



A Brief Gratitude Writing Intervention Decreased Stress and Negative Affect During the COVID-19 Pandemic

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Abstract

Exploring ways to mitigate the stress of the COVID-19 pandemic is important for long-term health. Expressive and gratitude-focused writing are effective methods to help individuals process traumatic or stressful events. Gratitude-focused writing may yield additional benefits because it helps individuals appraise events positively. We hypothesized that an online gratitude writing intervention would yield greater benefits than an expressive writing intervention or control group. Participants were randomized to one of three groups and completed assessments one-week and one-month post-intervention. The gratitude writing group maintained gratitude levels and decreased stress and negative affect at one-month post-intervention. The expressive writing group decreased in gratitude and showed no changes in stress or negative affect at one-month post-intervention. The control group decreased in gratitude and negative affect and showed no changes in stress at one-month post-intervention. Gratitude writing may be a better resource for dealing with stress and negative affect than traditional expressive writing methods under extremely stressful situations with uncertain trajectories.

Keyword COVID-19 · Gratitude · Expressive writing · Psychosocial intervention

1 Impact of the COVID-19 Pandemic

In March of 2020, the World Health Organization (WHO) declared the COVID-19 outbreak a global health pandemic (Bialek et al., 2020). As of February 2022, over 75 million individuals in the United States have been diagnosed with COVID-19 and almost 1 million COVID-19 related deaths have occurred (CDC COVID Data Tracker, 2022). The COVID-19 pandemic has been linked to significant increases in adverse mental health outcomes for Americans and individuals worldwide (American Psychological Association, 2020). Several longitudinal studies in the United States revealed significant increases in psychological distress early in the pandemic (Breslau et al., 2021; Czeisler et al., 2020). A systematic review and meta-analysis on the psychological

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impact of COVID-19 revealed increased rates of depression and anxiety across health care workers, patients, and the general public (Luo et al., 2020). Recent research has suggested that these elevated distress levels may be starting to return to pre-pandemic levels (Daly & Robinson, 2021). However, because the pandemic has been disruptive to the economy and the population's health, these increases in distress will likely remain for an extended period for particular groups (Breslau et al., 2021; Daly & Robinson, 2021).

Several mechanisms may help explain why the COVID-19 pandemic has had a negative impact on psychological well-being. For example, a lack of knowledge about the trajectory of new diseases and fear of illness often elicits fear and irrational responses, which causes elevated levels of stress and distress (Ko et al., 2006; Robinson & Daly, 2021). There is also some evidence that pre-existing mental health problems, lifestyle changes, and financial or economic stressors exacerbated the amount of distress that people experienced (Breslau et al., 2021; Robinson & Daly, 2021). Healthcare or other frontline workers may have been at heightened risks of adverse psychological outcomes from a greater risk of exposure (Hu et al., 2020; Lin et al., 2020). Furthermore, steps such as shelter in place orders and physical or social distancing may have prevented access to needed physical and mental health care and limited interactions with individuals in one's social network (Robinson & Daly, 2021; Vahratian et al., 2021).

2 Using Expressive Writing Paradigms to Reduce Distress

To date, little research has examined interventions that may mitigate the negative psychological impact of COVID-19. Expressive writing interventions, including gratitude-writing interventions, have improved psychological well-being (Cregg & Cheavens, 2020; Frattaroli, 2006). One reason these interventions are effective is that they allow individuals to engage in cognitive processing and the meaning-making process (Boals, 2012; Park & Blumberg, 2002). Individuals who can find more meaning after stressful life events such as terrorist attacks, chronic illness, or spousal loss, or other traumas experience lower levels of stress and distress and higher levels of adjustment (Park, 2010; Park & Blumberg, 2002; Updegraff et al., 2008).

In the classic expressive writing paradigm (Pennebaker, 1997), individuals write continuously for a brief period (e.g., 15–30 min) over several consecutive days while exploring their emotions regarding a significant life event. Expressive writing is thought to effectively reduce the negative effects of traumatic events on health because individuals often inhibit emotions, thoughts, and behaviors related to stressful or traumatic events. Over time, this inhibition can cause increased arousal that can exacerbate stress levels and impact well-being (Frattaroli, 2006; Pennebaker et al., 1987). As individuals write about their experiences, this inhibition is decreased. It is also thought that expressive writing allows individuals to engage in cognitive and emotional processing that helps them assign meaning to the event and integrate it into their existing meaning structures (Pennebaker, 1997). Indeed, expressive writing has been linked to positive physical and psychological outcomes such as improved mood, decreased anxiety, depressive and PTSD symptomatology, increased immune function, and decreased frequency and intensity of physical complaints (Baikie & Wilhelm, 2005; Kállay, 2015).

3 Gratitude Focused Interventions

More recently, research has examined the benefits of different types of expressive writing interventions, namely gratitude-focused interventions. Gratitude-focused interventions are derived from theory and research on gratitude, which is the emotional experience of noticing and appreciating the positive aspects of everyday life (Wood et al., 2010). Individuals with higher levels of gratitude experience better psychological well-being, including lower rates of depression, anxiety, and greater emotional functioning, including more positive affect, less negative affect, and higher life satisfaction (Datu & Mateo, 2015; Emmons & Mishra, 2011; Kong et al., 2015; Wood et al., 2010; Wood, Joseph, et al., 2008a, 2008b). Gratitude has also been associated with lower levels of stress (Wood et al., 2008a, 2008b), stronger social relationships (Algoe, 2012; Algoe et al., 2020), better self-reported physical health (Hill et al., 2013; O'Connell & Killeen-Byrt, 2018), and better cardiovascular and immune health (Cousin et al., 2020; Emmons & Stern, 2013). Research has also shown that gratitude alleviates the negative psychological consequences of stressors such as chronic illness and COVID-19 (Jiang, 2020; Sirois & Wood, 2017), and studies directly testing the stress-buffering effects of gratitude have shown that gratitude reduces the impact of stress on negative health outcomes (Deichert et al., 2019). Taken together, this research suggests that interventions targeted at increasing gratitude may be an effective resource for health promotion and maintenance.

Gratitude interventions rely on participants engaging in positive activities such as gratitude journaling, writing gratitude letters to others, or generating lists of events that occurred for which one is grateful. The Positive Activity Model posits that when people engage in positive activities, they will experience increases in positive emotions, thoughts, and behaviors. These positive responses are, in turn, associated with increased well-being (Lyubormirsky & Layous, 2013). Moreover, characteristics of the activity, as well as individual differences, may influence how much of an impact the activity has on their well-being. Therefore, recalling and writing about grateful experiences should be of psychological benefit to individuals because they are likely to positively affect the pathways linking positive activities and well-being (i.e., positive thoughts, emotions).

Several recent meta-analyses found that interventions focused on increasing gratitude may increase psychological well-being and decrease symptoms of depression and anxiety, although the effect sizes may be small (Cregg & Cheavens, 2020; Davis et al., 2016; Dickens, 2017). For example, women with breast cancer who participated in a two-week daily diary gratitude intervention showed increases in daily psychological functioning, greater perceptions of support, and increased use of adaptive coping strategies. Notably, many of these women completed the intervention online (Sztachañska et al., 2019), a delivery method shown to increase feelings of gratitude (Koay et al., 2020). Another intervention found a six week gratitude intervention consisting primarily of writing exercises did not decrease distress but did increase well-being compared to a self-kindness or control condition (Bohlmeijer et al., 2020).

Although the psychological health benefits of gratitude have been found across cultures, individuals from collectivistic cultures may experience fewer benefits from gratitude interventions than individuals from individualistic cultures. This may be because giving and receiving help from others is a cultural norm in collectivistic cultures (Boehm et al., 2011; Layous et al., 2013). For example, Americans who expressed gratitude experienced increased state gratitude compared to a control group, but participants from collectivistic cultures (i.e., Taiwan and India) did not experience the same gains. Interestingly, all

participants reported feelings of elevation after expressing gratitude (Shin et al., 2020). However, a recent online intervention with Filipino undergraduate students during the COVID-19 pandemic found that participants who expressed gratitude or expressed kindness towards others experienced increases in positive emotions compared to a control group (Datu et al., 2021).

4 Comparing Gratitude and Expressive Writing Interventions

Although studies demonstrate the benefits of both expressive writing and gratitude-focused writing on physical and psychological health, a paucity of research compares the two to see if one yields more health benefits than the other. One study found that compared to a control group, gratitude and expressive writing significantly increased students' feelings of life satisfaction over time. Moreover, although not-significant, participants in the gratitude writing group showed a trend for lower depressive symptoms over time than the expressive writing and control groups (Booker & Dunsmore, 2017). Another study of adults in psychotherapy found that participants in a gratitude writing condition showed greater mental health benefits up to three months post-intervention when compared to participants in an expressive writing or control condition. Participants in the gratitude writing condition also used more positive and fewer negative words than the expressive writing condition (Wong et al., 2018). Thus, gratitude writing interventions may yield more health benefits than expressive writing because gratitude writing generates positive emotions that attenuate negative emotional states, including psychological distress (Wood et al., 2010).

In addition to the mental and physical health benefits of expressive and gratitude writing interventions, these interventions are relatively easy to employ, non-invasive, and can be delivered using online techniques. In a study of women with breast cancer, 70% of participants completed an at-home writing intervention and provided follow-up data (Henry et al., 2010). Furthermore, participants viewed the intervention positively and showed significant improvement in psychological and physical well-being (Henry et al., 2010). This suggests that at-home or online interventions have the potential to reach populations who are unable to travel or who, during a global pandemic, need to maintain social distancing or quarantine restrictions.

5 The Present Study

The purpose of the current study was to compare the effectiveness of an online gratitude writing intervention and expressive writing intervention on self-reported physical and psychological health during the COVID-19 pandemic. Specifically, we hypothesized that compared to a control group of participants who did not engage in a writing exercise, participants who engaged in an online expressive writing exercise for one week and participants who engaged in an online gratitude writing exercise for one week would show increases in positive affect, decreases in negative affect, decreased feelings of depression, anxiety, and stress, increased levels of gratitude, and report fewer physical health symptoms at one-month post-intervention. Moreover, it was expected that individuals in the online gratitude writing condition would experience greater physical and psychological health benefits and greater increases in gratitude than participants in the online expressive writing condition.

6 Method

6.1 Participants

Participants were a community-based sample recruited through social media, professional listservs, word of mouth, and snowballing techniques. To be eligible for the study, participants had to be at least 18 years old, be able to understand and write in English, have a valid email address, and be able to complete a questionnaire online. Of the 208 participants randomized to a condition, 86 (41.35%) completed all three study assessments. An additional seven participants were removed because they failed attention checks, leaving a final sample size of 79. Figure 1 presents the randomization and flow of participants through the study.

6.1.1 Completers Versus Non-Completers

Of the 208 participants randomized to one of the conditions, only 187 participants completed the baseline survey and provided demographic information. Participants were less likely to complete the one-week follow-up assessment if their work hours or salary had not been impacted by the COVID-19 pandemic $\chi^2(1, n=187)=9.73, p=0.002$. Participants were less likely to complete the one-month follow-up assessment if their highest level of education was a high school diploma and more likely to complete it if their highest level of education was a graduate degree $\chi^2(3, n=187)=13.40, p=0.004$. Additionally, participants who completed the one-month follow-up assessment were slightly older $t(178.64)=-4.44, p<0.001$ and had been sheltering in place for more days $t(185)=-2.26, p=0.025$ than participants who did not complete the one-month follow-up. Completers did not differ from non-completers on other demographic characteristics or COVID-19 related variables, including income, self-rated health, gender, race, ethnicity, education, being furloughed due to the virus or being classified as an essential worker.

6.1.2 Participant Demographics

Participants were, on average, 40.86 years old ($SD=17.4$, range=19–80) and the majority identified as female ($n=68$), followed by male ($n=10$), and non-binary ($n=1$). Most participants were non-Hispanic ($n=78$), and they identified their race as White ($n=74$), Black/African America ($n=2$), Asian ($n=1$), American Indian/Alaskan Native ($n=1$), or Biracial/Multiracial ($n=1$). Most participants had either a college ($n=23$) or graduate degree ($n=44$), and their median annual income was \$60,000–79,000. The majority of participants were not considered to be essential workers ($n=63$) and had not experienced a change in their work hours or income due to COVID-19 ($n=57$).

Almost half of the participants ($n=33$) indicated they had at least one condition that made them at a higher risk for having more serious COVID-19 symptoms. Using a one-item indicator ranging from 1 *poor* to 5 *excellent*, participants rated their health at 3.82 ($SD=0.83$, range=2–5). All participants were engaged in social distancing at all three time points. The mean number of days participants had been social distancing at the baseline survey was 29.19 ($SD=10.8$, range=3–61), at the one-week follow-up was 35.65 ($SD=13.3$, range=3–69), and at the one-month follow-up was 55.77 ($SD=18.8$, range=2–95). Almost everyone in the sample was sheltering in place or staying at

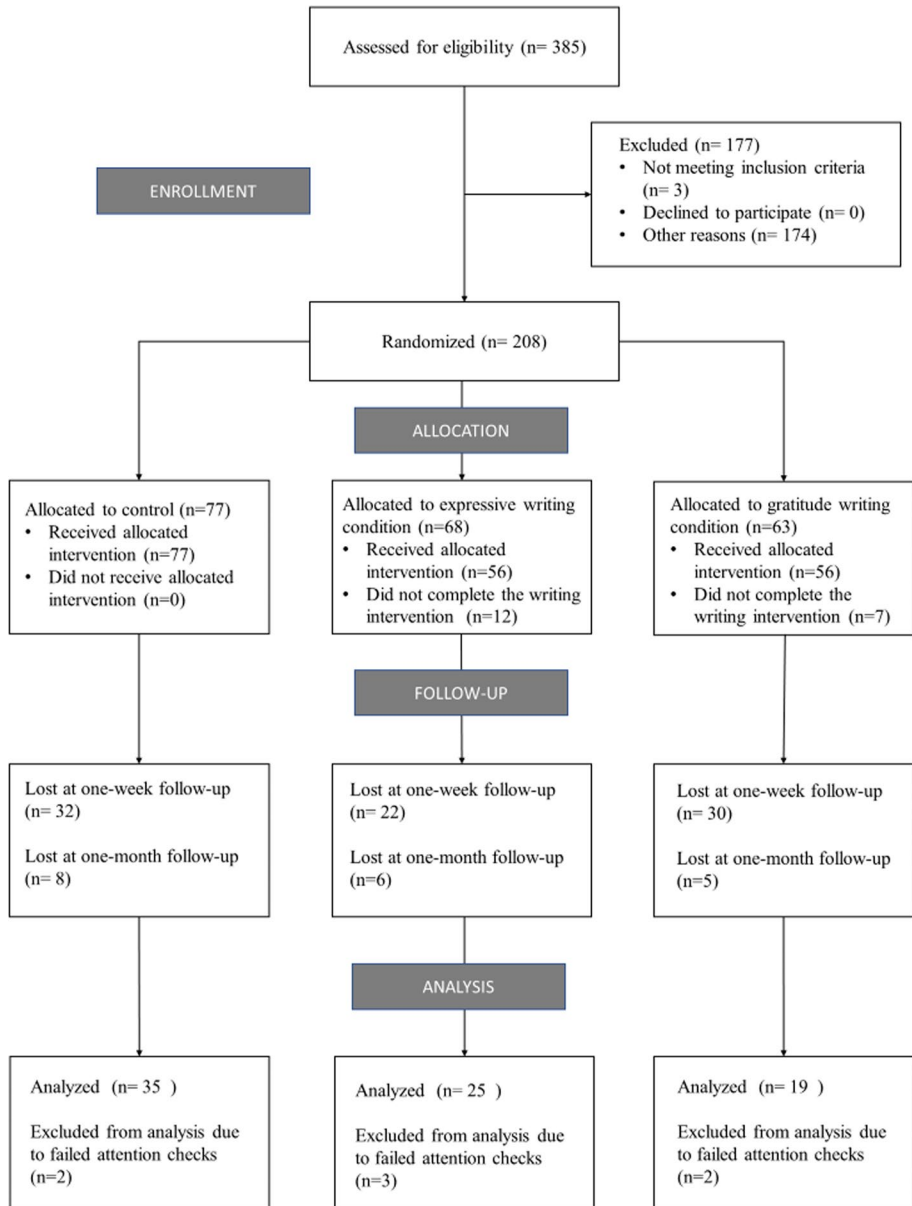


Fig. 1 Randomization and flow of participants in the present study

home throughout their time in the study (baseline: $n = 75$, one-week follow-up $n = 72$, one-month follow-up $n = 77$). Many participants did not know anyone who had been diagnosed with COVID-19 (baseline: $n = 31$, one-week follow-up $n = 26$, one-month follow-up $n = 20$) or knew one to five people diagnosed with it (baseline: $n = 44$, one-week follow-up $n = 49$, one-month follow-up $n = 53$).

6.2 Procedure

The Institutional Review Board approved all study procedures at the university where the study was conducted. All data were collected using the Qualtrics online survey platform. After completing an online screener and informed consent, participants completed several measures and were randomly assigned to an online gratitude writing, online expressive writing, or control condition. Both the expressive writing and gratitude writing conditions asked participants to write for a total of five to ten minutes. They then instructed participants to write on their own for five to ten minutes every day over the next week. A timer prevented participants from moving forward in the questionnaire to encourage them to write for at least five minutes. Participants in the control condition were not asked to write and moved on to complete the remainder of the study measures. Following the writing or control condition, participants were asked to complete measures of state gratitude, affect, and demographics. Participants in the gratitude and expressive writing conditions received two brief emails over the next week (day two and day four following the baseline questionnaire) reminding them to write for five to ten minutes every day. Participants in the gratitude condition were reminded to write on their own about things they were grateful for. Participants in the expressive writing condition were reminded to write expressively about their current situation. Approximately one week and one month following the baseline questionnaire, participants received an email with a link to a follow-up questionnaire. At the end of each of the three surveys, participants were thanked for their participation and entered in a drawing for one of 40 \$20.00 gift cards to Target.

6.3 Measures

6.3.1 Expressive Writing and Gratitude Writing Intervention

Based on Pennebaker and Beall's (1986) expressive writing paradigm, participants in the expressive writing condition were told to write about their very deepest thoughts and feelings about their current situation. We did not specifically ask them to write about COVID-19 but did ask them to focus on things that were currently happening in their life (e.g., the past week) instead of events in the past (e.g., several months or years ago). Because we were interested in comparing the gratitude and expressive writing conditions, we structured the gratitude intervention parallel to the expressive writing intervention. Participants in the gratitude condition were asked to write about things in their life, both large and small, that they were grateful for. In addition, participants were instructed to identify previously unappreciated aspects of their life that they were grateful for, including situations over the past week that were particularly meaningful or important. Again, we did not specifically ask participants to write about things they were grateful for in response to COVID-19. Participants in the control condition were thanked for completing the initial questionnaires and told that there were a few remaining questionnaires to complete.

6.3.2 State Gratitude

The three-item Gratitude Adjective Checklist (GAC; McCullough et al., 2002) assessed state gratitude. The GAC is a widely used measure of state gratitude and demonstrates strong psychometric properties (Emmons et al., 2019). At each time point, participants

rated how often they experienced three items (grateful, thankful, appreciative) over the past week on a scale of 1 *not at all* to 5 *extremely*. Items were summed, and higher scores reflected greater feelings of state gratitude. The GAC demonstrated strong reliability at all three time points ($\alpha=0.97$ at baseline; $\alpha=0.99$ at one week; $\alpha=0.99$ at one month).

6.3.3 Psychological Distress

The short form of the Depression, Anxiety, and Stress Scale (DASS-21; Henry & Crawford, 2005) assessed general psychological distress. The DASS-21 consists of 21 items that measure three subscales, including depressive symptoms (e.g., I felt that life was meaningless), anxiety (e.g., I felt scared without any good reason), and stress (e.g., I found it difficult to relax) on a four-point scale ranging from 0 *did not apply to me* to 3 *applied to me very much or most of the time*. Higher scores on each subscale indicated higher levels of each indicator of psychological distress. Research has established cut-off scores to delineate between normal (0–9), mild (10–13), moderate (14–20), and severe (21–27) levels of depression. Similar cut-off scores have been established for anxiety (0–7 for normal, 8–9 for mild, 10–14 for moderate, and 15–19 for severe) and stress (0–14 for normal, 15–18 for mild, 19–25 for moderate, and 26–33 for severe; Lovibond & Lovibond, 1995). Based on these cut-off scores, 70.9% of participants had normal to mild levels of depressive symptoms at baseline, 81.0% had normal to mild levels of anxiety, and 77.2% had normal to mild levels of stress. The depression subscale demonstrated reliability at all three time points ($\alpha=0.87$ at baseline; $\alpha=0.88$ at one week; $\alpha=0.91$ at one month), the anxiety subscale demonstrated adequate reliability ($\alpha=0.79$ at baseline; $\alpha=0.70$ at one week; $\alpha=0.78$ at one month), and the stress subscale also demonstrated adequate reliability ($\alpha=0.88$ at baseline; $\alpha=0.85$ at one week; $\alpha=0.89$ at one month).

6.3.4 Positive and Negative Affect

The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) assessed positive and negative affect. At each time point, participants rated 20 items regarding their affect over the past week on a scale of 1 *very slightly or not at all* to 5 *extremely*, with higher scores reflecting greater positive or negative affect. Ten of the items reflected positive affect (e.g., proud, enthusiastic), and ten of the items reflected negative affect (e.g., irritable, upset). Items for each subscale were summed, and higher scores reflected higher levels of either positive or negative affect. Both subscales demonstrated high reliability at all three time points (for positive affect: $\alpha=0.90$ at baseline; $\alpha=0.93$ at one week; $\alpha=0.93$ at one month; and for negative affect: $\alpha=0.91$ at baseline; $\alpha=0.90$ at one week; $\alpha=0.90$ at one month).

6.3.5 Physical Symptoms

The Cohen-Hoberman Inventory of Physical Symptoms (CHIPS; Cohen & Hoberman, 1983) assessed the frequency of participants' physical symptoms over the past week. The CHIPS consists of 39 common physical symptoms (e.g., headache, poor appetite) rated on a 5-point scale ranging from 0 *not at all* to 4 *all of the time*. Higher scores on this measure indicate a greater frequency of physical symptoms. In the present study, the CHIPS demonstrated good reliability ($\alpha=0.90$ at baseline; $\alpha=0.89$ at one week; $\alpha=0.91$ at one month).

6.3.6 Attention and Manipulation Checks

All three questionnaires contained attention check items that asked participants to select a specific response options for an item on a measure. These checks were used to identify participants who were not fully engaged in completing the questionnaires. Participants who failed an attention check ($n=7$) were removed from the analyses. Following the writing exercises or control condition, participants were asked to complete the gratitude attitude checklist and PANAS to assess whether or not the writing condition had an immediate impact on their affect and feelings of gratitude. Finally, in both the one-week and one-month follow-up assessments, we asked participants to report how many days they engaged in writing since the previous assessment and what type of writing they engaged in.

6.4 Analysis Plan

A series of 3×3 repeated-measures MANOVAs were conducted to examine how the control, expressive writing, and gratitude writing conditions differed over time in levels of distress (anxiety, depression, stress) and affect (positive and negative affect). Additionally, 3×3 ANOVAs examined how the conditions differed over time in gratitude and physical health symptoms. In all the analyses, condition (control, expressive writing, gratitude writing) was the between-subjects factor, and time (baseline, one week, one month) was the within-subjects factor. Significant group-by-time interactions were followed up with simple effects tests to examine how the groups differed across the time points. A priori power analysis using G*Power (Faul et al., 2007) determined that 72 participants would provide sufficient power to detect a medium effect size in a 3×3 repeated measures ANOVA.

7 Results

7.1 Covariates

One-way ANOVAs did not reveal significant differences based on condition in participants' age $F(2, 76)=0.21, p=0.81$, self-rated health $F(2, 76)=1.19, p=0.309$, or income $F(2, 76)=0.90, p=0.412$. Further, chi-square analyses did not reveal differences by condition in gender $\chi^2(4, N=79)=2.40, p=0.662$, race $\chi^2(8, N=79)=6.80, p=0.559$, education $\chi^2(6, N=79)=5.45, p=0.487$, COVID-19 high risk status $\chi^2(2, N=79)=1.31, p=0.520$, change in work hours or salary as a result of COVID-19 $\chi^2(2, N=79)=0.33, p=0.850$, or classification as an essential worker $\chi^2(2, N=79)=5.27, p=0.072$. However, gratitude increases with age (Chopik et al., 2019) and people with higher trait gratitude tend to experience more daily gratitude (McCullough et al., 2004). Moreover, financial distress or the fear of financial distress related to COVID-19 is associated with increased psychological distress (Robinson & Daly, 2021). Therefore, all main study analyses controlled for age, trait gratitude, and financial changes due to the COVID-19 pandemic.

7.2 Manipulation Check

A one-way ANOVA was conducted to examine participants' affect and state gratitude immediately following the writing exercise. No significant differences were found between participants in the control, expressive writing, or gratitude writing conditions in positive affect $F(2, 76)=0.28, p=0.761$, negative affect $F(2, 76)=0.003, p=0.997$, or gratitude *Welch's* $F(2, 47.64)=1.61, p=0.210$. At both the one-week and one-month follow-ups, we asked participants to report how often they had written since the previous assessment and what types of topics they wrote about. A one-way ANOVA revealed significant differences in the number of days that participants wrote at the one-week follow-up $F(2, 76)=28.37, p<0.001$. Participants in the control condition wrote for significantly fewer days ($M=0.83, SD=1.6$) than participants in the expressive writing ($M=4.08, SD=2.0$) and gratitude ($M=4.21, SD=2.3$) conditions. However, participants in the expressive writing and gratitude conditions did not differ in how many days they wrote. Similarly, there were significant differences in the number of writing days at the one-month follow-up *Welch's* $F(2, 31.89)=11.29, p<0.001$. Participants in the control condition wrote for significantly fewer days ($M=1.26, SD=2.8$) than participants in the expressive writing ($M=6.60, SD=7.1$) and gratitude ($M=7.58, SD=7.6$) conditions. Participants in the expressive writing and gratitude conditions did not differ in how many days they wrote.

Chi-square analyses revealed significant differences in what participants wrote about. For participants who wrote between the baseline and one-week follow-up ($n=51$), participants in the expressive writing condition were more likely to write about their current situation and participants in the gratitude writing condition were less likely to write about their current situation $\chi^2(2, N=51)=7.42, p=0.025$. Similarly, participants in the gratitude writing condition were more likely to write about things they were grateful for, while participants in the expressive writing condition were less likely to write about things they were grateful for $\chi^2(2, N=51)=11.04, p=0.004$. Participants in the control condition were more likely to write about other topics $\chi^2(2, N=51)=9.77, p=0.008$. For participants who wrote between the baseline and one-month follow-up ($n=43$), no group differences emerged in participants' likelihood of writing about the current situation $\chi^2(2, N=43)=0.97, p=0.616$, things they were grateful for $\chi^2(2, N=43)=1.57, p=0.455$, or other topics $\chi^2(2, N=43)=4.28, p=0.118$.

7.3 Effects of Writing Condition on Psychological Well-Being and Health

Next, we conducted a series of ANCOVAs and MANCOVAs to examine if there was an interaction between condition and time in participants' gratitude, psychological distress, affect, and physical symptoms. Significant interactions were further examined to determine if (1) the expressive writing and gratitude conditions showed greater benefits than the control group and (2) if the gratitude writing condition showed greater benefits than the expressive writing group.

7.3.1 State Gratitude

As shown in Table 1, after accounting for age, trait gratitude, and financial changes due to COVID-19, the interaction between group and time for state gratitude was significant.

Table 1 Interactions between time and condition for the main study variables

Measure	Control group <i>M (SE)</i>	Expressive writing <i>M (SE)</i>	Gratitude writing <i>M (SE)</i>	F-value	<i>p</i> Value	η^2
State gratitude				2.88	0.031	0.07
Baseline	11.43 (0.41)	11.80 (0.54)	11.47 (0.68)			
One-week	10.09 (0.42) ¹	10.52 (0.68) ¹	12.63 (0.62)			
One-month	9.86 (0.52) ¹	10.24 (0.72) ¹	10.95 (0.73) ²			
Depression				2.11	0.098	0.06
Baseline	8.74 (1.2)	11.04 (1.1)	11.16 (2.2)			
One-week	9.83 (1.2)	9.36 (0.83)	6.53 (1.4) ¹			
One-month	9.14 (1.4)	11.52 (1.6)	8.53 (1.9)			
Stress				2.92	0.030	0.07
Baseline	11.66 (1.4)	12.16 (1.4)	13.68 (2.6)			
One-week	11.09 (1.3)	11.84 (1.3)	7.26 (1.2) ¹			
One-month	11.03 (1.5)	11.92 (1.6)	7.90 (1.3) ¹			
Anxiety				1.89	0.129	0.05
Baseline	4.17 (0.99)	5.76 (0.83)	5.90 (1.5)			
One-week	3.31 (0.85)	4.16 (0.69)	2.21 (0.64)			
One-month	3.49 (1.0)	3.92 (0.75)	2.42 (0.51)			
Positive affect				1.88	0.124	0.05
Baseline	29.63 (1.2)	27.56 (1.5)	28.74 (1.8)			
One-week	26.00 (1.5) ¹	26.80 (1.6)	29.84 (1.6)			
One-month	26.83 (1.4) ¹	26.84 (1.5)	29.26 (2.0)			
Negative affect				2.58	0.045	0.07
Baseline	22.09 (1.4)	21.24 (1.3)	23.00 (2.2)			
One-week	19.29 (1.2) ¹	20.88 (1.1)	17.21 (1.2) ¹			
One-month	19.74 (1.2) ¹	20.16 (1.2)	17.53 (1.2) ¹			
Physical symptoms				1.77	0.138	0.05
Baseline	16.14 (2.1)	19.00 (2.5)	15.79 (1.9)			
One-week	15.03 (2.2)	14.44 (1.6) ¹	10.16 (1.8) ¹			
One-month	15.40 (2.5)	16.68 (2.0)	10.90 (1.3) ¹			

¹Significantly different from baseline²Significantly different from one-week

All analyses control for age, trait gratitude, and financial disruption due to COVID-19

State gratitude (Table 1, Fig. 2) marginally increased in the gratitude writing condition from the baseline to the one-week follow-up. It then decreased between the one-week and one-month follow-up. Overall, there was no change in gratitude between the baseline and one-month follow-up. In contrast, for both the expressive writing and control conditions, state gratitude decreased from the baseline to the one-week follow-up and between the baseline and the one-month follow-up. However, there was no difference from the one-week follow-up to the one-month follow-up. These analyses were conducted again without the covariates, and the pattern of results remained the same. Thus, our hypotheses were not supported. Participants in the gratitude writing condition maintained their levels of state gratitude, while participants in the control and expressive writing groups showed decreases in state gratitude.

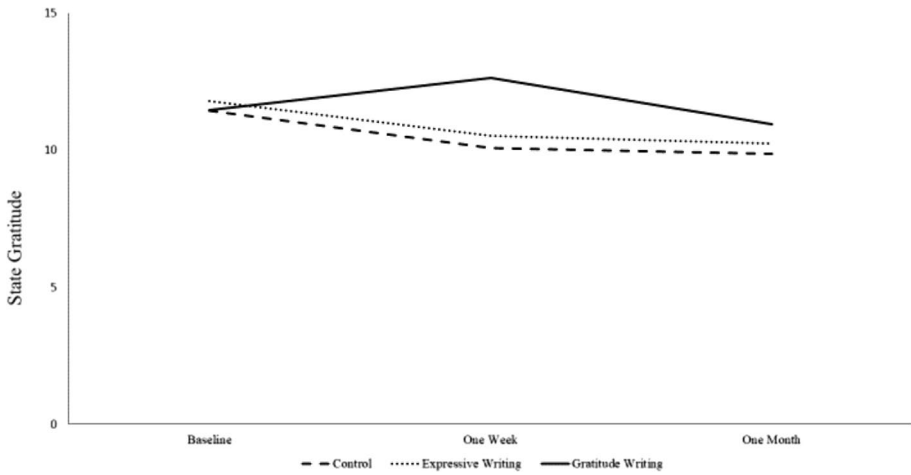


Fig. 2 Group differences over time in state gratitude

7.3.2 Psychological Distress

A multivariate interaction effect (Pillai's Trace=0.30, $F(12, 138)=2.07$, $p=0.022$, $\eta_p^2=0.15$) emerged for psychological distress. Univariate tests (Table 1) revealed that the interaction between condition and time was significant for stress but not anxiety or depression. Simple effects analyses were examined for stress, but not for depression or anxiety, to determine how each condition changed in stress over time. In the gratitude condition, there was a significant decrease in stress (Table 1, Fig. 3) from the baseline to one-week follow-up, no difference between the one-week and one-month follow-up, and a significant decrease between the baseline and one-month follow-up. In contrast, for both the control and expressive writing conditions, there were no changes between any of the time points. These analyses were conducted again without the covariates, and the pattern of results

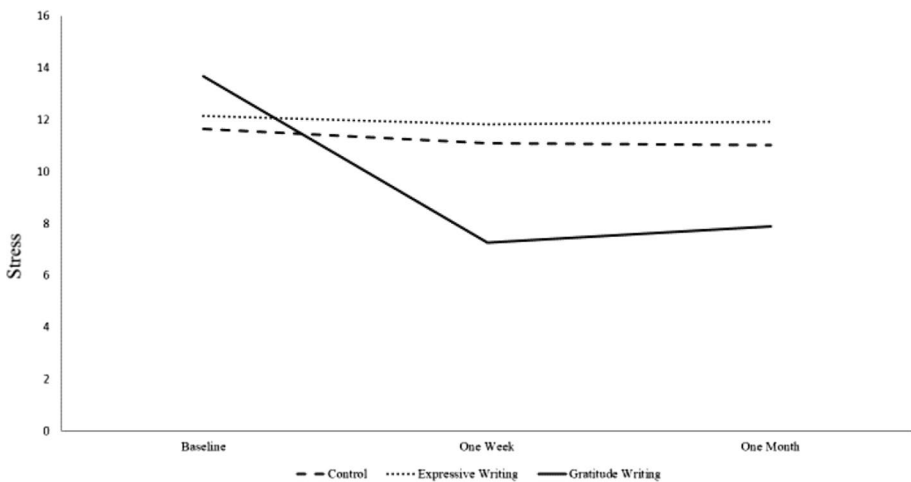


Fig. 3 Group differences over time in stress

remained the same. Thus, our hypotheses were partially supported. Participants in the gratitude writing condition showed significant decreases in stress at one-month post-intervention, while participants in the control and expressive writing groups showed no changes in stress over time.

7.3.3 Affect

A multivariate interaction effect (Pillai's Trace=0.22, $F(8, 142)=2.16$, $p=0.034$, $\eta_p^2=0.11$) emerged for affect. Univariate tests (Table 1) revealed that the interaction effect for condition and time was significant for negative but not positive affect. Simple effects analyses were conducted for negative affect, but not positive affect, to examine how each condition changed in negative affect over time. Pairwise comparisons revealed that for both the gratitude writing and control groups, there was a significant decrease in negative affect (Table 1, Fig. 4) from the baseline to one-week follow up, no difference between the one-week and one-month follow-up, and a significant decrease between the baseline and one-month follow-up. However, in the expressive writing condition, there were no changes between any of the time points. These analyses were conducted again without the covariates, and the pattern of results remained the same. Thus, our hypotheses were partially supported. Participants in both the control and gratitude writing condition showed significant decreases in negative affect at one-month post-intervention, while participants in the expressive writing group showed no changes in negative affect over time.

7.3.4 Physical Health Symptoms

The interaction between condition and time was not significant for the model examining physical health symptoms. Thus, simple effects analyses were not examined to see how each group changed in physical health symptoms over time. These analyses were conducted again without the covariates, and the pattern of results remained the same. Thus, our hypotheses were not supported for physical health symptoms.

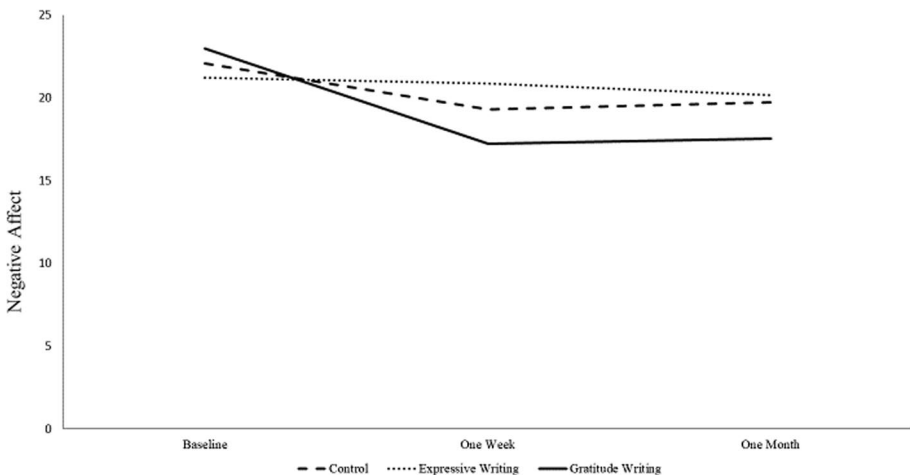


Fig. 4 Group differences over time in negative affect

8 Discussion

The gratitude intervention was effective in reducing participants' stress and negative affect. This is consistent with previous research showing that gratitude is linked to lower stress levels (e.g., Wood et al., 2008a, 2008b). Research suggests that gratitude can buffer the negative psychological outcomes associated with stressful life events (Deichert et al., 2019). Our results add to the growing body of evidence suggesting gratitude is a beneficial tool that reduces psychological distress associated with the experience of traumatic events such as natural disasters, terrorist attacks, war (Fredrickson et al., 2003; Israel-Cohen et al., 2015; Kashdan et al., 2006; McCanlies et al., 2014) and global pandemics.

One way gratitude influences well-being is through promoting increased positive cognitive states (Alkozei et al., 2018). The regular practice of gratitude, such as writing about things one is grateful for daily, may allow for a shift toward a positive cognitive style. Individuals with a positive cognitive style may interpret, attend to, and remember events more positively (Alkozei et al., 2018). Indeed, gratitude is linked to a decrease in negative cognitive processes such as intrusive rumination (Kim & Bae, 2019; Çolak & Güngör, 2020) and feelings of worry (Geraghty et al., 2010). Gratitude also increases positive mental states such as optimism (Emmons & McCullough, 2003; Huffman et al., 2016; Rey & Extremera, 2014) and motivation (Valdez et al., 2022). It is possible that the gratitude intervention allowed participants to focus on positive aspects of their life during an unpredictable pandemic with an unclear trajectory or find benefits during an adverse or challenging situation, and this resulted in decreased feelings of stress and negative affect.

The gratitude intervention may have decreased stress and negative affect because it allowed individuals to positively reframe the stressful life events in the world and make more meaning out of them. For example, individuals high in trait gratitude were more likely to positively reframe negative events, which helped them view the events as more manageable and meaningful (Lambert et al., 2009). Research also suggests that gratitude is positively associated with adaptive coping strategies such as support-seeking behaviors, active coping, positive reinterpretation, and growth and negatively associated with maladaptive coping strategies like disengagement, denial, and self-blame (Wood et al., 2007). Thus, the participants in this study who focused on things they were grateful for may have reframed the stressful and negative events regarding COVID-19 in a way that allowed them to feel more in control and better able to cope with the stress and uncertainty of the situation.

In contrast to the gratitude intervention, the expressive writing intervention did not reduce stress and negative affect. This is interesting given the wealth of research suggesting that expressive writing yields benefits for individuals who have experienced a traumatic event (Baikie & Wilhem, 2005; Kállay, 2015). Additionally, individuals in the gratitude intervention maintained their levels of gratitude throughout the study, while individuals in the expressive writing and control conditions showed decreases in gratitude over a month.

It is possible that while gratitude and expressive writing interventions both focus on individuals expressing their thoughts and emotions about things, the mechanisms through which they impact well-being may be different. For example, Booker and Dunsmore (2017) found that expressive writing was associated with more positive affect and fewer depressive symptoms through increased self-disclosure, while gratitude-focused writing was directly associated with life satisfaction and fewer depressive symptoms. Future research should examine the different pathways through which expressive writing and gratitude writing can influence well-being.

It is possible that these findings occurred because the COVID-19 epidemic was an ongoing stressor with an unclear and unpredictable trajectory. Thus, when individuals wrote about their experiences, they may not have created a narrative and engaged in cognitive processing, which is a hallmark feature of expressive writing (Pennebaker et al., 1987; Baikie & Wilhem, 2005). Indeed, many studies examining the benefits of expressive writing have focused on participants who experienced trauma in the past (e.g., death of a loved one, abuse, job loss) and are not necessarily experiencing a current, ongoing event (Baikie et al., 2012; Glass et al., 2019). Some research has examined the benefits of expressive writing for individuals dealing with a chronic stressor like chronic illness (e.g., asthma, arthritis, cancer). However, most of these studies were not conducted with newly diagnosed individuals (e.g., Broderick et al., 2004; Mosher et al., 2012). Even though chronic illness may be an ongoing stressor that changes and offers different challenges throughout the illness, there is generally a better understanding of the etiology, treatment, and trajectory of chronic illnesses than newly emerging diseases such as COVID-19 (Ko et al., 2006).

Neither the gratitude nor expressive writing interventions increased positive affect or decreased depressive symptoms, anxiety, or physical symptoms. One reason for this may be that participants in the current study reported relatively low levels of psychological distress and physical symptoms to begin with. Some research suggests expressive writing interventions are most successful in individuals who are experiencing more severe traumas or distress related to their trauma (Baikie & Wilhem, 2005; Robertson et al., 2019; Zachariae & O'Toole, 2015). Moreover, positive psychology interventions and gratitude-focused exercises may be most beneficial for individuals with depression or those with higher levels of dispositional gratitude (Harbaugh & Vasey, 2014; Portocarrero et al., 2020; Sin & Lyubomirsky, 2009). This study collected data relatively early during the onset of the COVID-19 pandemic (i.e., April to June of 2020). During this time, supports and accommodations were in place to help individuals coping with the myriad changes, including job loss and stay-at-home orders (e.g., ability to work at home, extra support for unemployment insurance, and a moratorium on evictions and utility shut-offs). Although it is likely that the COVID-19 pandemic was still distressing, most participants in this study reported that they were not considered essential workers and that their jobs had not been affected by the pandemic. In addition, almost all of the participants were sheltering at home through the duration of the study, and they knew relatively few people who were impacted by the illness. It would be interesting to conduct this study in a sample of participants who are more vulnerable to the impact of COVID-19 (e.g., loss of job/income, unstable housing, impacted by illness) or in a sample of participants who reported higher levels of distress related to COVID-19 to see if the pattern of results was different.

It is also possible that the intervention was not long enough or participants did not engage in enough writing to produce strong effects. We based both the expressive writing and gratitude writing interventions on the classic expressive writing paradigm designed by Pennebaker (1997). There is mixed evidence about whether or not the number, length, and timing of sessions in expressive writing and positive writing interventions make a difference in how effective these interventions are at improving well-being. For example, recent meta-analyses suggest that interventions with writing sessions spaced more than one day apart, interventions with three or more writing sessions, interventions with sessions lasting longer than 15 min, and interventions with longer follow-ups (e.g., more than two months) may produce larger effect sizes (Frataroli, 2006; Travagin et al., 2015). Positive psychology interventions longer in duration may have a greater impact on well-being because participants have more time to convert the activities they engage in during the intervention (e.g., gratitude writing) into habits

(Sin & Lyubomirsky, 2009). However, a more recent meta-analysis on gratitude interventions did not find that the duration of the intervention moderated intervention effects (Cregg & Cheavens, 2020).

One reason for these mixed results may be that determining an ideal intervention depends on a fit between the person and activity. Moreover, this fit may vary according to an individual's personality, culture, or motivation (Lyubomirsky & Layous, 2013). For example, individuals from collectivist cultures may benefit from interventions that focus on expressing gratitude towards others. In contrast, individuals from individualistic cultures may benefit less from this activity because it may leave them feeling less autonomous or indebted to others (Fritz & Lyubomirsky, 2018). Allowing individuals choice in what activities they engage in and how long they engage in them may produce stronger effects (Lyubomirsky & Layous, 2013). While we provided participants in the present study with specific instructions, we did not monitor their adherence to these instructions. While this may have implied some choice in how long and how often they wrote, future research should examine whether giving participants more clear choices in the types and lengths of activities they engage in produces more robust intervention benefits.

Our results also have implications for mental health practitioners and policymakers. Dispositional gratitude and gratitude interventions have produced significant mental health improvements for psychotherapy outpatients and patients with active suicidal ideation (Ducasse et al., 2019; Toussant & Friedman, 2009; Wong et al., 2018). Incorporating gratitude into psychotherapy would allow practitioners and health care policymakers to encourage individuals to "build what's strong" (Nelson, 2009, p. 46) rather than focus solely on negative aspects of one's experience. Such a focus may help promote a positive cognitive mindset by shifting focus from the negative to savoring more positive experiences and promoting the use of individuals' strengths (Seligman et al., 2006). It is also important to note that gratitude may have psychotherapeutic effects distinct from other positive emotions given gratitude's connection with social interactions (Emmons & Stern, 2013).

There are several limitations of the study that should be noted. First, although our results suggest that compared to the expressive writing and control conditions, participants in the gratitude writing intervention-maintained levels of gratitude and significantly lowered stress and negative affect, the effect sizes were relatively small. However, these effect sizes are consistent with other research examining the effects of gratitude and expressive writing on physical and psychological health. In general, interventions have reported effect sizes ranging from 0.00 to -0.31 depending on whether the comparison group was an active, positive intervention or neutral control group (Cregg & Cheavens, 2020; Dickens, 2017). Despite having small effect sizes, it is still worth considering these interventions to help individuals cope with stressful situations such as the COVID-19 pandemic, especially because they are relatively easy and cost-effective to implement. Moreover, small effects of one variable on another may still result in positive, meaningful changes in clinically relevant outcomes (Kazdin, 1999; Thompson, 2002).

Second, only 38% of the randomized participants were ultimately included in the final analysis. It is not uncommon for attrition to be higher in online or self-guided interventions (Eysenbach, 2005). Other internet-based interventions have shown similar attrition rates (e.g., Geraghty et al., 2010; Rabius et al., 2008; Strachan & Cash, 2002). Despite the high attrition rate in this study, individuals who did complete the study benefited from it. However, attrition resulted in a smaller sample size that was only powered to detect medium effect sizes. Given that the effect sizes for the conditions were smaller than expected, a larger sample size would have been beneficial. Future research should examine factors that might help reduce attrition

in online intervention studies, such as offering a waitlist condition or enhancing participants' internal locus control as part of the intervention (Geraghty et al., 2010).

Finally, this study was a convenience sample of individuals recruited through social media, university and professional listservs, and word of mouth. The majority of participants in the study were White, middle or upper-middle-class, educated women from the United States. Thus, the generalizability of these results may be limited. Some evidence suggests that women benefit more from gratitude interventions than men (Kashdan et al., 2009), and culture moderates the relationship between gratitude and well-being (Alkozei et al., 2018). Moreover, this study, along with most research on gratitude interventions, is limited by a lack of culturally diverse samples. Future studies should recruit a more evenly distributed sample in terms of cultural, sociodemographic, and socioeconomic backgrounds.

Despite its limitations, this study has several strengths. First, it adds to the growing body of literature suggesting that expressive writing, particularly gratitude-focused writing, is an effective, low-cost, and feasible way to reduce stress and negative affect in individuals experiencing a stressful life event, such as COVID-19. Moreover, despite the high attrition rate, the intervention was successfully implemented through virtual methods during a time when individuals were primarily confined to their homes. Thus, using this approach may be an alternative way to help individuals who are unable or unwilling to travel to in-person interventions. Finally, it is among the small number of studies suggesting that gratitude-focused writing interventions may offer unique benefits to individuals when compared to more traditional forms of expressive writing.

The COVID-19 pandemic is an unprecedented event that has presented multiple challenges and stressors for individuals in the United States and across the world. The lack of knowledge about the illness, along with the unknown trajectory of the pandemic, has likely contributed to higher levels of stress and negative emotions. Gratitude writing may be one effective way of helping individuals positively reframe their circumstances, decrease stress and negative mood states, and better adjust to the unpredictable and uncontrollable nature of a global pandemic.

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Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval Data collection for this study complied with the APA's ethical standards in the treatment of subjects. This study has been reviewed and approved as exempt by the University of Indianapolis Institutional Review Board.

Informed Consent All participants provided informed consent before taking part in the study.

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