

**Gratitude During the COVID-19 Pandemic in Germany: An Experimental Study
Investigating the Effects of a Gratitude Letter Writing Intervention on Mental Well-
Being and Gratitude**

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Abstract

At the beginning of the year 2020, a new form of the coronavirus (COVID-19) was discovered, which quickly spread from China around the world and caused a pandemic. Approximately one year after the COVID-19 outbreak, the pandemic is still not over and has further spread around the world. In addition to a physical threat, the COVID-19 pandemic seems to also have exerted detrimental effects on the mental well-being of the population. In order to deal with these detrimental effects, this experimental study had the aim to examine the efficacy of writing a gratitude letter in the form of a love letter and writing a break-up letter to enhance mental well-being and trait gratitude during the COVID pandemic. Therefore, for this experimental study a 2 (Experimental condition: Love letter vs. Break-up letter) x 3 (Time: Baseline measurement (T0) vs. Post-measurement (T1) vs. two week follow-up measurement (T2)) mixed design was applied. Mental well-being and trait gratitude were assessed at baseline measurement (T0) through an online survey. After approximately one week, 153 German participants with an age range between 18 and 77 were randomly allocated to one of two experimental conditions and received a second online survey (T1), which incorporated letter writing instructions for a love letter condition and a break-up letter condition. After participants in both experimental conditions completed their letters towards COVID-19 in the second survey, mental well-being and trait gratitude of participants were assessed a second time. Two weeks later, participants received a third online survey (T2) where mental well-being and trait gratitude was assessed again. Results of this experimental study revealed that writing a love letter and writing a break-up letter did not significantly enhance mental well-being and trait gratitude for participants over time. Besides that, writing a love letter did not significantly enhance mental well-being and trait gratitude more compared to writing a break-up letter. Based on these findings, this study indicated that a single gratitude letter writing effort seems to be not a sufficient mean to enhance mental well-being and trait gratitude during the COVID-19 pandemic. Future research should study how gratitude letters are most effectively applied to enhance mental well-being and trait gratitude and it should be investigated if gratitude letters have also initial and momentary effects on the measurement of gratitude.

Keywords: trait gratitude, mental well-being, gratitude letter, covid-19

At the end of December 2019, the World Health Organization (WHO) obtained the information that there are conditions in the Chinese city Wuhan, where people are suffering from pneumonia. In January 2020, a new form of the coronavirus was found to be the cause. The new coronavirus form was designated as COVID-19. Furthermore, in January 2020, the emergence of COVID-19 was classified as a public health emergency of international concern (PHEIC) by the WHO. Besides that, the WHO typified the emerging conditions through the COVID-19 infections as a pandemic (WHO, 2021a). Approximately one year after COVID-19 was first discovered and has further spread around the world, the COVID-19 pandemic is still not over. Besides that the COVID-19 pandemic has the potential to cause serious illness conditions (WHO, 2021b), the COVID-19 pandemic also has implications for the mental health conditions of the general population (WHO, 2021c).

Regarding the implications for the mental health of the population, the COVID-19 pandemic incorporates anxiety, stress, and insecurity as detrimental effects for the mental health of the population (Chakraborty, 2020; Dawson & Golijani-Moghaddam, 2020; Kumar & Nayar, 2020). These are and were caused by a quick spread of COVID-19 around the world (WHO, 2021c), by concerns to get infected through human contact (Dawson & Golijani-Moghaddam, 2020; Kumar & Nayar, 2020) and by the resulting possibility to die from an infection (Kumar & Nayar, 2020). Other causes included solitude because of missing social contact (Chakraborty, 2020; Dawson & Golijani-Moghaddam, 2020; Kumar & Nayar, 2020), and concerns regarding losing one's employment, which would lead to financial issues regarding one's subsistence and housing (Chakraborty, 2020; Kumar & Nayar, 2020; WHO, 2021c). Already millions of employees may mourn the loss of their profession (Kumar & Nayar, 2020). The distribution of incorrect facts and news in the social media and the possibility to not come into possession of vital resources, which can be seen by the excessive buy up of vital resources by people to keep these in reserve, also contributed to the implications for the population's mental health (Kumar & Nayar, 2020).

Based on the identified detrimental mental health effects for the population, which are the result of the COVID-19 pandemic, Kumar and Nayar (2020) mentioned that the most significant issue in dealing with these effects is the deficiency of the workforce in the mental health sector, who could provide support with dealing with the effects of the pandemic for the broad population. However, providing mental health support besides dealing with the possible physical health risks of COVID-19 is considered essential according to Chakraborty (2020). Furthermore, according to Jiang (2020) most research exclusively focused on the effects of COVID-19 on physical and mental health and not on how these adverse effects can

be reduced. Research on how to reduce the adverse effects of COVID-19 is considered according to Jiang (2020) as essential, since the current pandemic is different from former epidemics because of strict lockdowns and reoccurring contamination outbreaks. Therefore, a source which supports the mental health of the population under the COVID-19 conditions might be needed to account for the deficiency of the workforce in the mental health sector and for the missing research on how to reduce the adverse effects. In regard to that, it is considered according to Dawson and Golijani-Moghaddam (2020), that the recognition of mental resources, supportive for the mental health during the conditions of the COVID-19 pandemic, are of priority in order to use those to account for the adverse mental health consequences of COVID-19 during the pandemic but also longstanding (Dawson & Golijani-Moghaddam, 2020).

One accessible mental resource to account for the adverse mental health consequences could be gratitude. Based on a literature review about the effects of gratitude on welfare by Wood et al. (2010), they defined *gratitude* in the following way ‘(...) a trait as involving a life orientation towards noticing and appreciating the positive in life’. They outlined that there seems to be an advantageous and causal connection regarding gratitude to well-being. According to Toepfer et al. (2012), gratitude seems to be an available ability which is significantly beneficial for one’s well-being. That is supported by Park et al. (2004), who discovered that gratitude is a trait which possesses a fundamental connection to well-being and more specifically to the satisfaction of one’s life. However, the means through which gratitude as a trait is connected with well-being was not sufficiently investigated (Wood et al., 2010; Lin & Yeh, 2014; Lin, 2016). Still, prior investigations proposed hypotheses regarding potential means (Wood et al., 2010; Lin & Yeh, 2014). One hypothesis is the *Coping hypothesis* (Wood et al., 2010).

According to the coping hypothesis, ‘positive coping strategies’ are possible means through which gratitude is connected with well-being (Wood et al., 2010). According to Compas et al. (2001), coping is a reaction that emerges in order to deal with a stress inducing encounter with one’s environment or in order to reduce a detrimental mental condition which is caused by stress. A study by Wood et al. (2007) showed that three coping strategies were linked to gratitude. A first coping strategy that was more probably applied by grateful persons was the usage of accessible social help. Secondly, grateful persons were actively engaged in handling difficult situations through preparing themselves, through reinterpreting difficult circumstances from a more optimistic perspective and attempting to achieve the potentiality for personal development. As a third strategy, it was less probable for grateful persons to

evade difficult situations or circumstances through withdrawing from behaviourally handling these difficult situations, through rejecting the existence of a difficult situation and through engaging in drug abuse. Regarding these coping styles, less withdrawing from behaviourally handling difficult situations, less blaming oneself and a greater extent of optimistic reinterpretations of difficult circumstances as well as a greater extent of attempting to achieve the potentiality for personal development accounted for 51% of gratitude's connection to stress. Since grateful persons might engage more in beneficial coping mechanisms, they might perceive less stress (Wood et al., 2007). That is suggested, since stress is amongst other things caused when coping abilities are not sufficient to deal with certain situations (Lazarus & Folkman, as cited in Wood et al., 2010). Concluding, according to the coping hypothesis, gratitude contributes to well-being since stress is reduced through beneficial coping strategies.

The coping hypothesis might be supported by a study by Jiang (2020) in which it was investigated if gratitude operates as a safeguard in regard to the adverse effects of the COVID-19 pandemic. That was done in the context of a diary study on a daily basis with 231 adult people from China for two weeks. The findings of the study by Jiang (2020) revealed that the application of measures which establish an increase of gratitude result in a beneficial impact in the form of stress decline. Therefore, gratitude seems to be especially important since stress is one of the main detrimental effects of COVID-19 for the mental health of the population (Chakraborty, 2020; Dawson & Golijani-Moghaddam, 2020; Kumar & Nayar, 2020).

In the context of this study, a possible gratitude intervention can be writing a gratitude letter. Toepfer et al. (2012) executed a study with a pre- and post-test design, where they tested the impact of continuous writing of gratitude letters on well-being aspects and gratitude itself. Participants who wrote gratitude letters to another person to describe their gratefulness for this other person had enhanced levels of happiness, satisfaction with life, and a reduction of depressive manifestations compared to a control group, who were not engaged in a writing effort. However, the level of gratitude did not change for the experimental group (Toepfer et al., 2012). In the literature review about the effects of gratitude on welfare by Wood et al. (2010), an advantageous and causal connection regarding gratitude to well-being was stressed. When there is a causal connection between gratitude to well-being, one might expect the measurement of gratitude to increase as well for participants who wrote a gratitude letter. Therefore, the findings and suggestions of the literature found seem to be conflicting to some extent.

In regard to writing a gratitude letter, it is proposed that repeatedly looking at past experiences of gratitude through the engagement into a writing effort supports one's well-being, since comprehension of the experience is established (Toepfer et al., 2012). Generally, according to Pennebaker (1993), writing is considered as an effective and beneficial therapeutic tool and when engaging in writing about private past events this seems to have a beneficial effect on mental health. In regard to that, Pennebaker (1993) stated that disclosing optimistic feelings is related to a relaxing state. However, engaging with unpleasant and daunting past events is uncomfortable and distressing in regard to one's mental health at first but later this engagement is related to enhanced mental health conditions (Pennebaker & Susman, 1988; Pennebaker, 1993).

Furthermore, regarding the therapeutic effects of writing, King and Miner (2000) discovered that writing about a traumatic event, with a focus on its valuable and beneficial elements, led to similar health improvements compared to focusing on uncomfortable feelings regarding the traumatic event during the writing process. Therefore, according to King and Miner (2000), it is not required to re-experience a painful emotional state to benefit from the therapeutic effects of writing and the resulting health improvements. Furthermore, Marlo and Wagner (1999) researched if writing in regard to positively remembered experiences exerts beneficial effects on mental health. The results of their study indicated that mental health measures were most significantly enhanced when participants' writing efforts were concerned with positively remembered experiences and the slightest when concerned with negatively remembered experiences. Generally, both writing efforts significantly resulted in better mental health conditions (Marlo & Wagner, 1999).

In regard to a gratitude letter intervention, the current study was inspired by a master thesis by ter Avest (2020). In her master thesis ter Avest (2020) executed a qualitative study by letting participants decide between writing a love or break-up letter that was addressed towards COVID-19 to research the pandemic's possible effects on mental well-being. One finding of her study was that more participants decided to engage in writing the break-up letter and therefore this finding also derived that the participants' mental well-being is probably negatively affected through COVID-19. However, as it was shown in the previously mentioned literature, writing about positive experiences seems to benefit mental health equally and possibly more than writing about negative experiences (e.g. King & Miner, 2000; Marlo & Wagner, 1999). Furthermore, since for this study a gratitude letter intervention was used, where the positive experiences to write about are focused on gratitude, improvement of mental well-being was expected even more. That was expected, because gratitude itself

seems to be an available ability when used, which is beneficial for one's well-being (Toepfer et al., 2012). Furthermore, gratitude might be especially effective to improve mental well-being under the stress inducing circumstances of COVID-19, since grateful persons might engage more in beneficial coping methods and therefore might perceive less stress (Wood et al., 2007). Since improvement of mental well-being is especially expected for writing about gratitude, an increase in gratitude itself might be expected even more as well, since research indicated that mental well-being aspects are reciprocally connected with gratitude.

Enhancement of mental well-being aspects lead to enhancement of gratitude (Unanue et al., 2019).

In the current study, the love and break-up letter were not used as by ter Avest (2020) to research the pandemic's possible effects on mental well-being, but to let participants write a love or break-up letter as an experimental intervention and to study the interventions' effects on mental well-being and trait gratitude during the COVID-19 pandemic. Therefore, the aim of the current study was to examine the efficacy of writing a gratitude letter in the form of a love letter and writing a break-up letter to enhance mental well-being and trait gratitude during the COVID-19 pandemic. Based on that, it is hypothesized that (H1) *writing a love letter and a break-up letter both lead to enhanced levels of mental well-being and gratitude, but that* (H2) *this increase is significantly larger for the love letter compared to the break-up letter at post-measurement (T1) and two week follow-up measurement (T2).*

Methods

Study design

This study was a randomized controlled experiment and a 2 (Experimental condition: Love letter vs. Break-up letter) x 3 (Time: Baseline measurement (T1) vs. Post-measurement (T2) vs. two week follow-up measurement (T2)) mixed design was applied. This experimental study was conducted with German participants to test the effectiveness of writing a gratitude letter in the form of a love letter towards COVID-19 on mental well-being and trait gratitude. Two experimental conditions (Love letter vs. Break-up letter) were used but no control condition. That was done, since letting participants of a control group write about something else could also easily lead to positive or negative emotions during the writing process, which could distort the results. Instructing control group participants to write neutral might be also difficult to implement and possibly also difficult to do for participants. This experimental study incorporated three measurement points, where mental well-being and trait gratitude were assessed for both conditions. A baseline measurement (T0), followed

by the experimental manipulation and the post-measurement one week after (T1) and a subsequent two week follow-up measurement after post-measurement (T2). This study was ethically approved by the BMS ethical committee of the University of Twente (request number: 210168) before data was collected. Data was collected for approximately three to four weeks between April and May 2021.

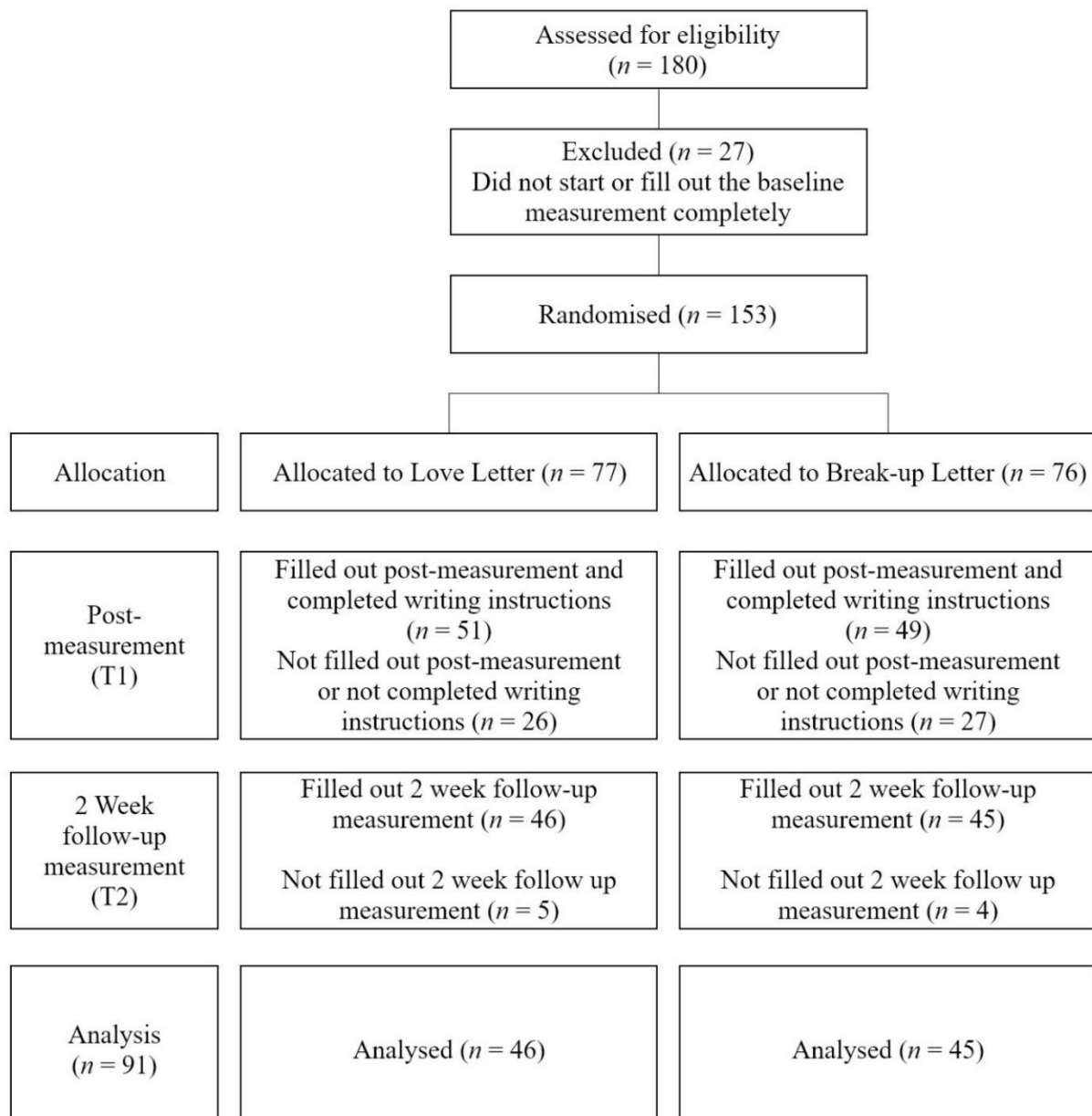
Participants and Procedure

The recruitment of participants took place through convenience sampling, where 180 participants were aimed to be recruited. Participants were recruited via the network and the social media accounts (What's App, Instagram) of the researchers themselves. In this case 12 students, who were engaged in conducting the current research. The recruitment criteria of this study restricted the participation to German participants with a minimum age of 18 years. Furthermore, participants needed a valid connection to the internet and an email address, since the study was conducted online. Potential participants received an online link, where they obtained information about the purpose of the study, the expenditure of time when participating and further information regarding informed consent, anonymous participation and contact details if participants had questions regarding the study. After the given information, participants had to provide their first name and their email address to register for participation when interested.

At the beginning of the study participants firstly received a survey, which entailed an informed consent form and the baseline measurement (T0), where mental well-being and trait gratitude were assessed. After approximately one week, participants were randomly assigned by using random numbers, which were created through randomization.org, to one of the two experimental conditions and received the second survey. There the first experimental condition was instructed to write a love letter to COVID-19 and the other experimental condition was instructed to write a break-up letter to COVID-19 (see Appendix A). Immediately after both experimental conditions completed their writing instructions, mental well-being and trait gratitude were assessed in the second survey which was the post-measurement (T1), and two weeks later in a third survey which was the two week follow-up measurement (T2). Both surveys had to be completed by participants within a time period of approximately one week. Besides the assessment of mental well-being and trait gratitude, the third survey incorporated a debriefing document to inform participants about what type of data was gathered, to provide them with information about the experimental conditions of the

study from which the participants can infer to which experimental group they were assigned to and to inform them about the purpose of the love and break-up writing instructions.

In Figure 1, where a flow chart of the participants in both experimental conditions throughout the measurement points of the study is presented, it is visible that from 180 participants, 153 participants filled out the baseline measurement. Therefore, 27 participants did not start or fill out the baseline measurement. Therefore, from the 153 participants that were left, 77 were randomly allocated to the love letter condition and 76 to the break-up letter condition. From the allocated participants in both experimental conditions, 91 participants completed the post-measurement (T1) and the two week-follow-up measurement (T2). From these participants 46 (50.6%) belonged to the love letter condition and 45 (49.4%) belonged to the break-up letter condition. Therefore, in total 91 (50.6%) participants were included in the data analysis of this study and 89 (49.4%) participants were excluded from the data analysis because of incomplete provided data. From the 46 participants in the love letter condition, 32 (69.6%) were female and 14 (30.4%) were male. From the 45 participants in the break-up letter condition, 32 (71.1%) were female and 13 (28.9%) were male. Furthermore, the mean age of participants in the love letter condition was 35.91 years ($SD = 16.34$) with an age range between 18 and 74 years. In the break-up letter condition the mean age was 35.53 ($SD = 17.05$) with an age range between 18 and 77 years.

Figure 1*Flow Chart of Participants in both Experimental Conditions*

Materials and Measures

In order to measure the main dependent variable mental well-being at T0, T1 and T2 for both experimental groups, a German translated version of the Mental Health Continuum-Short Form (MHC-SF) was applied. See Appendix B for an English and a German translated version of the MHC-SF. The mental health ingredients emotional well-being (EWB), psychological well-being (PWB) and social well-being (SWB) are measured by the MHC-SF. It incorporates 14 items for the 14 components of the mental health ingredients EWB, PWB and SWB (Keyes et al., 2008). These 14 items are answered by participants on a 6 Point-Likert scale and incorporate the answering options, 1 (never), 2 (once or twice a month), 3 (about once a week), 4 (two or three times a week), 5 (almost every day) and 6 (every day) (Lamers et al., 2011). Greater scores on individual items of the MHC-SF are related to greater well-being (Schotanus-Dijkstra et al., 2017). In the context of this study the total score of all three mental health ingredients was used in order to make inferences about overall mental well-being. An example question of the MHC-SF is *'During the past month, how often did you feel satisfied with life?'*. On the basis of an Dutch sample, Lamers et al. (2011) found in regard to the MHC-SF a high internal reliability ($\alpha = 0.89$). Furthermore, the test-retest reliability was shown to be moderate which indicates that the MHC-SF is receptive to alteration but also time stable (Lamers et al., 2011). At last, Lamers et al. (2011) found good convergent validity which identifies the MHC-SF as a valid measurement of well-being.

The second dependent variable gratitude was measured at T0, T1 and T2 for both experimental groups with the Gratitude Questionnaire-Six Item Form (GQ-6), which was created by McCullough et al. (2002). This questionnaire targets to measure a 'grateful disposition' or 'emotional trait'. McCullough et al. (2002) conceptualised this 'grateful disposition' as 'a generalized tendency to recognize and respond with grateful emotion to the roles of other people's benevolence in the positive experiences and outcomes that one obtains.' Six items are incorporated in the GQ-6 (Hudecek et al., 2020). Items are answered by participants on a 7 Point-Likert scale which incorporate the answering options 1 (strongly disagree), 2 (disagree), 3 (slightly disagree), 4 (neutral), 5 (slightly agree), 6 (agree) and 7 (strongly agree) (McCullough et al., 2002). Sum scores can result from the GQ6. Higher scores on the GQ-6 suggest higher 'dispositional gratitude' (Bohlmeijer et al., 2020). An example question of the GQ-6 is *'I have so much in life to be thankful for.'* In this study a German version of the GQ-6 was applied. Hudecek et al. (2020) executed a validation study of a German translated GQ-6. They found a low factor loading (0.29) for the sixth item. Therefore, the sixth item was removed which resulted in a better and proper factor structure.

This resulted in the GQ-5-G. In the context of their validation study the GQ-5-G was identified as a reliable and valid German gratitude questionnaire (Hudecek et al., 2020). Since the sixth item was excluded, sum scores between 5 to 35 can result from the GQ-5-G. For the GQ-5-G the third item has to be recoded beforehand, since this item is scored reversed. See Appendix C for an English and German translated version of the GQ-5-G.

Besides the two questionnaires, participants received between the baseline measurement (T0) and the post-measurement (T1) an instruction text for a letter writing task (experimental manipulation). The developed instructions were inspired by the instructions used in the study by ter Avest (2020). Both experimental groups received slightly different instructions for the letter writing task. The love letter group was instructed to write down what they love about Corona or for what they feel grateful for regarding the corona pandemic. They were also asked why they love and why they are grateful for what they have stated. The intention was to inspire their thoughts and to guide them to actually write about their gratitude. The break-up letter group received similar instructions besides that they were instructed to write about what they do not like about Corona. See Appendix A for the full instructions used for both experimental groups in English and German.

Analysis

All data analyses were conducted by using IBM SPSS Statistics 25.0. Regarding descriptive statistics, mean and standard deviations were calculated of the dependent variables for both experimental conditions. A dropout analysis was conducted to test differences in the dropout rates between both experimental conditions by making use of a Chi-square test. Independent samples t-tests were used to test for between group differences in mental well-being and trait gratitude at baseline measurement. Besides that, a Chi-square test was used to test differences in regard to gender and a Mann-Whitney U test was used to test differences regarding age between both experimental conditions.

For the analysis of the hypothesis a repeated-measures ANOVA was conducted. The main dependent variable was mental well-being, and the second dependent variable was trait gratitude. The change over time (T0, T1 and T2) was the within-subject factor and the experimental condition of either the love letter or the break-up letter demonstrated the between-subject factor as well as the independent variable. To test the first hypothesis (H1), *that writing a love letter and a break-up letter both lead to enhanced levels of mental well-being and gratitude*, the repeated measures main effect of time in mental well-being and trait gratitude across both experimental conditions was examined. Besides that, paired-samples t-

tests were performed to further investigate the effects of time on T1 and T2 for each experimental condition apart in regard to mental well-being and trait gratitude. That was done by comparing the love letter baseline measurement of mental well-being and trait gratitude with the love letter post- and two week follow-up measurement of mental well-being and trait gratitude. The same was done with the break-up letter condition. For the second hypothesis (H2), *that this increase is significantly larger for the love letter compared to the break-up letter at post-measurement (T1) and two week follow-up measurement (T2)*, the first hypothesis had to be confirmed at first. Besides that, the second hypothesis was confirmed or rejected on the basis of the interaction effects between time and experimental condition. The interaction effect of time and experimental condition was considered in order to know if there was a difference between the measurement points depending on the experimental condition a participant was assigned to.

Results

Dropout

From the 153 participants that were randomly assigned to one of the two experimental conditions, 100 (65.4%) participants filled out the post-measurement and 113 (73.9%) the two week follow-up measurement. For the final data analysis 91 participants were used since these participants completed the three measurement points T0, T1 and T2. A non-significant difference was found in the dropout rate between both experimental conditions $\chi^2(1) = 0.21$, $p = .646$.

Participants' Characteristics

For the comparison of the baseline measurements of mental well-being and trait gratitude of both experimental conditions, an Independent Samples T-test was executed to ensure that measurement differences at T1 and T2 are not attributable to differences in mental well-being and trait gratitude before the experimental manipulations took place. A non-significant difference in the measurement of mental well-being was detected between the love letter condition ($M = 4.29$, $SD = .65$) and the break-up letter condition ($M = 4.11$, $SD = .83$); $t(89) = 1.17$, $p = .244$. Furthermore, a non-significant difference in the measurement of trait gratitude was detected between the love letter condition ($M = 6.12$, $SD = .77$) and the break-up letter condition ($M = 5.92$, $SD = 1.01$); $t(89) = 1.05$, $p = .295$. Besides that, a non-significant difference was found in regard to gender between both experimental conditions

$\chi^2(1) = 0.03, p = .872$. Similarly, a Mann-Whitney U test revealed a non-significant difference between both experimental conditions in regard to age $U = 1032.00, p = .984$.

Repeated-measures analysis for mental well-being and trait gratitude

The within-group analysis revealed a non-significant main effect of time in mental well-being for both experimental conditions, $F(2, 178) = 0.54, p = .587$. This indicated, that writing the letters did not significantly enhance the mental well-being of participants. Regarding trait gratitude, a non-significant main effect of time was revealed for both experimental conditions, $F(2, 178) = 1.03, p = .359$, indicating that writing the letters did not significantly enhance participants' trait gratitude.

More specifically, paired-samples t-tests revealed that the measurement of mental well-being for the love letter condition was not significantly higher at post-measurement ($M = 4.29, SD = .75$); $t(45) = 0.07, p = .943$, and two week follow-up measurement ($M = 4.34, SD = .76$); $t(45) = -0.72, p = .475$, compared to the baseline measurement ($M = 4.29, SD = .65$). Regarding the break-up letter condition, the paired-samples t-tests revealed that the measurement of mental well-being was not significantly higher at post-measurement ($M = 4.17, SD = .94$); $t(44) = -0.83, p = .411$, and two week follow-up measurement ($M = 4.16, SD = .87$); $t(44) = -0.66, p = .511$, compared to the baseline measurement ($M = 4.11, SD = .83$).

Regarding the love letter condition, the paired-samples t-tests revealed that the measurement of trait gratitude was not significantly higher at post-measurement ($M = 6.03, SD = .93$); $t(45) = 1.03, p = .309$, and two week follow-up measurement ($M = 6.10, SD = .93$); $t(45) = 0.24, p = .814$, compared to the baseline measurement ($M = 6.12, SD = .77$). For the break-up letter condition, the paired samples t-tests revealed that the measurement of trait gratitude was not significantly higher at post-measurement ($M = 5.97, SD = 1.21$); $t(44) = -0.50, p = .623$, and two week follow-up measurement ($M = 6.08, SD = 1.08$); $t(44) = -1.83, p = .07$ compared to the baseline measurement ($M = 5.92, SD = 1.01$). These results of the paired-samples t-tests supported the non-significant main effect of time in mental well-being and trait gratitude for both experimental conditions, which indicated that writing the love letter and the break-up letter did not significantly enhance participants' mental well-being and trait gratitude.

The results of the repeated-measures analysis revealed a non-significant interaction effect between time and experimental condition regarding the measurement of mental well-being $F(2, 178) = 0.32, p = .728$. Regarding the measurement of trait gratitude, results

revealed similarly a non-significant interaction effect between time and experimental condition $F(2, 178) = 1.08, p = .340$. These results indicated a non-significant difference in mental well-being and trait gratitude between the three measurement points T0, T1 and T2 dependent on to which experimental group a participant belonged to. In the context of this study this indicates, that writing the love letter did not significantly enhance mental well-being and trait gratitude more compared to writing the break-up letter. See Table 1 for means and standard deviations of the dependent variables for both experimental conditions and the results of the repeated measures analysis.

Table 1

Means and standard deviations from the MHC-SF and the GQ-5-G regarding the dependent variables mental well-being and trait gratitude and results of the repeated measures analysis

	Love letter condition	Break-up letter condition				
	($n = 46$)	($n = 45$)	Condition	Time	Interaction	
	M (SD)	M (SD)	$F(1)$	$F(2)^*$	$F(2)^*$	p
Mental well-being (MHC-SF)						
Baseline measurement (T0)	4.29 (0.65)	4.11 (0.83)				
Post-measurement (T1)	4.29 (0.75)	4.17 (0.94)				
Follow-up measurement (T2)	4.34 (0.76)	4.16 (0.87)	1.02	0.54	0.32	0.728
Trait Gratitude (GQ-5-G)						
Baseline measurement (T0)	6.12 (0.77)	5.92 (1.01)				
Post-measurement (T1)	6.03 (0.93)	5.97 (1.21)				
Follow-up measurement (T2)	6.10 (0.93)	6.08 (1.08)	0.20	1.03	1.08	0.340

*Sphericity Assumed

Discussion

The aim of this experimental study was to examine the efficacy of writing a gratitude letter in the form of a love letter and a break-up letter to enhance mental well-being and trait gratitude during the COVID-19 pandemic. At first, it was hypothesized that writing a love letter and a break-up letter both lead to enhanced levels of mental well-being and gratitude. In this study, a single writing effort invested in a gratitude letter and in a break-up letter towards COVID-19 did not significantly enhance or reduce the mental well-being and trait gratitude scores of participants over time. Therefore, both interventions did not establish a significant increasing change in the measurements of mental well-being and trait gratitude which led to the rejection of the first hypothesis. Secondly, it was however hypothesized that the increase in mental well-being and trait gratitude is significantly larger for the love letter compared to the break-up letter at the measurement points T1 and T2. The results of this study indicate, that writing the love letter did not significantly enhance mental well-being and trait gratitude more compared to writing the break-up letter at T1 and T2, which led to the rejection of the second hypothesis.

Possible explanations why the gratitude letter was not found effective to establish significant increase in mental well-being might be related to differences in the method of this study compared to prior studies. A first explanation could be that the frequency of doing the writing task was too low, since participants simply wrote one gratitude letter. Toepfer et al. (2012), who tested the impact of continuous writing of gratitude letters, found that gratitude letters enhanced mental well-being aspects. One reason for this could be that participants in their study were instructed to compose one gratitude letter per week. Since these instructions were administered in three consecutive weeks, participants composed three gratitude letters in total and not only one gratitude letter as in the current study. That more letters should have been written to enhance mental well-being might be supported by the *positive-activity model* by Lyubomirsky and Layous (2013). According to this model, 'positive activities', in this study gratitude letters, increase well-being by enhancing positive mental states, cognitions and actions. There are different characteristics which 'positive activities' possess that affect the extent to which well-being is enhanced through these activities. One characteristic is the quantity of using these 'positive activities'. Lyubomirsky and Layous (2013) found that according to prior research, one usage of 'positive activities' per week seems to exert the greatest impact.

Besides the study by Toepfer et al. (2012), there were however RCT studies, where the effectiveness of writing one single gratitude letter was tested. Adair et al. (2020), tested the effectiveness of single gratitude letter to enhance the well-being of workforce in the health care sector. One well-being component that was assessed and which was positively changed was emotional exhaustion. Adair et al. (2020) provided participants with their baseline measurement result of emotional exhaustion before they wrote the gratitude letter. Through obtaining the measurement result of emotional exhaustion, most participants were highly willing to improve their emotional exhaustion scores. Adair et al. (2020) hypothesized that obtaining the results of the emotional exhaustion measurement could have stimulated behavioural alteration for well-being enhancement, since higher recognition of one's own condition was established. That is supported by the transtheoretical model, where the recognition of one's own problematic condition is a fundamental step in establishing behavioural alteration (Norcross et al., 2011). According to Adair et al. (2020), the recognition has increased the willingness to do something for one's well-being, which further reduced the emotional exhaustion. Participants in the current study did not receive insights in their well-being and gratitude scores. Because of being unaware of their well-being and gratitude condition, this could have limited the participant's willingness to effectively make use of the letters to improve their well-being and their gratitude.

A further explanation why both experimental conditions were found to be not effective in establishing a significant increasing change in mental well-being could be related to the finding that the mental well-being scores at the baseline measurement (T0) for the love letter condition ($M = 4.29$, $SD = .65$) and the break-up letter condition ($M = 4.11$, $SD = .83$) were average scores compared to the overall mean score of a presentable sample from the Netherlands ($M = 3.98$, $SD = .85$). This sample incorporated 1,662 participants within the age range of 18 to 87 and was used by Lamers et al. (2011) in order to assess the MHC-SF in regard to its psychometric properties. Since the sample of this study had average scores compared to a normal population, which indicate that participants did not have a low well-being, it might have been difficult to see an effect of the interventions on the measurement of mental well-being because of a smaller difference. Because of the COVID-19 pandemic's detrimental effects for the mental health of the population (Chakraborty, 2020; Dawson & Golijani-Moghaddam, 2020; Kumar & Nayar, 2020), participants were expected to have low well-being. A possible explanation why this was not the case could be that participants adapted to the developed circumstances of COVID-19 over time since this study was executed approximately one year after the COVID-19 outbreak. An indication for that might

be given by a study by Sun et al. (2020), which discovered that nurses experienced more adverse affective mental states during the COVID-19 pandemic at first, but beneficial affective mental states were experienced increasingly and concurrently. Participants for example reconsidered personal principles and discovered increased gratefulness for well-being and interpersonal relationships (Sun et al., 2020).

Regarding trait gratitude, a possible explanation for the non-significant results for both experimental conditions could be, that no effects of the intervention were assessed because gratitude was measured exclusively as a trait and momentary alterations were not measured. The gratitude questionnaire used in this study was created to measure gratitude as an emotional trait (McCullough et al., 2002). Therefore, it could be the case that the GQ-5-G was not the suitable measurement instrument to assess first effects of a gratitude intervention. A similar hypothesis was formulated by Toepfer et al. (2012), who suggested that the GQ-6 could not have the ability to differentiate between gratitude as a momentary condition and gratitude as a personal characteristic.

Strength, Limitations, and Implications for Future Research

Regarding the strengths of this study, the general study design of a randomized controlled experiment was a suitable design to test the efficacy of an intervention, which was in this study mainly the gratitude letter. The random assignment to the experimental groups by using random numbers reduced bias in the process of allocating participants to the experimental conditions. Besides that, this study incorporated another experimental condition to investigate the expectation, that writing a gratitude letter establishes a significantly larger increase in mental well-being and gratitude compared to another intervention, where increasing effects on mental well-being and gratitude were expected as well. Therefore, the current study design had the capacity to reveal meaningful results regarding the effectiveness of gratitude letter interventions. At last, this study incorporated the MHC-SF and the GQ-5-G, which were proven to be valid and reliable questionnaires (Lamers et al.; 2011; Hudecek et al., 2020).

The current study had following limitations. A limitation regarding the letter writing was that participants wrote one letter in total. That could have limited the potential efficacy of the letters to enhance mental well-being. Research indicated to increase the frequency of writing gratitude letters to enhance mental well-being by letting participants write one gratitude letter per week in several consecutive weeks (Toepfer et al., 2012; Lyubomirsky &

Layous, 2013). That would additionally suggest that in order to enhance the potential efficacy of gratitude letters to improve mental well-being, future studies should be longer in time so that several gratitude letters can be written by participants. Additionally, future studies could investigate if the writing of several gratitude letters is significantly more effective to increase mental well-being and gratitude than writing a single gratitude letter. Besides that, it can be investigated if gratitude letters are more effective, when participants are informed about their well-being and gratitude condition before they engage into the writing process as it was suggested by Adair et al. (2020). These investigations would provide practical knowledge on how to apply gratitude interventions, like a gratitude letter, most effectively in research and clinical practice.

Moreover, a limitation of this study was that only a two week follow-up measurement was included because of limited time resources. Since in prior research a lack of extended assessments of mental well-being after the application of gratitude interventions are present, long term impact on mental well-being by gratitude interventions is mainly unknown (Davis et al., as cited in Bohlmeijer et al., 2020). Therefore, this study did not have the capacity to provide further knowledge regarding the long term effectiveness of gratitude interventions on mental well-being as well as on trait gratitude. Therefore, future research should include extended assessments of mental well-being and gratitude by for example incorporating 6 month follow-up assessments to further research gratitude letters' long term impact. This limitation also underlines the need for future studies which are conducted over longer time periods.

At last, as outlined before, the used GQ-5-G was probably not the suitable measurement instrument to assess first effects of a gratitude intervention. Therefore, future studies should research if gratitude interventions and, in this case, gratitude letters have also initial and momentary effects on the measurement of gratitude. That might be valuable, since only a few studies assessed gratitude in the form of a mood condition (Bohlmeijer et al., 2020). In order to do that, another gratitude measurement than the GQ-6 or the GQ-5-G should be applied, since these questionnaires assess gratitude as an emotional trait (McCullough et al., 2002) and might be therefore not able to differentiate between gratitude as a momentary condition and gratitude as a personal characteristic (Toepfer et al., 2012). Therefore, it can be the case that no effects from gratitude letters on gratitude were assessed although there were momentary gratitude changes.

Conclusion

In conclusion, it can be stated that this study was of value since it focused compared to most prior research on reducing the COVID-19 pandemic's detrimental effects on mental well-being. However, this study demonstrated that a single gratitude letter writing effort seems to be not a sufficient mean to enhance the mental well-being and the gratitude of people under the current COVID-19 conditions. Future research should further study how gratitude letters are most effectively applied in order to enhance mental well-being and trait gratitude. Besides that, it should be investigated if gratitude letters have also initial and momentary effects on the measurement of gratitude. These implications for future research might lead to a better understanding of the right application and the efficacy of gratitude letter interventions to enhance mental well-being and gratitude.

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Appendices

Appendix A

Gratitude/Love letter condition

Letter instructions

In the following, you are asked to take your time (at least 10-20 minutes) to write a Love letter to Corona. You can spontaneously write down what comes to your mind when you think about what you love about Corona or feel grateful for regarding the corona pandemic. A further possibility to write about in the letter could be to explain why you love and why you are grateful for what you have stated. But it is your decision if you want to explain the reasons for which you are grateful more in-depth. You can write the letter in your own way. This also implies that you do not have to overthink what you would like to write down. You also do not need to pay attention to grammar, style or other formal aspects of writing. In order to help you better get into the process of writing the Love letter, you could write as if you address Corona as if it is another person. However, as mentioned before, you can write your letter in your own way. It might be helpful to set a timer on at least 10 minutes when you start writing.

German translated letter instructions

Im Folgenden werden Sie gebeten, sich Zeit (mindestens 10-20 Minuten) zu nehmen, um einen Liebesbrief an Corona zu schreiben. Sie können spontan aufschreiben, was Ihnen in den Sinn kommt, wenn Sie darüber nachdenken, was sie an Corona lieben oder wofür Sie sich dankbar fühlen in Bezug auf die Corona-Pandemie. Eine weitere Möglichkeit, in dem Brief darüber zu schreiben, könnte darin bestehen, zu erklären, warum Sie lieben und warum Sie dankbar sind für das, was Sie angegeben haben. Aber es ist Ihre Entscheidung, ob Sie die Gründe, für die Sie dankbar sind, ausführlicher erläutern möchten. Sie können den Brief auf Ihre eigene Art und Weise schreiben. Dies impliziert auch, dass Sie nicht zu viel darüber nachdenken müssen, was Sie aufschreiben möchten. Sie müssen auch nicht auf Grammatik, Stil oder andere formale Aspekte des Schreibens achten. Um Ihnen zu helfen, besser in den Prozess des Schreibens des Liebesbriefes zu kommen, können Sie schreiben, als ob Sie Corona wie eine andere Person adressieren würden. Wie bereits erwähnt, können Sie Ihren

Brief jedoch auf Ihre eigene Art und Weise schreiben. Es dürfte hilfreich sein, einen Timer auf mindestens 10 Minuten einzustellen, wenn Sie mit dem Schreiben beginnen.

Break-up letter condition

Letter instructions

In the following, you are asked to take your time (at least 10-20 minutes) to write a Break-up letter to Corona. You can spontaneously write down what comes to your mind when you think about what you do not like about Corona. A further possibility to write about in the letter could be to more specifically explain why you do not like Corona for what you have stated and why you would like to break-up with the corona pandemic. But it is your decision if you want to explain more specifically the reasons for why you do not like Corona and why you would like to break up with the corona pandemic. You can write the letter in your own way. This also implies that you do not have to overthink what you would like to write down. You also do not need to pay attention to grammar, style or other formal aspects of writing. In order to help you better get into the process of writing the Break-up letter, you could write as if you address Corona as if it is another person. However, as mentioned before, you can write your letter in your own way. It might be helpful to set a timer on at least 10 minutes when you start writing.

German translated letter instructions

Im Folgenden werden Sie gebeten, sich Zeit (mindestens 10-20 Minuten) zu nehmen, um einen Trennungsbrief an Corona zu schreiben. Sie können spontan aufschreiben, was Ihnen in den Sinn kommt, wenn Sie darüber nachdenken, was sie nicht an Corona mögen. Eine weitere Möglichkeit, in dem Brief darüber zu schreiben, könnte darin bestehen, genauer zu erklären, warum Sie Corona für das, was Sie angegeben haben, nicht mögen und warum Sie mit der Corona-Pandemie Schluss machen möchten. Aber es ist Ihre Entscheidung, ob Sie genauer die Gründe erklären möchten, warum Sie Corona nicht mögen und warum Sie mit der Corona-Pandemie Schluss machen möchten. Sie können den Brief auf Ihre eigene Art und Weise schreiben. Dies impliziert auch, dass Sie nicht zu viel darüber nachdenken müssen, was Sie aufschreiben möchten. Sie müssen auch nicht auf Grammatik, Stil oder andere formale Aspekte des Schreibens achten. Um Ihnen zu helfen, besser in den Prozess des Schreibens des Trennungs Briefes zu kommen, können Sie schreiben, als ob Sie Corona wie eine andere Person adressieren würden. Wie bereits erwähnt, können Sie Ihren Brief

jedoch auf Ihre eigene Art und Weise schreiben. Es dürfte hilfreich sein, einen Timer auf mindestens 10 Minuten einzustellen, wenn Sie mit dem Schreiben beginnen.

Appendix B

MHC-SF English

During the past month, how often did you feel ...	NEVER	ONCE OR TWICE	ABOUT ONCE A WEEK	ABOUT 2 OR 3 TIMES A WEEK	ALMOST EVERY DAY	EVERY DAY
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1. happy						
2. interested in life						
3. satisfied with life						
4. that you had something important to contribute to society						
5. that you belonged to a community (like a social group, or your neighborhood)						
6. that our society is a good place, or is becoming a better place, for all people						
7. that people are basically good						

8. that the way our
society works makes
sense to you

9. that you liked most
parts of your
personality

10. good at managing
the responsibilities of
your daily life

11. that you had warm
and trusting
relationships with
others

12. that you had
experiences that
challenged you to
grow and become a
better person

13. confident to think
or express your own
ideas and opinions

14. that your life has a
sense of direction or
meaning to it

MHC-SF German

Im letzten Monat, wie oft hatten Sie das Gefühl,	NIE	1--2 MAL IM MONAT	1 MAL IN DER WOCHE	2--3 MAL IN DER WOCHE	FAST TÄGLICH	TÄGLICH
--	-----	-------------------------	--------------------------	-----------------------------	-----------------	---------

1. dass Sie glücklich waren?
2. dass Sie Interesse am Leben hatten?
3. dass Sie zufrieden waren?
4. dass Sie einen wichtigen gesellschaftlichen Beitrag geleistet haben?
5. dass Sie zu einer Gemeinschaft gehörten (z.B. einer sozialen Gruppe, Ihrer Nachbarschaft oder Ihrer Stadt)?
6. dass unsere Gesellschaft besser für Ihre Bürger wird?
7. dass Menschen von Natur aus gut sind?

8. dass Sie verstehen,
wie unsere
Gesellschaft
funktioniert?

9. dass Sie die meisten
Aspekte Ihrer
Persönlichkeit
wertschätzen?

10. dass Sie Ihre
täglichen Aufgaben
und Verpflichtungen
gut erfüllen konnten?

11. dass Sie warme
und vertraute
Beziehungen zu
anderen haben?

12. dass Sie sich
entwickeln oder ein
besserer Mensch
werden?

13. dass Sie
selbstbewusst Ihre
eigenen Ideen und
Gedanken gedacht und
geäußert haben?

14. dass Ihr Leben
Richtung und Sinn
hat.

Appendix C

GQ-5-G English

1	2	3	4	5	6	7
(strongly disagree)	(disagree)	(slightly disagree),	(neutral)	(slightly agree)	(agree)	(strongly agree)

1 I have so
much in life
to be thankful
for.

2 If I had to
list
everything
that I felt
grateful for, it
would be a
very long list.

3 When I
look at the
world, I don't
see much to
be grateful
for. (*)

4 I am
grateful to a
wide variety
of people.

5 As I get
older I find
myself more
able to
appreciate the
people,
events, and
situations that
have been
part of my
life history.

GQ-5-G German

1	2	3	4	5	6	7
(starke Ablehnung)	(Ablehnung)	(leichte Ablehnung)	(neutral)	(leichte Zustimmung)	(Zustimmung)	(starke Zustimmung)

1. Es gibt so
viel in
meinem
Leben, für
das ich
dankbar bin.

2. Wenn ich
alles auflisten
müsste, für
das ich
dankbar bin,
wäre dies
eine sehr
lange Liste.

3. Wenn ich
die Welt
betrachte,
dann sehe ich
nicht viel, für
das ich
dankbar
bin.(*).

4. Ich bin
einer
Vielzahl an
Menschen
dankbar.

5. Je älter ich
werde, desto
mehr bin ich
in der Lage,
für die
Menschen,
die
Ereignisse
und die
Situationen,
die ein Teil
meiner
Lebensgeschi
chte gewesen
sind, dankbar
zu sein.
