaofei Xie et al., 2011) show that post-earthquake feelings of uncertainty are associated with and partially mediate mental health variables such as anxiety and depression. The earthquake disaster on February 6, 2023, had a profound impact on numerous individuals in Türkiye and has been associated with mental health challenges, including conditions like post-traumatic stress disorder, depressive symptoms, and heightened anxiety (Kiymis & Fakioglu, 2024). Considering the February 6, 2023 earthquake disaster, the COVID-19 pandemic, and the challenging life events in our country, it is important to develop intervention programs for intolerance of uncertainty, which is so related to mental health, and to increase psychological well-being. The logotherapy and positive psychology-oriented intervention developed in this study aims to reduce university students' intolerance of uncertainty and increase their psychological well-being.

METHOD

AIM AND METHODOLOGY OF THE RESEARCH

The aim of this study is to develop a group intervention based on logotherapy and positive psychology and to assess its effect on intolerance of uncertainty and psychological well-being in university students. In this study, a pretest-posttest control group design, one of the true experimental designs, was employed. In this design, participants were randomly assigned to either the experimental or control group, and measurements for both groups were taken before and after the intervention (Karasar, 2008). The independent variable of the study was a 12-session group intervention program combining positive psychology and logotherapy applied to the experimental group. Psychological well-being and intolerance of uncertainty levels of the university students participating in the study were the dependent variables of the study. The research design is given in Table 1.

Table 1. The design of the research

Group		Pre-Test	Procedure	Post-Test
Experimental Group	R	Measurement 1.1	12-session intervention	Measurement 1.2
Control Group	R	Measurement 2.1	No intervention was carried out	Measurement 2.2

Working Group

The research group was composed of volunteer university students from various departments of a university in Istanbul who exhibited symptoms of anxiety and intolerance of uncertainty. The participants, all female, had an average age of 22.50. One participant from the experimental group dropped out during the study, and the study was completed with 6 participants in the experimental group and 7 in the control group.

Intervention Process

The intervention aimed to reduce participants' intolerance of uncertainty and enhance their psychological well-being. The group leader, who completed training in logotherapy accredited by the Victor Frankl Institute (VFI) in Vienna and received supervision on positive psychology group interventions during their PhD studies, conducted the sessions. Ethics committee permission was obtained. The research was conducted at a university in Istanbul. Inclusion criteria were voluntariness and having an intolerance of uncertainty score above the average. Exclusion criteria were receiving any psychological support in the last three months, having a psychiatric diagnosis and taking psychiatric medication. Participants' psychological evaluations and their suitability for the group process were assessed with a structured pre-interview and additional psychological tests. The 14 participants who were determined to be suitable for the group were randomly assigned to the experimental and control groups. During the pre-interview, information about the process was given and informed consent was obtained.

Intervention

In this study, it was aimed to reduce the participants' intolerance of uncertainty and increase psychological well-being. In the intervention process, Ryff's psychological well-being model (e.g. Fava & Tomba, 2009; Ryff, 1989; Ryff & Keyes, 1995) and the therapeutic process of Logotherapy (e.g. Graber, 2004; Marshall, 2009) were taken into consideration. The group intervention is a closed group designed as 12 sessions. Each session lasts between 90 and 120 minutes. Summary information about the agendas of the intervention program is given in Table 2.

Table 2. Summary of Intervention

Sessions	Agenda of the sessions
Session 1	Introductions, establishing group contract, and psychoeducation on process.
Session 2	Expressing feelings about group/process, building trust, and assessing psychological well-being
Session 3	Exploring prospective/inhibitory dimensions of intolerance of uncertainty (Carleton, 2012) and impact on life; supporting environmental mastery for psychological well-being
Session 4	Assessing coping strategies for uncertainty; supporting self-acceptance for psychological well-being
Session 5	Giving information about the autonomic nervous system and practicing breathing and relaxation exercises. Supporting personal development for psychological well-being. Paradoxical intention.
Session 6	Paradoxical intention.
Session 7	Decision-making and uncertainty; Freedom, choice and responsibility in logotherapy. Promoting autonomy for psychological well-being.
Session 8	Relationships and uncertainty; navigating uncertainty in relationships. Fostering positive relationships with others for psychological well-being.
Session 9	The future, death, and uncertainty; supporting coping with uncertainty about the future and death.
Session 10	Logotherapy and meaning; Purpose in life for psychological well-being.
Session 11	Logotherapy and sources of meaning; Psychological well-being: Reflecting on the structured diary.
Session 12	Assessment, reflections on termination, relapse prevention plan, and closure.

DATA COLLECTION PROCESS

In this study, the Intolerance of Uncertainty Scale was used to assess intolerance of uncertainty and the Flourishing Scale was used to assess psychological well-being. Additional scales were also used for psychopathological assessment if needed during the inclusion process. An information form created by the researcher was used for information such as age and gender of the participants.

Intolerance of Uncertainty (IUS-12) Scale

A shortened version of the 27-item scale originally created by Freeston et al. (1994) was created by Carleton et al. (2007). Scores on the scale range from 12 to 60, with higher scores indicating greater intolerance of uncertainty (Carleton et al., 2007; Freeston et al., 1994). Sarıçam et al. (2014) adapted the short version of the scale into Turkish. To evaluate the construct validity of this Turkish adaptation, a confirmatory factor analysis was performed. The results aligned with the original structure, indicating that the 12 items grouped into two dimensions: prospective anxiety and inhibitory anxiety. The factor loadings of these items ranged from .55 to .87. For reliability, Cronbach's alpha coefficients were calculated as .88 for the entire scale, .84 for the prospective anxiety subscale, and .77 for the inhibitory anxiety subscale. For internal consistency, Cronbach's alpha coefficient is .91 in non-clinical sample and .92 in clinical sample, test-retest correlation coefficient is .74 and item-total correlation values are between .42 and .68 (Sarıçam et al., 2014).

The Flourishing Scale

The Psychological Well-Being Scale, initially created by Diener et al. in 2009, was later renamed the "Flourishing Scale" (Diener et al., 2009; Telef, 2013). A validity study with university students demonstrated that the scale has a single-factor structure, accounting for 53% of the total variance. Factor loadings for the items ranged from .61 to .77, and the scale showed a Cronbach's alpha internal consistency coefficient of .87. The Turkish adaptation was conducted by Telef (2013), where reliability analysis indicated a Cronbach's alpha of .80. The test-retest analysis further confirmed a positive and significant correlation between the two administrations ($r = 0.86, p < .001$). Higher scores on the scale reflect greater psychological well-being (Telef, 2013).

LIMITATIONS OF THE STUDY

There are some limitations in this study. The first one is the sample group of the study. The study is limited to 13 university student participants and the gender of all participants is female. The data collected in the study are limited to the qualities measured by the Intolerance of Uncertainty and The Flourishing scales. The study is limited to the 12-session group intervention program based on logotherapy and positive psychology developed by the researchers. In the study, pre-measurement and post-measurement were taken from the participants. Another limitation of the study is that the follow-up measurement was not taken.

FINDINGS

This section offers a comprehensive presentation and analysis of the study's findings. To examine the pre-test and post-test scores of the experimental and control groups, an initial assessment of the data's suitability for normal distribution was conducted. Based on the normality test results, kurtosis and skewness values were calculated. Considering these values (intolerance of uncertainty scale experimental group post-test skewness coefficient 2.153; Control group pretest intolerance of uncertainty scale skewness coefficient 1.521) Tabachnick and Fidell's (2013) suggestion was taken into consideration and it was determined that the data did not exhibit normal distribution. In addition, considering the low number of data sets ($n < 15$), Mann-Whitney U and Wilcoxon Signed-Ranks tests, which are non-parametric tests, were used as recommended in the literature (Çokluk, Şekercioglu, Büyüköztürk, 2012; Tabachnick, Fidell, Ullman, 2007). Accordingly, preliminary information on participants' scale scores was provided. Table 3 presents the participants' scale scores both before and after the intervention. Following this, a comparison of the pre-test and post-test scores from the experimental and control groups was conducted using the Mann-Whitney U Test. Subsequently, within-group comparisons of pre-test and post-test measurements for the experimental and control groups were made using the Wilcoxon Signed-Ranks Test.

Table 3. Information on the Scale Scores of the Participants

Measurement Tool	N	Group		Mean	sd
The Intolerance of Uncertainty Scale	6	Experimental group	Pre-test	38.17	5.04
			Post-test	22.5	7.45
	7	Control group	Pre-test	37.71	6.02
			Post-test	38.86	2.79
The Flourishing Scale	6	Experimental group	Pre-test	39.66	9.51
			Post-test	48.34	5.89
	7	Control group	Pre-test	33.71	5.02
			Post-test	37.72	7.34

Findings Regarding the Pre-Test and Post-Test Comparison of Intolerance to Uncertainty and Psychological Well-Being of Experimental and Control Groups

The pre-tests of the experimental and control groups were first compared regarding the Intolerance of Uncertainty and The Flourishing scales, and then the post-tests were compared Mann Whitney U test was used in the analysis The results are presented in Table 4.

Table 4. Mann Whitney U Test Results

Measurement Tool	Group	N	Mean rank	Sum of ranks	U	z	p	
The Intolerance of Uncertainty Scale	Pre-test	Experimental group	6	6.93	48.50	20.500	-0.072	0.945
		Control group	7	7.08	42.50			
	Post-test	Experimental group	6	3.58	21.50	0.500	-2.937	0.001*
		Control group	7	9.93	69.50			
The Flourishing Scale	Pre-test	Experimental group	6	8.17	49.00	14.000	-1.006	0.366
		Control group	7	6.00	42.00			
	Post-test	Experimental group	6	9.58	57.50	5.500	-2.220	0.022*
		Control group	7	4.79	33.50			

(* $p < 0.05$, * $p < 0.01$)

As indicated in Table 4, no significant difference was found between the pre-test scores for intolerance of uncertainty in the experimental and control groups ($U=20.500$, $z=-0.072$, $p > .05$). However, a significant difference was observed in the post-test scores, with the results favoring the experimental group ($U=0.500$, $z=-2.937$, $p < .05$). In the post-test, intolerance of uncertainty scores for the experimental group were significantly lower than those for the control group.

As shown in Table 4, there was no statistically significant difference in psychological well-being pre-test scores between participants in the experimental and control groups ($U=14.000$, $z = -1.006$, $p > .05$). However, a statistically significant difference emerged in the post-test scores, favoring the experimental group ($U=5.500$, $z=-2.220$, $p < .05$). The post-test scores for psychological well-being were significantly higher in the experimental group compared to the control group.

Findings Regarding the Comparison of the Pre-test and Post-test of the Experimental Group and the Comparison of the Control Group Pre-test and Post-test

The pretest and posttest scores of the Intolerance of Uncertainty Scale and The Flourishing Scale of the Experimental and Control Groups were compared. Wilcoxon Signed Rank Test was used to analyze whether there was a significant difference between the ranks of positive differences and the ranks of negative

differences. First of all, the pre-tests and post-tests of the experimental group regarding the Intolerance of Uncertainty and The Flourishing scales were compared. The results are presented in Table 5. Afterwards, the pretests and posttests of the control group regarding the Intolerance of Uncertainty and The Flourishing scales were compared and presented in Table 6.

Table 5. Wilcoxon Signed Rank Test Results for the Experimental Group

Measurement Tool		N	Mean rank	Sum of ranks	z	p
The Intolerance of Uncertainty Scale	Negative ranks	6	3.50	21.00	-2.670	0.008*
	Positive ranks	0	.00	.00		
	Ties	0				
The Flourishing Scale	Negative ranks	0	.00	.00	-2.002	0.045*
	Positive ranks	6	3.50	21.00		
	Ties	0				

(* $p < 0.05$)

As shown in Table 5, according to the findings obtained from the analysis of the Wilcoxon Signed Rank Test, there was a statistically significant difference between the positive difference rankings and negative difference rankings of the experimental group's intolerance of uncertainty ($z = -2.670$; $p < 0.05$) and psychological well-being ($z = -2.002$; $p < 0.05$) pre-test and post-tests. The findings of the study show that the intervention for the experimental group was effective in reducing intolerance of uncertainty and increasing psychological well-being.

The Wilcoxon signed-rank test results for the pre-tests and post-tests of the control group regarding the Intolerance of Uncertainty and The Flourishing scales are presented in Table 6.

Table 6. Wilcoxon Signed Rank Test Results for the Control Group

Measurement Tool		N	Mean rank	Sum of ranks	z	p
The Intolerance of Uncertainty Scale	Negative ranks	3	3.83	11.50	-0.426	0.670
	Positive ranks	4	4.13	16.50		
	Ties	0				
The Flourishing Scale	Negative ranks	3	2.50	7.50	-1.101	0.271
	Positive ranks	4	5.13	20.50		
	Ties	0				

As seen in Table 6, there was no statistically significant difference between the pre-test and post-test scores of the Intolerance of Uncertainty ($z = -0.426$; $p > 0.05$) and The Flourishing ($z = -1.101$; $p > 0.05$) scales of the control group.

RESULTS, DISCUSSION and SUGGESTIONS

As a result of the study, logotherapy and positive psychology-oriented group intervention was found to be effective in reducing intolerance to uncertainty and increasing psychological well-being. No logotherapy and positive psychology-based intervention directly addressing intolerance to uncertainty was found in the literature. When interventions for intolerance of uncertainty are examined, it is seen that these interventions (Arslan, 2013; Özgöl, 2023; Yıldız, 2017) are effective. Arslan (2013) examined the effect of uncertainty management program on intolerance of uncertainty and reported that intolerance of uncertainty decreased as a result of the intervention. Yıldız (2017) stated that the psycho-education program oriented towards gaining a secure attachment style was effective on intolerance of uncertainty. Özgöl (2023) reported that the metacognitive therapy-based program was significantly effective on intolerance to uncertainty. The results of this study similarly revealed that intolerance to uncertainty can be reduced with interventions. Logotherapy is an effective approach for many different mental health problems (Frankl, 2009). In the literature, there are Logotherapy-based intervention programs for many different variables such as suicide risk (Erdem, 2022),

depression (Uğuryol Ünal, 2023), post-traumatic embitterment disorder (Düşünceli, 2016), life purpose (Yetkin, 2016). Numerous studies have been reported in Türkiye (e.g., Çolak, 2014; Düşünceli, 2015; Erdem, 2022; Şanlı, 2016; Uğuryol Ünal, 2023; Yetkin, 2016) and in the international literature (e.g., Heidary et al., 2023; Robatmili et al., 2015; Sun et al., 2022). Similar to these data, this study revealed that logotherapy and positive psychology-based intervention was also effective in reducing intolerance of uncertainty. In terms of positive psychology, similar to this study, there are studies in the literature showing that group-based psychological well-being interventions are effective. Albayrak (2013) reported that group psychoeducation for psychological well-being was effective (Albayrak, 2013). Akin (2009), who applied a rational emotive behavioral approach-based intervention program for university students, reported that psychological well-being and self-awareness increased at the end of the study (Akin, 2009). Ümmet and Yalın (2020) revealed that the total score of psychological well-being increased significantly as a result of psychoeducation to increase psychological well-being (Ümmet & Yalın, 2020). These results show that group interventions to increase psychological well-being are effective, similar to the results of this intervention.

The perception of uncertainty as a threat plays a critical role in both the development and maintenance of anxiety (Carleton, 2012; Buhr & Dugas, 2002; Norr et al., 2013). Logotherapy includes techniques to reduce anxiety and is effective in anxiety disorders (Frankl, 2009). Çolak (2010) reported a significant decrease in social anxiety as a result of group counseling intervention for social phobia (Çolak, 2010). Frankl (2009) introduced paradoxical intention, one of the exposure techniques, for anxiety and fear states. Therefore, it can be thought that this intervention program helped the participants to make sense of the mechanism for anxiety and to cope with uncertainty with the paradoxical intention technique. Ryff and Singer (1996) stated that interventions that remove the individual from the negative functioning state are successful, but there are deficiencies in terms of permanent effects. They suggested that the absence of well-being creates vulnerability to possible negativity (Ryff & Singer, 1996). It is stated that there are residual symptoms and relapse after treatment for anxiety disorders. (Fava, Ruini, & Belaise, 2007; cited in. Fava & Tomba, 2009). The need for intervention protocols that include psychological well-being is emphasized (Fava & Tomba, 2009). Psychological well-being therapy was applied sequentially with cognitive behavioral therapy in the treatment of generalized anxiety disorder and a significant reduction in anxiety was reported (Fava et al., 2005). Similarly, in this study, the intervention program focused on logotherapy and psychological well-being therapy was significantly effective in reducing intolerance to uncertainty and increasing psychological well-being.

The search for meaning can reduce the distress that individuals feel towards uncertainty. Meaning is a means to experience a sense of stability (Morse et al., 2021). Frankl argued that people need to give meaning to everything they encounter, otherwise the resulting existential vacuum can lead to mental disorders (Frankl, 2009). Through logotherapy, individuals can combat difficulties, contradictions, and uncertainties by adding meaning to their lives, thereby increasing their hope and exploring alternative solutions (Wong, 2012). In terms of Ryff's well-being psychotherapy, having a meaning in life is considered as a goal that increases well-being. Individuals who can add meaning to life enjoy their developmental processes and have the capacity to see the events they experience as a part of their personal development. These individuals can direct their lives in line with the goals they set (Fava & Ruini, 2003). Frankl defines one of the paths to understanding in life as the experiential path. An individual can discover meaning in life by having an experience or interacting with a person (love) (Frankl, 2009). Similarly, in terms of positive psychology, relationships are a fundamental dimension of psychological well-being and are supported in the psychological well-being model. Self-actualizing individuals can establish deep friendships and feel close to others with feelings of empathy and compassion (Ryff & Singer, 1996). On the other hand, the personal development dimension of psychological well-being emphasizes the development of one's own potential and continuing to grow as an individual. Thus, it supports the individual to realize his/her own potential and to be in need of realizing this potential. In this context, it can be said that both well-being psychotherapy and logotherapy processes are effective in reducing intolerance to uncertainty and increasing psychological well-being (Ryff & Singer, 1996).

Existential philosopher Kierkegaard (2004) associates anxiety with uncertainty. Factors such as people's lack of knowledge about the future and uncertainty about the consequences of choices constitute the sources of anxiety. In the face of uncertainty, if individuals make choices by being aware of their own existence and freedom, they can accept anxiety and see it as a part of their existence (Kierkegaard, 2004). Logotherapy sees the individual as a fundamental and responsible person who adds meaning to his/her life by determining his/her own values (Frankl, 2009; Frankl, 2019). Human beings are unique but their freedom is limited.

According to Frankl, this freedom is the freedom to choose within the framework of the conditions the individual is in (Frankl, 2009). In this context, the individual who faces uncertainty in many areas of his/her life (Anderson et al., 2019) has the freedom to choose his/her attitude. Logotherapy involves teaching clients that they have the freedom to respond to their problems and showing them various techniques and how they can be applied to their problems (Wong, 2012). In particular, socratic dialog is one of the most frequently used logotherapy techniques for attitude change. In this way, the client can search for clues about personally meaningful attitude changes (Schulenberg et al., 2008). From the perspective of Ryff's psychological well-being model, one of the sub-dimensions of psychological well-being is autonomy. Autonomy is having options in one's life and being able to make free choices (Ryff, 1989). On the other hand, another dimension supported in the model of psychological well-being is self-acceptance. Having positive attitudes towards oneself is important for psychological functioning (Ryff & Singer, 1996). In addition to self-acceptance and positive attitude towards oneself, one of the indicators of psychological well-being is environmental mastery. It is the creation of an environment that is suitable for the individual's own feelings, thoughts and values and that is psychologically good for him/her (Ryff & Singer, 1996). The philosophical foundations and techniques of logotherapy and intervention on the dimensions of psychological well-being may have been effective in changing attitudes towards uncertainty and increasing psychological well-being in the process.

Logotherapy and Positive Psychology have common emphases in terms of many concepts. Ryff's well-being psychotherapy utilized clinical, humanistic, developmental psychology literature and existential philosophy. It is a multidimensional model (Ryff, 1989). In the psychological well-being model, it is stated that living a life rich in purpose and meaning, continuous growth and having quality ties with others have health benefits (Ryff & Singer, 2008). The fact that this study supported the participants at these points can be considered to contribute to the effectiveness of the study results.

This study presents a multidimensional intervention that integrates positive psychology and logotherapy. Similarly, integrative group interventions have been shown to be effective in the context of both positive psychology (Eryilmaz & Altınsoy, 2021; Uzun & Deniz, 2023) and logotherapy (Wong, 2016; Ameli, 2016).

It has been observed that intervention programs addressing intolerance of uncertainty are limited in the existing literature. Given the strong relationship between intolerance of uncertainty and mental health, it is crucial to develop intervention programs targeting this variable. This study was based on logotherapy and Ryff's well-being psychotherapy, and it is recommended that future research contributes to the literature by incorporating different theoretical approaches. Furthermore, it is suggested that future researchers should focus on designing group counseling, group guidance, or psychoeducation programs rooted in various therapy approaches to address intolerance of uncertainty. Developing culturally sensitive programs and conducting studies that account for cultural contexts in this field would also be valuable. The dissemination of such interventions in universities, psychological counseling centers, and community health services will play an important role in improving individuals' quality of life by increasing their tolerance to uncertainty and psychological well-being. This study was conducted exclusively with female university students, and its effectiveness can be evaluated in future research with different sample groups. Additionally, follow-up measurements were not included in this study; thus, future studies incorporating follow-up measurements are recommended to evaluate the long-term effects of the program.

Declarations

Conflict of Interest

No potential conflicts of interest were disclosed by the author(s) with respect to the research, authorship, or publication of this article.

Ethics Approval

The ethics committee approval of this research was obtained from "Yıldız Technical University Social and Human Sciences Research Ethics Committee" with the approval numbered '2023/04' dated '05.04.2023'.

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Research and Publication Ethics Statement

Hereby, we as the authors consciously assure that for the manuscript "The Effectiveness of Logotherapy and Positive Psychology-Based Group Intervention on Intolerance to Uncertainty" the following is fulfilled:

- This material is the authors' own original work, which has not been previously published elsewhere.

- The paper reflects the authors' own research and analysis in a truthful and complete manner.
- The results are appropriately placed in the context of prior and existing research.
- All sources used are properly disclosed

Contribution Rates of Authors to the Article

The authors provide equal contribution to this work.

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