



“Staying Home – Feeling Positive”: Effectiveness of an on-line positive psychology group intervention during the COVID-19 pandemic

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Abstract

The current study investigated the effectiveness of a group on-line positive psychology intervention (OPPI) designed to mitigate the psychological impact of the COVID-19 pandemic and the subsequent measures to control it. Study participants ($N = 82$, $M_{age} = 33.07$, $SD = 9.55$) were all Greek adults divided into an intervention ($n = 44$) and a control group ($n = 38$). The intervention group attended a voluntary, online, two-week, six-session (each 50 min), group intervention. The intervention aimed at enhancing participants' personal strengths and resilience in order to cope more effectively with the psychological impact of social distancing (e.g., feelings of anxiety, sadness, fear, and/or loneliness). All participants completed an online questionnaire one week before the intervention's implementation, which included scales measuring their: demographic characteristics, empathy, resilience, affectivity, feelings of loneliness, depression and anxiety levels, and feelings of fear regarding the outbreak. Participants in both the intervention and control group completed the same measures the week following the intervention's termination to examine its effects, and two weeks later to examine its long-term effectiveness. The intervention was found to be effective in alleviating the impact of the pandemic and in strengthening participants' resilience. More specifically, the results showed significant decreases for the intervention group in all measures of psychosocial distress (anxiety, depression, loneliness and fear) and significant increases in empathy, resilience, and experience of positive emotions. The study's implications for the development and implementation of online psychological interventions during a crisis are discussed.

Keywords Telemental health · Group intervention · COVID-19 · Social distancing · Resilience

Introduction

The global outbreak of COVID-19 has led to over 88 million confirmed cases and 1.9 million deaths globally (World Health Organization, 2021). Research evidence so far supports the claim that the COVID-19 pandemic has a profound psychological impact. More specifically, increased symptoms of stress, anxiety and depression have been observed in the general population (Pancani et al., 2020; Salari et al., 2020).

Subjective well-being, in terms of life satisfaction and positive affect (Li, Wang, et al., 2020; Zacher & Rudolph, 2020), as well as resilience (Killgore et al., 2020b) have also been adversely affected. At the same time, the novelty of the circumstances surrounding the pandemic has led to excessive fear concerning the coronavirus (Asmundson & Taylor, 2020), which seems to be associated with increased risk of heart attacks (Wessler et al., 2020) and an increase in mental disorders (Satici et al., 2020).

Since a cure for the disease is currently lacking, the public health strategy of social distancing, coupled by quarantine of infected areas, has been implemented in many countries, including Greece (Palgi et al., 2020). However, such measures, despite reaching the goal of delaying the virus' spread, also lead to increased feelings of loneliness, limit people's access to their habitual social support systems and cause the failure of their current coping mechanisms (Park et al., 2020), thus risking further exacerbation of the pandemic's negative psychological impact (Horesh & Brown, 2020; Park et al., 2020). Loneliness in particular increased during the COVID-19

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pandemic (Park et al., 2020) and was associated to anxiety, depression, self-harm, suicide attempts, and sleep disturbances (Killgore et al., 2020a; Kokou-Kpolou et al., 2020; Palgi et al., 2020; Voitsidis et al., 2020), symptoms that may persist months or years after quarantine has been lifted (Brooks et al., 2020).

Empathy and resilience have been suggested as potential buffers against the negative consequences of the pandemic. There is evidence suggesting that a person's empathy is associated to their perception of the pandemic and adherence to measures such as physical distancing and the use of face masks that limit the dispersion of the virus (Cerami et al., 2020; Pfattheicher et al., 2020). Also, resilience has been suggested to mitigate the psychosocial impact of the pandemic (Li, Yang, et al., 2020) and plays an important role in the positive adjustment of the entire family during the pandemic (Prime et al., 2020).

Based on the above, there is an urgent need to develop highly flexible, cost-effective, and efficient treatment options that alleviate the negative psychosocial effects of the pandemic discussed above and that are based on the constructs that seem to act as buffers against them (i.e., empathy and resilience). Telemental health has been suggested as a practical and efficient alternative for providing mental health care to the general public, as well as to people who are more vulnerable to COVID-19 (Holmes et al., 2020; Roncero et al., 2020). Telemental health refers to a variety of technological options for delivering mental healthcare via remote telecommunication channels, including, but not limited to, mobile device applications, video or telephone conferencing, and online self-help content (Gentry et al., 2019; Riemer-Reiss, 2000). Such treatment modalities form an efficient, cost-effective, viable, and acceptable option for delivering mental healthcare, even to people who would otherwise face difficulties in accessing such services (Bolton & Dorstyn, 2015; Gentry et al., 2019; Riemer-Reiss, 2000). Nevertheless, even though telemental health has been suggested as a practical and efficient alternative for providing mental health care to the general public, as well as to people who are more vulnerable to COVID-19 (e.g., Courtet et al., 2020; Holmes et al., 2020; Li, Yang, et al., 2020; Zhang et al., 2020) and even though several hospitals have reorganized their services to provide online and/or telephone support for people in need (Roncero et al., 2020; Zhang et al., 2020), no structured intervention targeting the psychological impact of the COVID-19 pandemic on the general public has been implemented and evaluated internationally.

To fill this gap, Positive Psychological Interventions (PPIs), a promising approach shown to enhance well-being across a wide range of ages, characteristics, and settings (e.g., Chakhssi et al., 2018; Meyers et al., 2013; Owens & Waters, 2020; Seligman et al., 2005; Sin & Lyubomirsky, 2009), can be used. More specifically, PPIs are “treatment

methods or intentional activities that aim to cultivate positive feelings, behaviors, or cognitions” (Sin & Lyubomirsky, 2009, p. 468). These activities can be classified into categories such as: savoring, gratitude, kindness, empathy, optimism, strengths, and meaning (Parks & Titova, 2016) and have been found to be effective not only in enhancing well-being, happiness, life satisfaction, and positive affect, but also in reducing depressive symptoms, stress, and anxiety (e.g., Gander et al., 2016; Lambert et al., 2018; Meyers et al., 2013; Sin & Lyubomirsky, 2009), results that remain significant several months later (e.g., Gander et al., 2016; Lambert et al., 2018).

Recently, few studies have attempted to examine the impact of Online Positive Psychological Interventions (OPPIs) on people's well-being (e.g., Bolier et al., 2013; Gander et al., 2016; 2012; Kaplan et al., 2013; Mitchell et al., 2009; Seligman et al., 2005). OPPIs have so far been delivered to different populations (e.g., adolescents, adults, elders, employees; e.g., Baños et al., 2017; Kaplan et al., 2013; Proyer et al., 2014; Sergeant & Mongrain, 2014). The majority of them employ a one-component approach, e.g., optimism (Sergeant & Mongrain, 2014), while some combine two components, such as mindfulness and gratitude (Howells et al., 2014). Their duration spans from brief one or two-week-interventions (e.g., Gander et al., 2016; Kaplan et al., 2013) to longer ones (e.g., ten weeks; Abbott et al., 2009). Most of them have been offered as self-guided, web-based interventions (e.g., Mitchell et al., 2009; Proyer et al., 2014), while few are phone-based applications (e.g., Howells et al., 2014). Empirical data support the efficacy of OPPIs in enhancing well-being and alleviating depressive symptoms (Bolier et al., 2013; Corno et al., 2018; Gander et al., 2012). It is worth noting that only one study has examined the effectiveness of OPPIs on resilience, anxiety, and stress, showing no statistically significant results (Abbott et al., 2009). Moreover, no OPPI has focused on empathy and loneliness. Loneliness, in particular, has not been investigated at all within the PPIs literature, until very recently (Parks & Boucher, 2020; Weiss et al., 2020), despite its connection to serious physical problems, mortality, low psychological well-being and poorer quality of life (Coyle & Dugan, 2012; Newall et al., 2013).

Based on the theoretical frame detailed above, the current study aimed at the development, implementation and assessment of an OPPI for alleviating the adverse psychological effects due to the COVID-19 pandemic in adults of the general population in Greece. More specifically, we used a quasi-experimental, pre-post-intervention study design to address the psychological effects caused by the outbreak of the COVID-19 pandemic and the subsequent social distancing discussed above. We hypothesized that participation in a theoretically-driven, on-line, group intervention aiming at strengthening the participants' resilience and imparting them the necessary skills to cope with the negative psychosocial impact of COVID-19 pandemic in their lives, would enhance their psychosocial

functioning, while simultaneously it would significantly decrease their psychosocial distress. More specifically, we expected that the intervention participants would demonstrate a significant increase in empathy, resilience, and experience of positive emotions, while they would also exhibit a significant decrease in anxiety, depression, loneliness, negative affect and fear regarding the pandemic and its consequences in comparison to the participants in the control group.

Method

Participants

The study was conducted in accordance with the Declaration of Helsinki and the guidelines of the American Psychological Association (APA). Participants were recruited through social networks and online forums. The intervention was described as a voluntary, brief, two-week program including mindfulness and positive psychology exercises. The only inclusion criteria were age (i.e., >18), expressed interest for participation and knowing how to operate teleconferencing free software. All participants who met the above criteria and provided electronic informed consent were included in the sample. Allocation of participants in the intervention or the control group was based on their expressed interest and time concerns. Participants could withdraw from the study at any moment without providing any justification. The final sample included 82 Greek adults (18 men, 64 women) from various parts of Greece aged 20–65 years ($M_{age} = 33.07$, $SD = 9.55$). The intervention group consisted of 44 participants (6 men, 38 women) aged 20–54 years ($M_{age} = 31.93$, $SD = 8.09$), while the control group included 38 participants (12 men, 26 women) aged 22–65 years ($M_{age} = 34.39$, $SD = 10.96$). The members of the intervention and the control group who completed the questionnaires in the follow-up measurement were 43 (7 men, 36 women, $M_{age} = 32.00$, $SD = 8.14$) and 26 (7 men, 19 women, $M_{age} = 33.12$, $SD = 9.77$) respectively.

Measures

All study participants completed an online questionnaire at three time points: (1) before the intervention's implementation (pre-measurement), (2) after its conclusion (post-measurement), and (3) two weeks later (follow-up-measurement). The questionnaire included nine quantitative self-report scales that are described below. All scales have previously been translated and used in Greek showing good psychometric properties.

Descriptive Measures Data on demographic variables (i.e., sex, age, city of residence) were collected through a self-report questionnaire.

Empathy Participants' empathy levels were measured using the Interpersonal Reactivity Index (IRI; Davis, 1980). The questionnaire is made of four seven-item subscales on a 5-point Likert scale, each assessing a different facet of empathy. The perspective-taking scale measures a person's efforts to understand others' point of view ($\alpha = 0.79$). The fantasy scale assesses the tendency to imagine oneself in fictional situations, such as movies or daydreams ($\alpha = 0.69$). The empathic concern scale measures a person's positive emotional reactions towards others ($\alpha = 0.72$). Finally, the personal distress scale assesses a person's feelings of disquiet due to witnessing another's hardship ($\alpha = 0.77$). The first two subscales measure the cognitive component of empathy, while the latter two measure the affective component.

Resilience Resilience was measured using the 10-item version of the Connor-Davidson Resilience Scale (CD-RISK-10; Campbell-Sills & Stein, 2007), which assesses a person's capability to effectively cope in difficult situations. Items are measured on a 5-point Likert scale and the scale showed good internal reliability in the current study ($\alpha = 0.88$).

Mood The participants' mood prior to each measurement was assessed with the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) which includes 20 items on a 5-point Likert scale, ten of which measure positive affect ($\alpha = 0.84$) and the other ten negative affect ($\alpha = 0.84$). Participants were asked to rate the extent to which they have felt each mood in the past two weeks.

Loneliness Feelings of loneliness during the two weeks preceding each measurement were investigated through the De Jong Gierveld Loneliness Scale (De Jong Gierveld & Van Tilburg, 1999). The scale has 11 items on a 5-point Likert scale. It can be used as a unidimensional measure of overall loneliness ($\alpha = 0.83$), or as two separate subscales that assess social (5 items; $\alpha = 0.75$) and emotional (6 items; $\alpha = 0.82$) loneliness (De Jong Gierveld & Van Tilburg, 1999).

Anxiety and Depression Symptoms of anxiety and depression were assessed using two scales that assessed these symptoms during the two weeks preceding each measurement. First, the Generalized Anxiety Disorder 7-item Scale (GAD-7; Spitzer et al., 2006) was used to assess participants' symptoms of anxiety. The scale consists of seven items measured on a 4-point Likert scale ($\alpha = 0.89$). Second, the Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001) was utilized to assess participants' depressive symptoms. The scale includes nine items measured on a 4-point Likert scale ($\alpha = 0.88$).

Fear Participants' fear due to the COVID-19 pandemic was measured with the Fear of the Coronavirus Questionnaire (FCQ; Mertens et al., 2020), a custom-built measure that includes eight items measured on a 5-point Likert scale ($\alpha = 0.75$). Sample items are: "I am very worried about the corona virus outbreak.", "I am taking precautions to prevent infection (e.g., washing hands, avoiding contact with people, avoiding door handles).", and "I am worried that friends or family will be infected."

Procedure

The "Staying Home – Feeling Positive" intervention introduced in this paper is a six-session, online, positive psychology group intervention, which was based on the positive psychology tradition, but also incorporated some elements of the cognitive-behavioral psychotherapeutic model (in the second session, see Table 1). Our intervention aimed at alleviating the negative psychological effects caused by the COVID-19 pandemic and the subsequent social distancing by enhancing participants' personal strengths and resilience. Based on the literature showing that empathy and resilience are suggested to mitigate the negative consequences of the pandemic (Cerami et al., 2020; Li, Yang, et al., 2020; Pfattheicher et al., 2020; Prime et al., 2020), we structured the intervention's content around these constructs. At the same time, we targeted feelings of loneliness and tried to facilitate the development of coping strategies for negative emotions such as fear, anxiety, and depression that research shows they have increased during the pandemic (e.g. Harper et al., 2020; Killgore et al., 2020a; Li, Wang, et al., 2020; Li, Yang, et al., 2020a). We largely followed the premise of positive psychology that we can improve mental health through enhancing positive emotions, behaviors and thoughts (Schueller & Parks, 2012). Moreover, we implemented a "shotgun" approach, meaning that participants were taught several distinct positive psychology techniques, which has been associated with higher effect sizes in

meta-analyses of positive psychology interventions (Schueller & Parks, 2012).

The intervention was delivered online using various teleconferencing free software (e.g., Skype) in small groups of 5–7 members. Each session lasted approximately 50 minutes and the intervention's duration was two weeks (three sessions per week). The intervention was implemented from April 22nd to May 8th of the year 2020. Each group session focused on a different topic (see Table 1) and a written protocol of the intervention was prepared. Three experienced female facilitators led the intervention. In order to ensure fidelity in the delivery of the intervention, the facilitators were trained to deliver it and received supervision before and after each session by the first author during the intervention's implementation.

Data Analyses

Data analysis was performed using IBM SPSS Statistics 25 statistical package. The scales' reliability at baseline was assessed using Cronbach's alpha coefficient. To examine differences between the intervention and the control group in pre-test, independent samples *t* tests (two-tailed) were run. To analyze the effect of the intervention, mixed design ANOVAs were applied with time (pre-test, post-test, and follow-up) as the within-subjects factor and group (intervention and control) as the between-subjects factor. To further examine interactions, paired samples *t* tests were run first between the baseline and post-scores, second between post and follow-up scores and third between baseline and follow-up scores. Additional independent samples *t* tests were run to examine differences between the two groups over time.

Results

All scales showed good internal reliability, with Cronbach alphas ranging from 0.69 to 0.89 (see above in the description

Table 1 Overview of the Sessions

Session	Goals
1. Self-protection and team building	1. To provide psychoeducation regarding self-protection during (and after) the COVID-19 pandemic. 2. To build rapport between the group members and the group facilitator, while also enhancing a sense of belongingness in the group.
2. Learning to relax	1. To understand how anxiety, depression, and fear can impact our emotions, cognitions, and behaviors. 2. To learn appropriate relaxation techniques.
3. Developing mindful coping mechanisms	1. To assist group members in developing effective coping mechanisms for anxiety and depression.
4. Cultivating a positive mindset	1. To guide group members in developing a more positive mindset in their everyday lives during the pandemic.
5. Enhancing empathy, altruism, and love	1. To develop group members' empathy, altruism, and love towards other people in their lives.
6. Summing up and saying goodbye	1. To remind group members the lessons learned from participating in the intervention. 2. To facilitate the termination of the intervention.

of the scales for exact values). Table 2 shows scores for all variables in all three measurements. There were no significant differences between the intervention and the control group in any of the scales at baseline (Table 2).

Statistically significant group \times time interactions within the mixed design ANOVAs were found in all outcomes except for perspective-taking, resilience, overall loneliness, emotional loneliness, social loneliness, and depression according to GAD-7, thus partially confirming our initial hypothesis (Table 2).

Paired samples *t*-tests showed that members of the intervention group felt significantly less afraid of the coronavirus in post-test compared to baseline, $t(43) = -2.982$, $p = .005$, $d = .45$, as well as in the follow-up measurement compared to baseline and post-test, $t(42) = 5.034$, $p = .005$, $d = 0.77$ and $t(42) = -2.963$, $p = .005$, $d = .46$ respectively. On the other hand, the feeling of fear for the coronavirus of the members of the control group did not change significantly either in post-test compared to baseline or in the follow-up measurement compared to baseline and post-test, $t(37) = -0.415$, $p = .680$, $d = .07$, $t(25) = 1.825$, $p = .080$, $d = .36$, and $t(25) = -1.710$, $p = .100$, $d = .34$ respectively (see Fig. 1).

Analyses showed that in post-test compared to baseline members of the intervention group gained a deeper understanding of others' perspectives, $t(43) = 2.460$, $p = .018$, $d = .37$, imagined themselves in fictional situations more, $t(43) = 2.593$, $p = .013$, $d = .39$, and felt less distress due to others' hardship, $t(43) = -3.358$, $p = .002$, $d = .51$, but their positive emotional reactions towards others remained unchanged, $t(43) = 0.719$, $p = .476$, $d = .01$. Intervention participants' fantasy increased significantly more in the follow-up measurement compared to post-test, $t(42) = -3.090$, $p = .004$, $d = .47$, while perspective-taking, empathic concern and personal distress did not change, $t(42) = .710$, $p = .482$, $d = .11$, $t(42) = .054$, $p = .958$, $d = .01$, and $t(42) = -1.027$, $p = .310$, $d = .16$ respectively. The ability to understand others' perspectives and the amount of distress felt changed significantly in the follow-up measurement compared to baseline, $t(42) = -2.949$, $p = .005$, $d = .45$ and $t(42) = 3.621$, $p = .001$, $d = .55$, respectively. The use of fantasy in imaginary situations and the adoption of positive reactions towards others remained the same, $t(42) = -.135$, $p = .893$, $d = .02$ and $t(42) = -.829$, $p = .412$, $d = .13$, respectively. Members of the control group showed no significant difference in post-test compared to baseline in perspective-taking, $t(37) = 1.521$, $p = .137$, $d = .25$, fantasy, $t(37) = -1.717$, $p = .094$, $d = .29$, empathic concern, $t(37) = -1.951$, $p = .059$, $d = .32$, and personal distress, $t(37) = .488$, $p = .629$, $d = .08$, as well as in the follow-up measurement compared to post-test, $t(25) = -1.141$, $p = .889$, $d = .01$, $t(25) = -.300$, $p = .767$, $d = .06$, $t(25) = -1.484$, $p = .150$, $d = .30$, and $t(25) = -.853$, $p = .402$, $d = .17$, respectively. Perspective-taking, fantasy and personal distress did not change significantly in the follow-up

measurement compared to baseline, $t(25) = -.659$, $p = .516$, $d = .13$, $t(25) = 1.409$, $p = .171$, $d = .26$, and $t(25) = .290$, $p = .774$, $d = .05$, respectively; whereas empathic concern decreased significantly, $t(25) = 4.953$, $p = .000$, $d = .97$ (see Fig. 1).

Post hoc comparisons revealed a significant increase in the resilience of the intervention group members in post-test compared to baseline, $t(43) = 2.398$, $p = .021$, $d = .36$, but showed no significant change in the follow-up measurement compared to baseline and post-test, $t(42) = -1.713$, $p = .094$, $d = .26$ and $t(42) = -1.048$, $p = .301$, $d = .16$ respectively. The resilience level of the control group members did not change significantly in post-test compared to baseline and in the follow-up measurement compared to baseline and post-test, $t(37) = .855$, $p = .398$, $d = .14$, $t(25) = -.449$, $p = .657$, $d = .09$, and $t(25) = -1.239$, $p = .227$, $d = .25$ (see Fig. 1).

Members of the intervention group experienced significantly more positive feelings, $t(43) = 4.578$, $p = .000$, $d = .69$, and significantly less negative feelings, $t(43) = -3.411$, $p = .001$, $d = .52$, in post-test compared to baseline, but no significant change was observed in either variable in the follow-up measurement compared to post-test, $t(42) = -1.113$, $p = .272$, $d = .17$ and $t(42) = -.290$, $p = .773$, $d = .04$, respectively. In general, the level of positive feelings did not change significantly from pre-test to the follow-up measurement, $t(42) = 1.113$, $p = .272$, $d = .56$. On the other hand, negative feelings decreased significantly in the follow-up measurement compared to baseline, $t(42) = 3.303$, $p = .002$, $d = .50$. Members of the control group did not exhibit significant change either in positive affect, $t(37) = .031$, $p = .976$, $d = .01$, or negative affect, $t(37) = -.291$, $p = .772$, $d = .05$, from baseline to post-test. However, they experienced significantly more negative feelings in the follow-up measurement compared to post-test, $t(25) = -2.173$, $p = .039$, $d = .43$, while positive feelings did not change significantly, $t(25) = -.819$, $p = .421$, $d = .16$. No significant change was noted in the follow-up measurement compared to baseline for positive or negative feelings, $t(25) = .819$, $p = .421$, $d = .25$ and $t(25) = .983$, $p = .335$, $d = .20$, respectively (see Fig. 1).

Intervention participants felt significantly less overall loneliness, $t(43) = -4.390$, $p = .000$, $d = .66$, emotional loneliness, $t(43) = -3.931$, $p = .000$, $d = .59$, and social loneliness, $t(43) = -2.765$, $p = .008$, $d = .41$, in post-test compared to baseline. Feelings of overall, emotional and social loneliness did not significantly change in the follow-up measurement compared to post-test, $t(42) = -.541$, $p = .591$, $d = .08$, $t(42) = -1.521$, $p = .136$, $d = .23$, and $t(42) = 1.004$, $p = .321$, $d = .15$, respectively. However, a significant change was observed in all three constructs in the follow-up measurement compared to baseline, $t(42) = 4.232$, $p = .000$, $d = .65$ for overall, $t(42) = 4.052$, $p = .000$, $d = .62$ for emotional and $t(42) = 4.052$, $p = .000$, $d = .62$ for social loneliness. On the other hand, for the members of the control group the level of overall, emotional, and

Table 2 Measurement Results of All Variables Comparing the Intervention and the Control Group

	Pre-measurement			Post-measurement			Follow-up-measurement			Group × time interactions				
	<i>M</i>	<i>SD</i>	Mean difference between groups	<i>M</i>	<i>SD</i>	Mean difference between groups	<i>M</i>	<i>SD</i>	Mean difference between groups	<i>M</i>	<i>SD</i>	Mean difference between groups	<i>F</i> (<i>df</i>) = <i>p</i> , η_p^2	
Fear of COVID-19	IG	25.59	5.75	$t(80) = .675, p = .501, d = .15$	23.18	5.57	$t(80) = -.995, p = .318, d = .22$	21.65	5.93	$t(67) = -.882, p = .381, d = .22$	21.65	5.93	$t(67) = -.882, p = .381, d = .22$	$F(1.767, 118.380) = 3.382, p = .043, \eta_p^2 = .048$
	CG	24.74	5.66		24.50	6.31		23.00	6.51		23.00	6.51		
Perspective-Taking	IG	20.18	3.60	$t(80) = 1.814, p = .073, d = .40$	21.34	3.98	$t(80) = 2.065, p = .042, d = .46$	21.70	4.00	$t(67) = 1.755, p = .084, d = .43$	21.70	4.00	$t(67) = 1.755, p = .084, d = .43$	$F(1.609, 107.816) = .566, p = .533, \eta_p^2 = .008$
	CG	18.47	4.90		19.32	4.89		19.81	4.85		19.81	4.85		
Fantasy	IG	17.55	4.83	$t(80) = .698, p = .487, d = .16$	18.95	4.99	$t(80) = 2.758, p = .007, d = .61$	17.60	3.81	$t(67) = 2.616, p = .011, d = .65$	17.60	3.81	$t(67) = 2.616, p = .011, d = .65$	$F(2, 134) = 3.215, p = .043, \eta_p^2 = .046$
	CG	16.84	4.20		15.92	4.94		15.27	3.21		15.27	3.21		
Empathic Concern	IG	22.27	3.87	$t(80) = .374, p = .710, d = .08$	22.64	3.54	$t(80) = 2.179, p = .032, d = .48$	22.60	3.10	$t(67) = 2.727, p = .008, d = .68$	22.60	3.10	$t(67) = 2.727, p = .008, d = .68$	$F(2, 134) = 6.048, p = .003, \eta_p^2 = .083$
	CG	21.97	3.28		21.16	2.39		20.42	3.41		20.42	3.41		
Personal Distress	IG	13.18	4.87	$t(80) = 1.856, p = .067, d = .45$	11.00	5.49	$t(80) = -.542, p = .589, d = .12$	10.37	5.06	$t(67) = .054, p = .957, d = .01$	10.37	5.06	$t(67) = .054, p = .957, d = .01$	$F(1.720, 115.257) = 4.922, p = .012, \eta_p^2 = .068$
	CG	11.32	4.12		11.58	3.92		10.31	4.40		10.31	4.40		
Resilience	IG	28.16	7.20	$t(80) = .987, p = .326, d = .22$	30.64	6.28	$t(80) = 2.283, p = .025, d = .51$	30.05	6.84	$t(67) = 1.621, p = .110, d = .40$	30.05	6.84	$t(67) = 1.621, p = .110, d = .40$	$F(1.407, 94.296) = .740, p = .435, \eta_p^2 = .011$
	CG	26.74	5.59		27.39	6.57		27.23	7.24		27.23	7.24		
Positive Affect	IG	33.39	6.79	$t(80) = -.525, p = .601, d = .12$	37.91	6.25	$t(80) = 2.582, p = .012, d = .57$	37.19	6.66	$t(67) = 2.183, p = .033, d = .54$	37.19	6.66	$t(67) = 2.183, p = .033, d = .54$	$F(1.794, 120.206) = 8.456, p = .001, \eta_p^2 = .112$
	CG	34.18	6.94		34.21	6.72		33.31	7.91		33.31	7.91		
Negative Affect	IG	23.52	7.21	$t(80) = -.300, p = .765, d = .07$	19.34	6.89	$t(80) = -2.943, p = .004, d = .65$	19.05	7.11	$t(67) = -1.303, p = .197, d = .32$	19.05	7.11	$t(67) = -1.303, p = .197, d = .32$	$F(1.429, 95.759) = 4.657, p = .021, \eta_p^2 = .065$
	CG	24.00	7.17		23.79	6.75		21.38	7.42		21.38	7.42		
Overall Loneliness	IG	15.50	8.32	$t(80) = -1.064, p = .291, d = .24$	11.48	7.93	$t(80) = -2.949, p = .004, d = .65$	11.26	9.13	$t(67) = -1.763, p = .082, d = .48$	11.26	9.13	$t(67) = -1.763, p = .082, d = .48$	$F(1.623, 108.731) = 1.493, p = .230, \eta_p^2 = .022$
	CG	17.45	8.20		16.76	8.29		15.19	8.74		15.19	8.74		
Emotional Loneliness	IG	9.55	4.64	$t(80) = -1.066, p = .290, d = .24$	7.14	5.14	$t(80) = -2.197, p = .031, d = .49$	6.47	5.65	$t(67) = -1.449, p = .152, d = .36$	6.47	5.65	$t(67) = -1.449, p = .152, d = .36$	$F(1.587, 106.298) = .560, p = .533, \eta_p^2 = .008$
	CG	10.79	5.92		9.71	5.45		8.58	6.22		8.58	6.22		
Social Loneliness	IG	5.95	4.90	$t(80) = -.722, p = .472, d = .16$	4.34	3.90	$t(80) = -2.938, p = .004, d = .65$	4.79	4.38	$t(67) = -1.723, p = .089, d = .43$	4.79	4.38	$t(67) = -1.723, p = .089, d = .43$	$F(1.625, 108.908) = 1.976, p = .152, \eta_p^2 = .029$
	CG	6.66	3.74		7.05	4.46		6.62	4.05		6.62	4.05		
Anxiety GAD-7	IG	6.59	4.17	$t(80) = 1.193, p = .236, d = .63$	4.02	3.45	$t(80) = -2.433, p = .017, d = .54$	4.35	3.60	$t(67) = -.607, p = .546, d = .11$	4.35	3.60	$t(67) = -.607, p = .546, d = .11$	$F(1.382, 92.616) = 5.042, p = .017, \eta_p^2 = .070$
	CG	5.53	3.86		6.16	4.49		4.78	4.75		4.78	4.75		
Depression PHQ-9	IG	6.32	5.47	$t(80) = -.787, p = .434, d = .17$	3.80	3.80	$t(80) = -2.668, p = .009, d = .59$	3.49	3.74	$t(67) = -1.447, p = .153, d = .36$	3.49	3.74	$t(67) = -1.447, p = .153, d = .36$	$F(1.364, 91.383) = .461, p = .558, \eta_p^2 = .007$
	CG	7.29	5.70		6.82	6.31		5.15	5.83		5.15	5.83		

IG: Intervention group; CG: Control group

social loneliness did not change significantly either in post-test compared to baseline [$t(37) = -.729, p = .471, d = .12, t(37) = -1.801, p = .080, d = .29$, and $t(37) = .689, p = .495, d = .11$, respectively], or in the follow-up measurement compared to baseline [$t(25) = 1.437, p = .163, d = .28, t(25) = 1.685, p = .104, d = .33$, and $t(25) = .223, p = .825, d = .04$, respectively] and post-test [$t(25) = -.360, p = .722, d = .07, t(25) = -.246, p = .807, d = .05$, and $t(25) = -.232, p = .818, d = .44$, respectively] (see Fig. 1).

Members of the intervention group experienced significantly less anxiety in post-test compared to baseline, $t(43) = -3.743, p = .001, d = .57$ according to the GAD-7. No significant change was observed in the follow-up measurement compared to post-test, $t(42) = .837, p = .407, d = .13$. However, intervention participants felt significantly less anxious in the follow-up measurement compared to baseline, $t(42) = 3.142, p = .003, d = .48$. Members of the control group did not report a significant change in anxiety according to GAD-7 in post-test compared to baseline, $t(37) = .968, p = .339, d = .16$ or in the follow-up measurement compared to baseline and post-test, $t(25) = .085, p = .933, d = .02$ and $t(25) = -.918, p = .368, d = .25$, respectively (see Fig. 1).

Finally, intervention participants felt significantly less depressed in post-test compared to baseline, $t(43) = -3.465, p = .001, d = .52$ according to the PHQ-9. Depression levels did not change significantly in the follow-up measurement compared to post-test, $t(42) = -1.550, p = .129, d = .23$, but they decreased significantly in the follow-up measurement compared to baseline, $t(42) = 3.898, p = .000, d = .60$. Members of the control group did not report any significant change in their depression levels in post-test compared to baseline or in the follow-up measurement compared to post-test, $t(37) = -.701, p = .488, d = .11$ and $t(25) = -.775, p = .446, d = .15$, respectively. However, depression symptoms increased significantly in the follow-up measurement compared to baseline, $t(25) = 2.814, p = .009, d = .57$ (see Fig. 1).

Discussion

Research so far demonstrates that the COVID-19 pandemic poses a serious threat to people's mental health (e.g., Killgore et al., 2020a; Kokou-Kpolou et al., 2020; Li, Wang, et al., 2020; Li, Yang, et al., 2020; Salari et al., 2020). Despite the call for (telemental) psychological interventions (e.g., Courtet et al., 2020; Zhang et al., 2020), we have not found any study assessing the efficacy of any structured intervention targeting the psychological impact of COVID-19 pandemic in the general population.

In order to fill this gap, in this study we tested the efficacy of an online, positive psychology group intervention, aiming at enhancing participants' personal strengths and resilience in

order to mitigate the adverse psychosocial effect of the COVID-19 pandemic and the subsequent social distancing. The efficacy of the intervention was demonstrated by the partial confirmation of the hypothesis made at the outset of the study. More specifically, findings of the present study showed that participation in the "Staying Home – Feeling Positive" program was associated with a significant enhancement of participants' positive psychosocial functioning, and significant decreases in measures of psychosocial distress, in comparison to the control group.

Based on the literature suggesting that a person's social resources, resilience and altruism may act as buffers against the psychosocial impact of the pandemic, (Holmes et al., 2020; Li, Yang, et al., 2020; Pfattheicher et al., 2020; Prime et al., 2020), the intervention focused on enhancing participants' resilience and empathy. Even though most people exhibit resilience, even in the face of great adversity (Chen & Bonanno, 2020), a recent study found that people's resilience was significantly and negatively affected during the pandemic and was associated with increased depression and anxiety symptoms, as well as more pronounced worry regarding the pandemic's effects (Killgore et al., 2020a). In this study, intervention participants demonstrated significantly increased resilience after completing the intervention, while members of the control group did not show any significant change. This result is very important in the face of evidence suggesting that a person's resilience can shield them against the adverse effects of the pandemic and the application of measures such as social distancing (Li, Yang, et al., 2020). It is also plausible that the group format of the intervention might have enhanced resilience by providing social support for participants. This is further supported by research indicating that perceived social support significantly predicted greater resilience during the pandemic (Killgore et al., 2020a).

The results also revealed that intervention participants increased their efforts to understand others' point of view (perspective taking) and to imagine themselves in fictional situations (fantasy), while they also felt less disquiet due to witnessing others' hardship (personal distress) after the intervention, compared to the control group. Moreover, the changes in perspective taking and personal distress remained significant at follow-up. Empathy has been shown to play an important role in the perception of the pandemic's impact and in adherence to measures that mitigate its spread, such as physical distancing and wearing face masks (Cerami et al., 2020; Pfattheicher et al., 2020). Adding to this, our results suggest that a person's capacity for cognitive and affective empathy may play an important role in their adjustment during the pandemic. More specifically, the intervention's implementation seems to have strengthened participants' cognitive empathy, namely perspective taking and fantasy and weakened their personal distress, changes that previous research has associated with decreased depressive symptoms and feelings of

loneliness (Schreiter et al., 2013; Tully et al., 2016). It is also possible that the observed increase in the participants' empathetic abilities may be accounted by the enhancement of their resilience, as proposed in previous research (Taylor et al., 2020).

The COVID-19 pandemic has also affected people's emotions, leading to significant increases in negative emotions and decreases in positive emotions and life satisfaction (Li, Wang, et al., 2020). In this study, participation in the intervention was associated with elevated levels of positive affect and decreased levels of negative affect, which remained significant at follow-up, compared to no significant change in the control group. This result is particularly important in the face of previous research within the positive psychology tradition showing that the experience of positive emotions (e.g., gratitude, love) during adverse situations plays an important role in resilience and adaptive coping, while it also acts as a buffer against the development of depressive symptoms (Fredrickson et al., 2003).

The intervention was also found to be effective in reducing the feeling of fear regarding COVID-19 compared to the control group, a finding that remained significant at follow-up. Fear about COVID-19 may play a protective role in the context of the current pandemic by leading to greater adherence to health-compliant behaviors (e.g., distancing; Harper et al., 2020). On the other hand, excessive fear may have an adverse effect in our mental health (Harper et al., 2020; Wessler et al., 2020). Intervention participants kept feeling fear in the weeks following the intervention, but to a significantly lesser extent compared to baseline. This suggests that the intervention imparted participants with the skills to cope with excessive fear, without leading to a false assurance about the seriousness of the situation.

Research shows that loneliness, anxiety, and depression have increased during the pandemic (e.g., Asmundson & Taylor, 2020; Salari et al., 2020). Loneliness in particular has also been found to exacerbate symptoms of depression and anxiety (Killgore et al., 2020a; Palgi et al., 2020) and is associated with insomnia (Kokou-Kpolou et al., 2020; Voitsidis et al., 2020), thus supporting the need to alleviate loneliness in order to prevent other complications. Members of the intervention group reported significantly less loneliness, depression, and anxiety after their participation, decreases that remained significant at follow-up. These results are in line with the positive psychology literature demonstrating that the application of PPIs leads to significant decreases in depressive symptoms, stress, and anxiety (e.g., Gander et al., 2016; Lambert et al., 2018; Meyers et al., 2013; Sin & Lyubomirsky, 2009) and further supports the limited research evidence that PPIs can be effective in reducing people's loneliness (Weiss et al., 2020). Moreover, the fact that the current intervention utilized the group format, in addition to its content that was designed to enhance social cognitions and behaviors, may

have increased participants' perceived social support, thus reducing their loneliness. To this effect, all the intervention participants commented that engaging in the program made them feel less alone and provided a welcome respite from their daily routines during the quarantine. Moreover, the group format provided members the opportunity to see how others perceived and coped with the pandemic, thus taking advantage of the group therapeutic factors of instillation of hope, cohesion and vicarious learning that have been found to play an important role in the effectiveness of face-to-face group interventions (Yalom & Leszcz, 2005). This is also in line with previous research suggesting that group-based video conferencing treatments decrease participants' feelings of isolation (Gentry et al., 2019) and create a supportive social environment (Burkow et al., 2013; Riemer-Reiss, 2000). Furthermore, this result strengthens several scholars' proposal that the employment of interventions that combat loneliness and enhance social support and connectedness could mitigate the negative psychological impact of the pandemic and increase well-being (Courtet et al., 2020; Holmes et al., 2020; Killgore et al., 2020a).

Taken together, the fact that the intervention was based on the positive psychology tradition, including some elements of the cognitive-behavioral psychotherapeutic model could account for its effectiveness. PPIs have been found to enhance the positive aspects of a person's life, such as life satisfaction, and positive affect, while they are also effective in reducing psychosocial distress (e.g., Gander et al., 2016; Lambert et al., 2018; Meyers et al., 2013; Sin & Lyubomirsky, 2009). More particularly, OPPIs have also demonstrated their effectiveness in improving well-being and decreasing depressive symptoms (e.g., Corno et al., 2018; Gander et al., 2012). There is also much research showing that cognitive-behavioral techniques reduce depressive symptoms, stress, and anxiety, even in online interventions (e.g., Cukrowicz & Joiner, 2007; Păsărelu et al., 2017).

Limitations and Strengths

The results of the current study should be viewed within its limitations. First, participants were not randomized into the intervention and control group. Even though the two groups did not differ significantly at baseline, future studies should use of a more vigorous randomized design in order to ensure generalization of results. The higher attrition observed in the control group at the follow-up measurement further limits generalization. Future studies should address this point by taking measures to increase control group participants' motivation. The small sample size was also a limitation and together with the control group's high attrition rate may have limited the power of analysis and masked some significant results. For example, the mixed design ANOVAs did not reveal any

significant group \times time interaction regarding overall loneliness, however the paired samples *t* tests showed significant decreases in both post-measurement and follow-up-measurement compared to baseline for the intervention group and no change for the control group. Moreover, even though the two groups did not differ significantly at baseline, there was a significant difference in their scores after the intervention and a trend for statistical significance two weeks later. A further limitation pertaining to the sample is that study participants were predominantly young women and none of them had been diagnosed with COVID-19. Future studies should therefore test the efficacy of the intervention in different populations. Another limitation concerns the exclusive use of self-report measures, most of which were not designed specifically to measure symptoms and emotions related to COVID-19. While all the instruments used in the study had good psychometric properties, future studies should also include other objective measures. Additionally, we call for action regarding the development of instruments that will reliably measure the effect of COVID-19 on the population.

A further possible limitation concerns the timeframe when the intervention was delivered and the short two-week follow up measurement. More specifically, the intervention was implemented during the past two weeks of quarantine and its conclusion coincided with the lift of the restrictive measures. Even though the timeframe might have affected the results, the fact that no significant differences were observed in the control group supports the contention that the intervention was the most important factor leading to the positive results of the study. Despite that, future studies should address this point by replicating the intervention in order to detect whether change can be attributed to the program or to other conditions and by following up on study participants over longer periods. Similarly, due to the novelty of the situation and the urgency of the timeframe when the intervention was employed (i.e., the ending of the quarantine), the intervention was not pilot tested before its implementation, which may arise questions regarding its reliability and validity. Nevertheless, the study's results, even if they are short-term, provide some preliminary support towards this.

The implementation of the intervention via teleconferencing can simultaneously be viewed as a potential limitation and as its strength. Since telemental health is a relatively new mode of therapy, there is little research regarding who can benefit most from this modality and the potential undetected negative outcomes for some patients (Andersson & Titov, 2014). Moreover, because of its online nature, only adults who are relatively technologically savvy could participate in it, thus limiting generalization to the general population. On the other hand, online delivery of the intervention was a necessity because of the quarantine, and its flexibility allowed participants from different locations to engage in a program that would otherwise be inaccessible to them. Furthermore,

research so far indicates the efficacy of telemental health services in diverse populations and psychological problems (e.g., Bolton & Dorstyn, 2015; Gentry et al., 2019). More particularly, OPPIs have shown to be effective in increasing well-being and decreasing depressive symptoms (e.g., Gander et al., 2012). Furthermore, there is evidence that the online provision of mental health services might be equally effective with traditional, individual or group, face-to-face interventions (e.g., Gentry et al., 2019). Group-based video conferencing treatments in particular have the additional advantage of decreasing participants' feeling of isolation (Gentry et al., 2019) and creating a supportive social environment (Burkow et al., 2013; Riemer-Reiss, 2000), which may have accounted for the decrease in loneliness observed.

A final strength of the study refers to the fidelity in the delivery of the intervention, which was assured through the creation of a detailed written protocol and the training and regular supervision of the groups' facilitators.

Conclusions and Implications

Taken together, the results of this study suggest that the "Staying Home – Feeling Positive" intervention reached its goal of reinforcing participants' empathy and resilience, alleviating at the same time the pandemic's adverse psychosocial effects. The study has important implications for the OPPIs literature, the provision of telemental health interventions, and our understanding of the psychosocial variables surrounding the COVID-19 pandemic. First, this study adds to previous research on OPPIs showing their effectiveness in enhancing participants' well-being and reducing depressive symptomatology (e.g., Gander et al., 2012, 2016; Kaplan et al., 2013; Seligman et al., 2005). Simultaneously, since no study on OPPIs has examined their effectiveness on loneliness and empathy, this study fills a major gap by providing first evidence that an OPPI can have a positive impact on these variables (Parks & Boucher, 2020), even during adverse environmental conditions (i.e., quarantine).

Second, the study contributes to the existing literature that demonstrates the efficacy of telemental health services in diverse populations and psychological problems (e.g., Bolton & Dorstyn, 2015; Gentry et al., 2019). The promising results of this study show that group-based video conferencing is an effective and feasible option for providing valuable support to the general population in order to build psychological resources (i.e., resilience and empathy) and successfully cope with the pandemic's adverse impact. This strengthens the proposition that telemental health could be successfully implemented in the context of the pandemic for the provision of mental health services (Holmes et al., 2020; Roncero et al., 2020). Knowledge gained from the present study could act as a basis to develop tailor-made interventions for vulnerable groups, such as medical personnel and other front-line

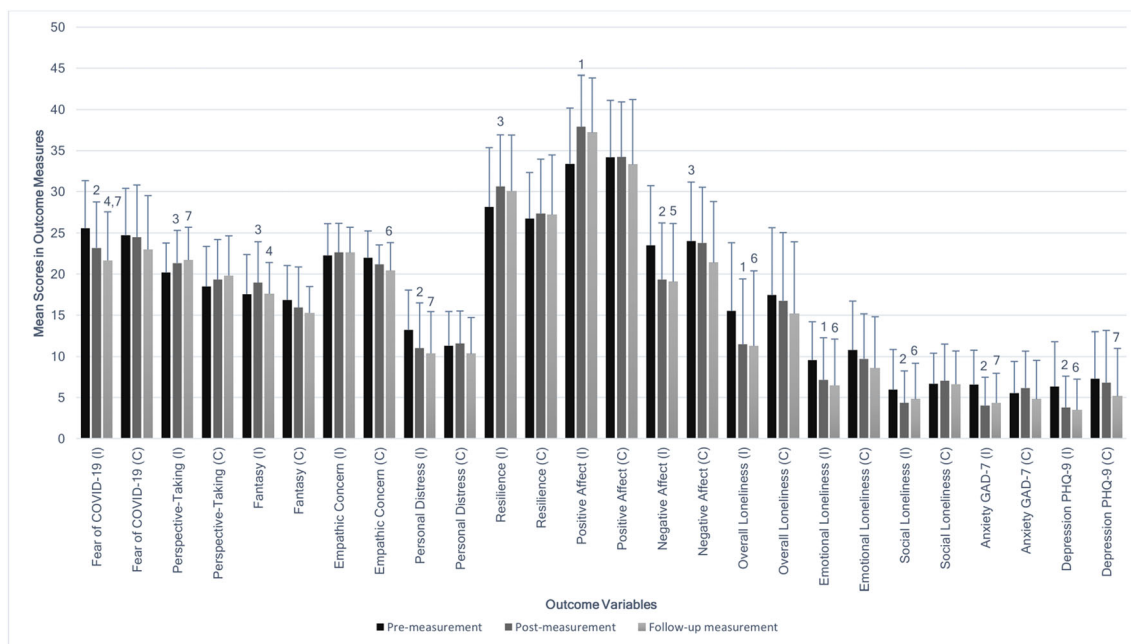


Fig. 1 Measurement Results of All Variables Displaying Changes in the Intervention and the Control Group

I: Intervention group; C: Control group. ¹Statistically significant difference in post-test compared to baseline ($p < .001$). ²Statistically significant difference in post-test compared to baseline ($p < .01$). ³Statistically significant difference in post-test compared to baseline ($p < .05$). Statistically significant difference in the follow-up measurement

workers, that are at risk for developing more adverse psychosocial symptoms due to the pandemic (Brooks et al., 2020), and could also be applied in future pandemics or relevant situations that are associated with increased morbidity and/or psychological distress (e.g., a major earthquake).

Finally, even though research is currently focusing mainly on the pandemic's negative impact, our research also leaves space for investigating the potential positive impact of dealing with the pandemic. More specifically, research suggests that after experiencing a negative event, it is possible that some people experience posttraumatic growth (Lau et al., 2006), meaning positive consequences such as changes in one's self-perception, relationships, and way of viewing life (Tedeschi & Calhoun, 1996). The results of this study suggest that application of a structured OPPI to the general population can promote participants' growth by enhancing their resilience, empathy and experience of positive emotions, while simultaneously it can facilitate recovery by decreasing the pandemic's negative psychosocial impact. Replication of the intervention to a larger and more representative sample could provide valuable insight regarding how we can further assist in posttraumatic growth following the pandemic.

Data Availability Statement The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

compared to post-test ($p < .001$). ⁴Statistically significant difference in the follow-up measurement compared to post-test ($p < .001$). ⁵Statistically significant difference in the follow-up measurement compared to post-test ($p < .01$). ⁶Statistically significant difference in the follow-up measurement compared to baseline ($p < .001$). ⁷Statistically significant difference in the follow-up measurement compared to baseline ($p < .01$).

Declarations

Conflict of Interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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