MASTER THESIS

Optimism and Well-Being in Times of COVID-19

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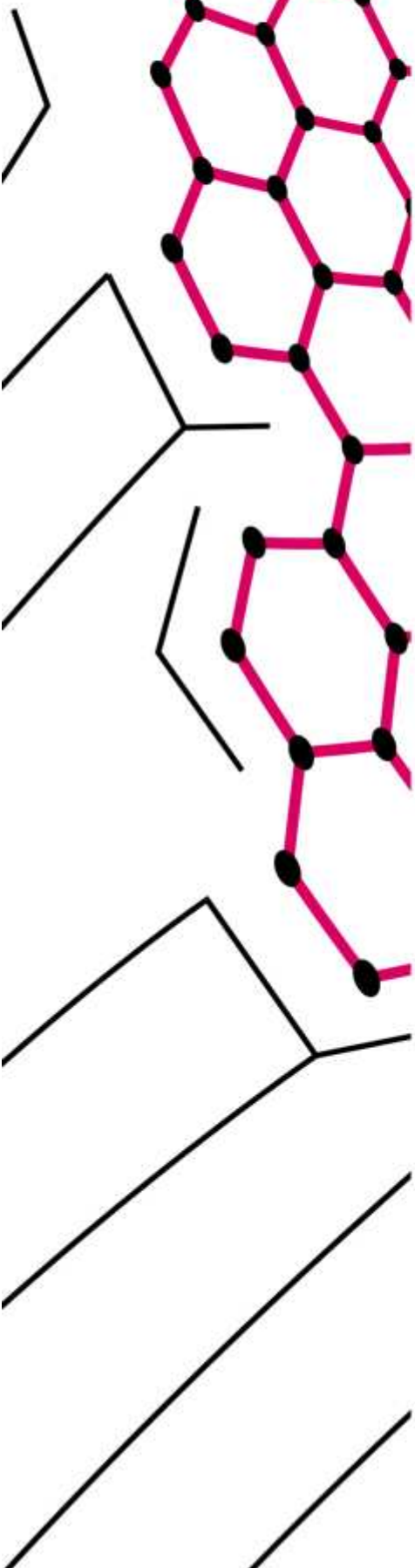
Abstract

Introduction: During the COVID-19 pandemic people encounter COVID-19-related life changes which might influence their well-being. A decrease in well-being could be protected by psychological resources such as optimism. The present study explored the stability of optimism between 2019 and 2020. It was expected that optimistic people experienced more well-being in 2020 and less when optimism decreased. Moreover, it was hypothesized that governmental recommendations were perceived as effective by optimists and less effective by people whose optimism decreased. Further, the perceived effectiveness of governmental recommendations was expected to mediate the relation of optimism and well-being.

Methods: Data from 2019 and 2020 came from the Dutch Longitudinal Internet Studies for the Social Sciences (LISS panel) with overall 6,817 participants and from two assembled studies regarding well-being and regarding the effects of the COVID-19 outbreak. Optimism was measured via the Life Orientation Test Revised, well-being with the Mental Health Continuum Short Form Revised, and the perceived effectiveness of the recommendations by using a questionnaire regarding the COVID-19 outbreak. T-tests for independent and paired samples, Pearson and Spearman correlations, and simple mediation analyses were conducted.

Results: Optimism did not change between 2019 and 2020. Optimism in 2019 correlated positively with overall well-being in 2020, with each dimension and with the perceived effectiveness of the recommendations. An optimism change was neither related to well-being nor to the perceived effectiveness of the recommendations. The perceived effectiveness of the recommendations did not mediate between optimism or optimism change and well-being.

Conclusion: The present study displayed support for stable dispositional optimism in adverse times. It replicated the protective effect of optimism on well-being and showed that optimists perceived the COVID-19 recommendations as more effective. Future research could expand the findings by studying further timepoints and distinctive mediating factors.

Introduction

The coronavirus disease 2019 (COVID-19) was first documented in Wuhan, China in December 2019 whereupon a pandemic evolved. To control the spread of the virus, governmental regulations were implemented such as social distancing, lockdowns, wearing face masks and working from home (RIVM, 2021). The recommendations and the disease itself foster physiological, psychological, social, and economic impacts on people in various life areas (RKI, 2021). Multiple stressors concerning the governmental recommendations such as financial uncertainty, boredom or frustration were identified as risk factors to well-being (Brooks et al., 2020). However, still mentally healthy and flourishing people were identified during the COVID-19 pandemic (Gloster et al., 2020). Repeatedly, higher well-being was found in optimistic people during adverse times (e.g., Scheier & Carver, 1992). Thus, optimism as a psychological resource might act as protective factor for well-being during the COVID-19 pandemic, as well (Pellerin & Raufaste, 2020). However, there is still an ongoing debate whether optimism is even stable in times of adversity (Carver et al., 2010). Therefore, the present study focused on optimism, as a psychological resource. It examined the relation of optimism and its change during the pandemic to well-being. Further, the connection of the perceived effectiveness of the COVID-19 recommendations to optimism and to the relation between optimism and well-being was studied.
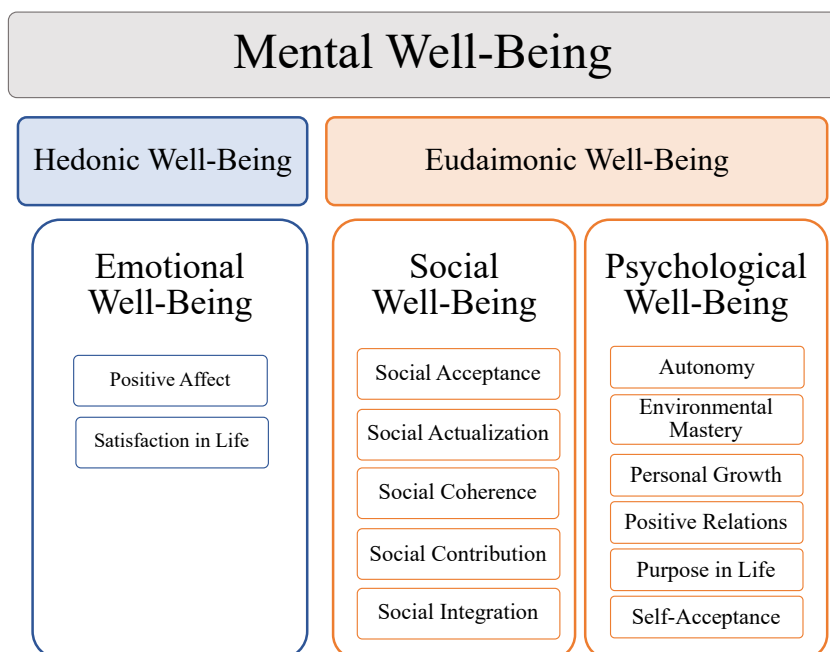
Well-Being

Prior research has predominately focused on negative properties of mental health including mental illness, languishing and pathology (e.g., Seligman & Csikszentmihalyi, 2000). However, researching well-being next to pathology is valuable to comprehend the occurrence of mental health (Seligman & Csikszentmihalyi, 2000). Subsequent research headed towards the consideration that reducing mental illness does not necessarily increase mental health (Keyes, 2002). Hence, the definition of mental health emphasizes well-being instead merely the

absence of mental illness and includes people's effective functioning and coping in stressful situations (WHO, 2005).

Well-being is divided into two distinct parts: hedonia and eudaimonia (Ryff, 1989). Hedonic well-being, also known as *emotional well-being,* refers to the presence of positive affect and satisfaction in life (Keyes, 2005). Eudaimonia describes the manifestation of one's true self by generating competencies, a purpose in life and qualities. *Psychological well-being* was introduced and covered the aspects of eudaimonia (Keyes, 2005; Ryff & Keyes, 1995). Moreover, a social factor of well-being was advocated and added *social well-being* to the concept (Keyes, 1998). Well-being developed into a multidimensional construct (*mental well-being)* consisting of three dimensions with several sub-dimensions (see figure 1).

Figure 1

The Construct of Mental Well-Being With its Sub-Dimensions According to Keyes (2005)

The impact of the COVID-19 pandemic on people's mental well-being could depend on individual characteristics. While some people were languishing in their mental health (e.g., Gloster et al., 2020), other experienced positive effects like increased rest and social

connectedness during COVID-19 lockdowns (Gijzen et al., 2020). Especially, people with high optimism levels experienced more well-being (e.g., Arslan et al., 2021; Pellerin & Raufaste, 2020; Reizer et al., 2021). Thus, the negative impacts of the COVID-19 pandemic on well-being might be buffered by psychological resources like optimism.

Optimism

Optimism refers to the expectancy of something good happening to oneself (Carver et al., 2010) regardless which means led to the outcome (Carver & Scheier, 2014). Two popular perspectives describe the nature of optimism either as a learnable (Peterson & Seligman, 1984) or as a dispositional construct (Aspinwall & Brunhart, 1996; Carver et al., 2010; Scheier & Carver, 1992; Segerstrom et al., 2006). According to the first perspective, an optimistic view can be learned from interpretations of past events. It is expressed via a person's explanation for the occurrence of situations (Peterson & Seligman, 1984). Optimists explain negative outcomes with unstable, external and specific causes, and positive ones with stable, internal and global causes (Peterson & Avila, 1995). The threshold is lowered to change negative events into positive ones (Carver et al., 2010). Dispositional optimism is incorporated into the *Expectancy-Value-Theories* (Austin & Vancouver, 1996) as a combination of positive expectations (confidence) and goal values. A dispositional amount of optimism influences to which degree people feel confident to reach future goals. In this case, optimism is seen as a stable trait, as long as no major life changes occur, such as illnesses or external threats (Carver et al., 2010).

Below, a closer look will be taken at the beneficial aspects of being optimistic. During illness-related times of adversity such as breast cancer treatment, optimistic patients showed more illness acceptance, positivity (Carver et al., 1993), and assurance to beat cancer which led to a higher life quality (Schou et al., 2005). In General, higher optimism is connected to positive relationships (Carver & Scheier, 2014), better mental health and well-being (Aspinwall & Brunhart, 1996; Carver et al., 2010; Scheier & Carver, 1992). Other positive effects like positive

emotions, life satisfaction, happiness and closer relationships (Carver et al., 2010; Scheier & Carver, 1992) are related to mental well-being (Keyes, 2002). Higher optimism was found to be accompanied by more psychological and subjective well-being (Alarcon et al., 2013) as well as by more hedonic (e.g., Dunn, 2017) and eudaimonic well-being (e.g., Falkenstein, 2018).

In conclusion, it is still unclear how optimism responds to times of adversity. On the one hand, optimism could remain stable due to its learned or dispositional properties. On the other hand, optimism might change when the situation is perceived as adverse. Hence, the impact of the COVID-19 pandemic and governmental recommendations could be individual. Changes in optimism might influence well-being levels as well. If optimists perceive the governmental recommendations as effective, they could experience more environmental mastery, and thus, more well-being.

COVID-19

To stop the spread of COVID-19, governmental recommendations were implemented such as lockdowns and quarantines (RIVM, 2021). Whether people adhere to the recommendations might be related to how they perceive them (e.g., Antonides & van Leeuwen, 2020). Individual or sociodemographic variables such as age, socio-economic status or education could influence people's perception of the pandemic and lead to individual experiences (e.g., Constandt et al., 2020; Poelman et al., 2021).

Contradicting well-being experiences were found during the COVID-19 pandemic. On the one hand, the negative psychological impact of the COVID-19 pandemic mediated between negative COVID-19 related aspects such as perceived stigmatization and lower hedonic and eudaimonic well-being (Paleari et al., 2021). On the other hand, no changes in self-reported mental health were found and as the pandemic persisted, a regain of preliminary well-being levels (Gijzen et al., 2020). Positive experiences during lockdown were based on greater rest, intensified connection to others (Gijzen et al., 2020), and positive effects from being outdoors

(Lades et al., 2020). Internationally, 10% of people experienced stress or symptoms of mental illnesses like depression and were languishing in their mental health during the COVID-19 pandemic. In parallel, 40% were flourishing and 50% had moderate mental health (Gloster et al., 2020). Compared to 2016 before the pandemic, similar levels of flourishing people in the Netherlands (36.5%) were found, fewer languishing people (1.6%) and more with moderate mental health (61.9%; Schotanus-Dijkstra et al., 2016). In summary, for some individuals, well-being still seems possible in times of COVID-19. However, it is difficult to determine the extent of the COVID-19 pandemic. Varying results among the literature occur, perhaps, due to individual experiences or the novelty of the situation.

Optimism and Well-Being in Times of COVID-19

Why do some people experience well-being in times of COVID-19 and others do not? Protective factors for distinctive well-being dimensions (Delle Fave et al., 2016; Keyes, 2002) were identified. Overall, well-being levels in 2020 decreased due to aspects of the COVID-19 pandemic like lockdowns but could individually be protected by psychological resources including optimism (Pellerin & Raufaste, 2020).

The reason why optimism protects well-being during the COVID-19 pandemic has not been researched yet. In the following, possible explanations are introduced. Consistent with the *Expectancy-Value Theory* (Austin & Vancouver, 1996), optimistic people might expect that governmental recommendations aim to control the virus spread and positively influence the future. According to *Learnable Optimism* (Peterson & Seligman, 1984), optimists could perceive the COVID-19 situation as a short-term, external situation, that only effects them in specific areas. Optimists use more frequently *Positive Illusions* (Taylor & Brown, 1988, 1994). Hence, they believe to have more control in adverse situations. These perspectives include attitudes that could support well-being in times of adversity. According to the *Model of Appraisal and Coping Process* (Folkman & Greer, 2000) optimists use proactive and approach-

focused coping styles (Aspinwall & Brunhart, 1996; Aspinwall & Taylor, 1997; Lazarus & Folkman, 1984; Scheier & Carver, 1992; Solberg Nes & Segerstrom, 2006) to resolve stressful events which lead to positive emotions and well-being (Folkman & Greer, 2000). Perceiving the COVID-19 recommendation as effective could serve as emotion-focused coping technique and could explain higher well-being in optimistic people. However, the COVID-19 pandemic could also have different or severe impacts on well-being and optimism. It is the first pandemic after the influenza pandemic in 2009 and COVID-19 is more infectious and fatal than influenza (RKI, 2020). Since optimism changes when people experience altering resources (Segerstrom, 2007), the protective effect on well-being might not occur during the COVID-19 pandemic.

Research Questions and Hypotheses

The following research questions have been studied for the present thesis:

1. Is optimism stable between 2019 and 2020, during the COVID-19 pandemic?

Due to contradicting findings throughout the literature and the novelty of the COVID-19 pandemic, no expectations about the stability of optimism were made in the present study. On the one hand, optimism could be a stable trait even in times of adversity. On the other hand, the COVID-19 pandemic could be perceived as majorly adverse and lead to changes in optimism.

2. Are optimism levels in 2019, before the pandemic, and their change during the pandemic related to well-being?

Hypothesis 1a: People who were more optimistic in 2019, before the pandemic, experienced more overall well-being and more emotional, psychological and social well-being in 2020.

Hypothesis 1b: People whose optimism decreased between 2019 and 2020 experienced less overall well-being and less emotional, psychological and social well-being in 2020.

3. Which role plays the perceived effectiveness of the COVID-19 recommendations?

Hypothesis 2a: People with more optimism in 2019, before the pandemic, perceive the COVID-19 recommendations during the pandemic as effective.

Hypothesis 2b: People whose optimism decreased between 2019 and 2020 perceive the COVID-19 recommendations during the pandemic as less effective.

Hypothesis 3a: The perceived effectiveness of the COVID-19 recommendations mediates between the relation of optimism in 2019 with well-being and with each well-being dimension in 2020.

Hypothesis 3b: The perceived effectiveness of the COVID-19 recommendations mediates between the relation of optimism change in 2019 and 2020 with well-being and with each well-being dimension in 2020.

Methods

Procedure

The data in the present study was selected from the Dutch Longitudinal Internet Studies for the Social Sciences (LISS panel) which are administered by CentERdata (Tilburg University, the Netherlands). Since 2008 about 6,817 participants were asked to fill out online questionnaires each month every year. The core study in the LISS panel explores the following modules: Health, Religion and Ethnicity, Social Integration and Leisure, Family and Household, Work and Schooling, Personality, Politics and Values, as well as Economic Situations like Assets, Income and Housing. Additionally, other assembled studies and background variables of the participants were conducted. In the core study, 5,000 households, randomly drawn from the population register by Statistics Netherlands, are participating. The randomized sample and easy accessibility of the participation in the study make the sample a good representation of the Dutch population.

The data used in the present study regarding optimism was drawn from the personality module between May and June 2019 and between May and June 2020. Data was also selected from two separately assembled studies that researched further themes and included partially the

participants of the LISS panel. The first study ("COVID-19 study"), by Gaudecker, van Rooij and Mastrogiacomo, identified the effects of the outbreak of COVID-19 in March 2020. The second study ("well-being study"), by Westerhof and ten Klooster (2020), assessed well-being and mental health in May 2020. Moreover, three background variables from May 2020 were included in the analyses. These were gender, age and highest education with diploma.

Participants

Participation in the LISS study is optional and random samples were drawn from the LISS participants for the assembled studies. Thus, inevitably the sample size in the present study varied. To mitigate, a sample size reduction was done later. Overall, in the personality module, 5,859 people replied completely to the questionnaires from 2020 and 5,021 from 2019. In the COVID-19 study, 5,453 participants responded sufficiently and in the well-being study 2,719 people. In the latter, participants were divided into four groups, each filled in different versions of the questionnaire. Group 1 and 4 had versions with revised items and group 1 and 3 with revised response formats. The present study used the version of group 3, in which 727 participants filled in a questionnaire with original items and revised response format.

Due to different assessment times, not every participant took part in every study. But the present study analyzed longitudinal data, and thus, a data set without missing data was needed to compare the two assessment times. Accordingly, the sample for the present study was adapted and only participants were included in the analyses who completed all analyzed items. The final sample consisted of 487 participants (246 female, 241 male) with a mean age of 53 years. The reduction of the sample size might result in a selection bias which would have systematically influenced the results. Therefore, the mean values of sociodemographic variables, optimism in 2019 and 2020, well-being and its dimensions in 2020 as well as the perceived effectiveness of the COVID-19 recommendations were compared to the parameter values of the initial sample size. The sample from the personality module in 2020 was used as

a base rate sample size. A t-test for independent samples and a X^2-test compared the values of participants who completely filled in the questionnaires (final sample) with those with missing data. The participants in the final sample were significantly younger and experienced less psychological well-being than participants missing in the final sample (see table 1). Since the other variables showed no significant deviations and for pragmatic reasons, all following analyses were based on the reduced sample size.

Table 1

Results of the T-Test for Independent Samples and X^2-Test to Compare the Variables Between the Final Sample With Those Missing in the Final Sample

	Final sample	Missing in final sample	Base rate sample
n	487	5372	5,859[a]
Gender, *n*		4344	4831
Female	246	2354	2600
Male	241	1990	2231
$X^2(df)$[b]		2.24(1)	
Highest education with diploma[c], *n*		5365	5852
Primary School	18	218	236
VMBO	97	1001	1098
HAVO/VWO	61	545	606
MBO	112	1287	1399
HBO	111	1407	1518
University	69	699	768
Other/ not yet started /- completed	19	208	227
$X^2(df)$[d]		6.28(8)	
Age			
n	487	4344	4831
M (SD)	52.87 (19.48)	55.04(18.32)	54.82(18.45)
t(df)[e]		2.34(586.52)*	
Optimism 2019			
n	487	3883	4370
M (SD)	14.41 (3.87)	14.77(3.61)	14.73 (3.64)
t(df)[e]		1.94(596.68)	
Optimism 2020			
n	487	5372	5859
M (SD)	14.54 (3.68)	14.69(3.62)	14.67 (3.63)
t(df)		.87(5857)	

Overall well-being 2020			
n	487	218	705
M (*SD*)	2.81 (.74)	2.92(.77)	2.85 (.75)
t(*df*)		1.82(703)	
Emotional well-being			
M (*SD*)	3.33 (.96)	3.35(.92)	3.34 (.95)
t(*df*)		.18(703)	
Social well-being			
M (*SD*)	2.35 (.81)	2.43(.91)	2.37 (.84)
t(*df*)		1.19(703)	
Psychological well-being			
M (*SD*)	2.94 (.84)	3.12(.84)	3.00 (.84)
t(*df*)		2.68(703)[**]	
Recommendations[f]			
n	487	4563	5050
M (*SD*)	4.31 (.58)	4.36(.56)	4.36 (.56)
t(*df*)		1.89(5048)	

Note. n = sample size; *M* = mean value; *SD* = standard deviations; *df* = degrees of freedom. [*] *p* < .05; [**] *p* < .01. a: *n* of the Personality module 2020. *n* varies among the variables, due to different samples and studies.; b: with continuity correction. c: from May 2020. d: Pearson X^2. e: significant Levene-test, thus, adjusted df's were used. f: perceived effectiveness of the recommendations.

Measures

Well-Being

In the assembled well-being study, four different versions of the Mental Health Continuum Short Form (MHC-SF; Keyes, 2002) were used; three revised versions and the original one. Each questionnaire was filled in by a different group of participants. The present study used a version with the original items of the MHC-SF by Keyes (2002), with a shortened inquiry period and revised response format (MHC-SF-R; see Appendix A) by Westerhof and ten Klooster (2020). The questionnaire measures overall well-being and the three dimensions emotional, psychological and social well-being. It contains the question "*During the past week, how often did you feel...*" and each item represents an ending to the question. The items are estimated on a 6-point Likert scale from *Never* (0) to *(Almost) always* (5). The original MHC-SF referred to the past month and followed a 6-point Likert scale from *Never* (0) to *Every day* (5). The revised version seemed beneficial for the present study because during the COVID-19

pandemic life changes may happen more frequently and a shorter inquiry period offered a more detailed insight. To score overall well-being and each dimension separately, mean scores were calculated ranging from 0-5. Overall well-being consists of the mean score of all 14 items, emotional well-being of the first three, social well-being of the items 4-8 and psychological well-being as of item 9.

To examine the construct validity and reliability of the MHC-SF-R an exploratory factor analysis (EFA) and a reliability analysis were conducted. A principal component analysis (PCA) with Varimax rotation was used and determined the three-factor structure according to the mental well-being dimensions (Keyes, 2002). The Kaiser-Guttman criteria with eigenvalue > 1 (Guttman, 1954; Kaiser, 1960) and a visual examination of the scree-plot confirmed the structure. The factors explained 63.34% of total variance. Factor 1 was labeled "Psychological Well-Being", factor 2 "Emotional Well-Being" and factor 3 "Social Well-Being". Because alterations from the theoretical structure were minor, no items were removed. The well-being variables were computed according to the theoretical structure of the three dimensions (see Appendix B for the complete results). The internal consistency of all MHC-SF-R items was excellent with Cronbach's alpha, α = .90. Emotional well-being had high reliability with α = .88 as well as psychological well-being with α = .85 and acceptable reliability for social well-being with α = .78. Reliability is excellent when Cronbach's alpha is α > .90, α > .80 is good/high and α > .70 is acceptable (Blanz, 2015).

Optimism

Optimism was measured by the Life Orientation Test Revised (LOT-R) by Scheier, Carver and Bridges (1994). It consists of ten items that represent statements like "*In uncertain times, I usually expect the best.*" or "*It's easy for me to relax.*" The evaluation of each item is made via a 5-point Likert scale from *strongly disagree* (0) to *strongly agree* (4). Items 1, 4, 10 measure optimism and items 3, 7, 9 assess pessimism. For scoring, the sum of the three

optimism items is calculated plus the reversed pessimism items. The rest are filler items and are not part of the scoring. For the required variables in the present study, each sum score of optimism 2019 and 2020 was computed, as well as their change score. A score range between 0-13 represents high pessimism or low optimism, a range of 14-18 moderate optimism and a score between 19-24 represents high optimism and low pessimism (Scheier et al., 1994).

To examine whether a one-factor structure was empirically determinable, a PCA with Varimax rotation was conducted with a fixed number of one factor. The PCA included all optimism items and the reversed pessimism items of 2019 and 2020. It resulted in one factor "Optimism" which explained 41.38% of the total variance. Deviations from the one-factor structure were minor, thus, it was used in the present study (see Appendix B for the complete results). Reliability is acceptable for optimism in 2019 with Cronbach's alpha, $\alpha = .78$ as well as for optimism in 2020, $\alpha = .76$ (Blanz, 2015).

COVID-19

The questionnaire *Effects of the Outbreak of COVID-19* developed by the "COVID-19 ImpactLab" explores the influence of the pandemic on people's social and financial situation and determines the attitude towards governmental recommendations against COVID-19. For the present study the ten items of the question "*In your opinion, how effective are the following actions for protecting yourself against the coronavirus?*" were of interest. Recommendations like *wearing a face mask*, *avoiding crowds* or *washing your hands* are rated from *not effective at all* (1) to *very effective* (5). To create a scale that measures the perceived effectiveness of the COVID recommendations (in the following also referred to as "recommendation variable"), the mean score of all items was calculated.

Two PCAs with Varimax rotation were conducted (see Appendix B for the complete results). The first one identified three factors according to the Kaiser-Guttman criteria with eigenvalue >1 (Guttman, 1954; Kaiser, 1960) which explained 57.61% of total variance and

two factors according to the scree-plot which explained 47.07% of total variance. Having in mind that the items belong to a single question, on a theoretical basis a one-factor structure was expected. Four items that were constructed conditionally were removed. A second PCA with Varimax rotation included only the "unconditional" items. According to the Kaiser-Guttman criteria and the scree-plot, it resulted in a one-factor structure which explained 52.4% of total variance. Thus, one factor labeled as "Perceived Effectiveness of the Recommendations" was worked with. After the reduction, internal consistency was high with Cronbach's alpha, $\alpha = .81$ (Blanz, 2015).

Statistical Analysis

For data analysis, the software *IBM SPSS Statistics*, version 27 was used. Most analyses used $p = .05$, only the Kolmogorov-Smirnov Test (KS test) used $p = .10$. The calculated variables were examined for normal distribution, as it is a requirement for most of the tests applied in the study. A KS test showed no normal distribution for all variables which could be a side effect of the large sample size. The larger the sample, the easier small deviations from normality are significant. Therefore, distributions were reexamined by using histograms (see Appendix B). Visually, optimism in 2019 and 2020 and overall well-being were normally distributed. The recommendation variable did not show a normality shape and non-parametric analyses were subsequently conducted with it.

Descriptive statistics of the calculated variables were assessed and their relation to sociodemographic variables. The relations to age, gender and highest education were examined with a t-test for independent samples or Pearson and Spearman correlations.

To answer research question 1, and explore whether optimism is stable over time, the mean scores of optimism 2019 and optimism 2020 were examined via a paired t-test. The expected relations of well-being with optimism and with an optimism change in hypotheses 1a/b were analyzed by using Pearson correlations. The expected associations in hypotheses 2a/b

between the recommendation variable and optimism in 2019/optimism change were examined by using Spearman correlations. All hypotheses were directional and were tested one-sided. The mediating effect of the perceived effectiveness of the recommendations between optimism in 2019/optimism change and overall well-being and each of its dimension was expected in hypotheses 3a/b (see figure 2). They were analyzed via eight simple mediation analyses with the *SPSS PROCESS Macro* by Andrew Hayes (2013). All simple mediation analyses incorporated unstandardized coefficients of the variables and worked with 95%-confidence intervals based on 10,000 bootstrap samples. The latter were evaluated as significant when excluding zero. The mediation analyses for hypothesis 3a consisted of optimism in 2019 (X), the recommendation variable (M) and either overall well-being in 2020 (Y) or each well-being dimension (Y). For hypothesis 3b, four mediation analyses were conducted with the change score of optimism (X) and the previous M- and Y-variables. Two simple mediation analyses with optimism 2019 or optimism change (X), the recommendation variable (M) and overall well-being in 2020 (Y) incorporated age, gender and education as covariates. Beforehand four statistical assumptions (Hayes, 2013) were examined according to the suggestions of Kane & Ashbaugh (2017): Linearity, homoscedasticity, normality of the estimation error and independence of the estimation error. The first three were examined with scatterplots and QQ-plots by conducting simple regression analyses, each path of the mediation analyses with overall well-being (Y) as independent simple regression analysis (see Appendix B).

Figure 2

Model of the Simple Mediation Analyses Based on Andrew Hayes (2013)
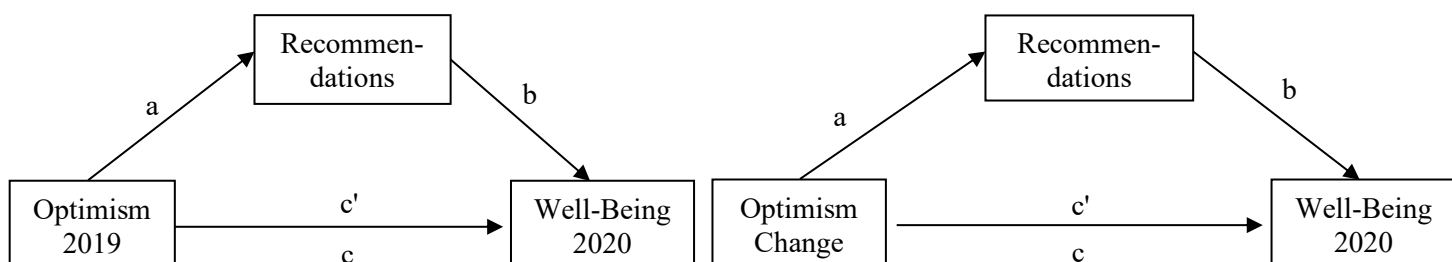
Results

Descriptive Analyses

On a descriptive basis, optimism was stable between the assessment in 2019 and the one in 2020. Optimism levels were just above the threshold to moderate optimism. Regarding well-being, on average the participants experienced "*sometimes*" to "*regularly*" overall, social and psychological well-being. Only emotional well-being was experienced "*regularly*" on average. The COVID-19 recommendations were on average evaluated as "*effective*" to "*(very) effective*". Table 2 displays the precise mean values and standard deviations.

Table 2

Mean Values (M) and Standard Deviations (SD) of the Variables

	Range	*M*	*SD*
Optimism 2019	0-24	14.41	3.87
Optimism 2020	0-24	14.54	3.68
Overall well-being 2020	0-5	2.81	.74
Emotional well-being		3.33	.96
Social well-being		2.35	.81
Psychological well-being		2.94	.84
Recommendation variable	0-5	4.31	.58

Notes. n = 487.

Men and women did not differ significantly in their average level of well-being in 2020, optimism in 2019 and 2020 and the perceived effectiveness of the recommendations. However, older age was accompanied by less psychological well-being and greater perceived effectiveness of the recommendations. A higher educational level was accompanied by more optimism in 2019 and 2020. The higher the educational level, the greater did the participants experience overall well-being, social well-being and psychological well-being in 2020. Plus, with higher education the recommendations were perceived as less effective. In summary, age

could have a confounding effect on the recommendation variable and psychological well-being. Highest education might be a confounder for all variables besides emotional well-being.

Table 3

Gender, age and Highest Education in Relation With Optimism in 2019 and 2020, Overall Well-Being (WB) in 2020, Emotional Well-Being (EWB), Social Well-Being (SWB), Psychological Well-Being (WB) and the Recommendation Variable (Recommendations)

	M (SD)	Optimism 2019	Optimism 2020	WB[c]	EWB	SWB	PWB[d]	Recommen-dations
Gender[a]		.49	.17	-.30	.31	-.43	-.45	-1.94
Age[b]	52.87 (19.48)	.02	-.04	-.09	.02	-.06	-.14***	.14***
Education[b]	4.01 (1.60)	.13***	.18***	.14***	.07	.12***	.14***	-.11*

Note. $n = 487$. * $p < .05$; *** $p < .001$; $df = 485$; a: t-test with independent samples in the row. b: Pearson correlation in the row, Spearman correlation with recommendation variable. c: $df = 469.38$ with continuity correction. d: $df = 462.83$ with continuity correction.

Research Questions and Hypotheses

Research Question 1: Is Optimism Stable Between 2019 and 2020, During the COVID-19 Pandemic?

In the paired t-test the comparison of average optimism levels in 2019 and optimism in 2020 was not significant ($t(486) = -1.11$, $p = .266$). To answer research question 1, no changes in optimism were found between 2019 and 2020.

Research Question 2: Are Optimism Levels in 2019, Before the Pandemic, and Their Change During the Pandemic Related to Well-Being?

Optimism in 2019 significantly correlated with overall well-being and each of its dimensions in 2020 (see table 4). With higher optimism, more well-being was experienced. All

correlations were positive and hypothesis 1a was confirmed. The Pearson correlation between well-being and the optimism change in 2019 and 2020 was not significant. Hypothesis 1b was rejected because changes in optimism were not related to well-being in 2020 and its dimensions.

Research Question 3: Which Role Plays the Perceived Effectiveness of the Recommendations?

The positive Spearman correlation between optimism 2019 and the recommendation variable was significant and confirmed hypothesis 2a. People with greater optimism in 2019 perceived the recommendations as more effective. In contrast, the change in optimism between 2019 and 2020 was not related to the perceived effectiveness of the recommendations. Thus, hypothesis 2b was rejected.

Table 4

Pearson and Spearman Correlation Results Between Optimism and the Change Score With the Recommendation Variable and With Well-Being and its Dimensions

	Optimism 2019	Change Score
	r	r
Overall Well-Being 2020	.47***	.03
Emotional well-being	.46***	-.01
Psychological well-being	.45***	.02
Social well-being	.30***	.07
	ρ	ρ
Recommendation variable[a]	.09*	-.05

Note. * $p < .05$; *** $p < .001$; $df = 485$; a: Spearman correlations in this row.

Regarding the statistical assumptions for mediation analyses (Hayes, 2013), scatterplots (see Appendix B) indicated linear relationships and homoscedasticity between most variables. Additionally, Q-Q plots (see Appendix B) showed normal distribution of the estimation errors

for most variables. Only the relation between the change score and well-being (path b, *change score - overall well-being mediation*) was non-linear, heteroscedastic and non-parametric. Also, the relation between optimism in 2019 and the recommendation variable (path a, *optimism - overall well-being mediation*) indicated heteroscedasticity and non-parametric distribution. Independence of estimation errors could be suggested for the mediation analyses with optimism 2019 since all variables were conducted separately. The optimism change between 2019 and 2020 might be non-independent as it is a variable computed from two assessment points. In conclusion, the assumptions (Hayes, 2013) seemed to be fulfilled sufficiently for the mediation analyses with overall well-being in 2020. The majority of relations showed linearity, normality and homoscedasticity. Independence is difficult to determine since data was drawn from external study conductions. Violations from the assumptions were considered in the discussion.

For hypothesis 3a, the first simple mediation analysis (see figure 3) showed that optimism in 2019 is neither related to the perceived effectiveness of the recommendations nor is the perceived effectiveness subsequently connected to overall well-being in 2020. However, people who had more optimism in 2019, experienced significantly more overall well-being with the mediator excluded. But the effect could not be explained by the mediator. The relation between optimism 2019 and overall well-being is not mediated by the perceived effectiveness of the recommendations. Regarding the mediation analyses that included the well-being dimensions in 2020, higher optimism in 2019 was accompanied by greater emotional well-being with the mediator included. Though, the relation was not mediated by the perceived effectiveness of the recommendations. The same effects were observed for psychological well-being and social well-being (see table 5 or Appendix B). Regarding hypothesis 3b, no path of the conducted simple mediation analyses (see figure 3) was significant. A change in optimism between 2019 and 2020 was not related to the perceived effectiveness of the recommendations. Neither the recommendation variable nor the optimism change was related to overall well-being in 2020 and each of its dimensions. The mediator did not add to the explanations of the results.

In the end, no relation between an optimism change and well-being in 2020 or its dimensions was found, as well as no mediating effect by the recommendation variable (see Appendix B).

Figure 3

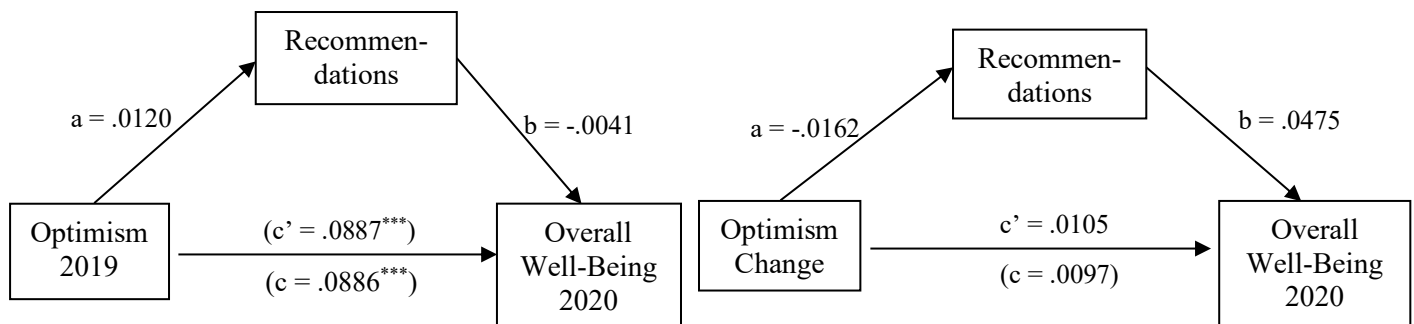*Results of the Simple Mediation Analyses With Overall Well-Being, Based on Andrew Hayes (2013)*

Table 5

Unstandardized Coefficients of the Mediation Analyses Between Optimism in 2019 and the Dimensions of Well-Being in 2020

	Emotional Well-Being	Social Well-Being	Psychological Well-Being
a path		.01	
b path	.05	-.05	.01
c path	.11***	.06***	.10***
c' path	.11***	.06***	.10***
ab path	.00 95%-CI[-.00, .00]	-.00 95%-CI[-.00, .00]	.00 95%-CI[-.00, .00]

Note. ***$p < .001$.

Having in mind, that some of the variables were related to sociodemographic variables, two simple mediation analyses were conducted, adding age, gender and highest education as covariates. The possible mediating effect of the recommendation variable between optimism 2019 (X) or the optimism change in 2019 and 2020 (X) on overall well-being in 2020 (Y) was

examined. The results of the mediation with optimism 2019 showed that more optimism is accompanied by higher well-being independent of the mediator (c' = .09***), even after including the covariates age, gender and education. With lower educational levels, the recommendations were perceived as more effective. Age and gender were related to the recommendation variable and age also to well-being (see table 6). No other paths were significant and no mediating effect was found.

    The second mediation with covariates and the optimism change indicated that age and gender were related to the perceived effectiveness of the recommendations. Additionally, higher well-being was accompanied by a higher educational level (see table 6). But all paths turned out non-significant and no mediating effect of the recommendation variable was found.

Table 6

Unstandardized Coefficients of the Mediation Analyses Which Included the Covariates

	Recommendations[a]	Well-Being in 2020
Optimism in 2019		
Age	.00**	-.00*
Gender	.11*	.03
Education	-.03*	.03
Optimism change		
Age	.00**	-.00
Gender	.11*	.02
Education	-.03	.06**

Note. * p < .05; ** p < .01. a: recommendation variable.

    In conclusion, optimism was significantly related to overall well-being and each dimension with and without the mediator, but no mediating effects of the recommendation variable were found. Regarding the optimism change, no results were significant. Thus, hypotheses 3a and 3b were rejected. Age, gender and highest education were individually

related to well-being and the perceived effectiveness of the recommendations, though the correlations were small. Integrating the sociodemographic variables did not change the previous mediation analysis results between optimism in 2019/optimism change and overall well-being in 2020. Thus, age, gender and highest education did not confound the relation between optimism in 2019/ optimism change and well-being in 2020.

Discussion

The respective study provides insights into the relation of optimism and well-being during the COVID-19 pandemic and their connection to the perceived effectiveness of governmental COVID-19 recommendations. Regarding research question 1, the examination of the stability of optimism showed that people who were optimistic before the pandemic did not lose their optimism during it. It was expected in the hypotheses 1a/b that optimism in 2019 and an optimism change between 2019 and 2020 were related to well-being in 2020 and its dimensions. Indeed, people with more optimism in 2019 experienced greater overall, emotional, psychological, and social well-being in 2020. A change in optimism was neither related to well-being nor to its dimensions. Thus, hypothesis 1a was confirmed and hypothesis 1b was rejected. In the hypotheses 2a/b it was expected that optimism in 2019 and an optimism change were related to the recommendation variable. Hypothesis 2a was confirmed since more optimism in 2019 was accompanied by perceiving the COVID-19 recommendations as more effective. There was no relation between a change in optimism and the recommendation variable, thus, hypothesis 2b was rejected. In the hypotheses 3a/b, it was expected that the perceived effectiveness of the recommendation mediated the relations between optimism 2019 or an optimism change and well-being. In contrast, the recommendation variable did not serve as a mediator, and hypotheses 3a/b were rejected. Checking for possible confounding effects of sociodemographic variables did not change the mediation results.

The present study found moderate optimism levels for Dutch citizens during the pandemic in 2020. The optimism levels were nearly identical to the ones in 2019, before the pandemic and similar to those found for Dutch citizens in 2016 (Alleva et al., 2016). For well-being, moderate levels were found in 2020 which reflected a decrease in well-being compared to studies with Dutch citizens from years before the pandemic (e.g., Lamers et al., 2011; Schotanus-Dijkstra et al., 2016). The COVID-19 recommendations were on average perceived as effective in the present study in 2020. On the contrary, one year later Dutch citizens perceived most COVID-19 recommendations as less effective (Georgieva et al., 2021).

The examination of differences in optimism in 2019 and 2020 did not indicate that optimism changes in times of adversity. This supports the trait-like stability of optimism and is consistent with dispositional optimism, found in other studies (e.g., Carver et al., 2010). There might be several explanations for the occurrence of stable optimism in times of adversity. First, optimists expect that difficulties in the present will alter in the future (Chang et al., 2013). This attitude could keep their positive prospects during adverse times. Second, the COVID-19 pandemic did not impact all people negatively and, thus, was not a situation that was adverse enough to change dispositional optimism in people. Even though optimism was assessed in 2020 during a lockdown period, the pandemic was still emerging, and restaurants and shops were open in the Netherlands. Some people even saw it as a time of rest (Gijzen et al., 2020) and optimism and well-being levels were identified as moderate in 2020. In 2021 the pandemic persisted for more than a year and governmental measures increased or got more severe. The development of the COVID-19 pandemic could have the potency to change optimism. Third, optimism did not show changes in the present study because the research interval could have been too short. In general, optimism levels vary throughout a person's life, independent of the valence of events (Chopik et al., 2020). Thus, optimism levels may fluctuate eventually, but it may need more time. In 2021, a year after the present study, higher optimism levels for Dutch

and Belgian citizens were found (Vos et al., 2021). Perhaps optimism does not decrease as the COVID-19 pandemic persists, as previously expected.

The positive relation of optimism and well-being found in the present study replicated the findings of prior research (e.g., Scheier et al., 1992; Carver et al., 2010), which underlines their robustness. Since people with more optimism in 2019 experienced higher well-being during the COVID-19 pandemic, optimism might have indeed acted as a protective psychological resource for well-being (e.g., Arslan et al., 2020). If so, it could be expected that well-being stays stable throughout the pandemic due to the existence of dispositional optimism.

Since the present study found no alterations in optimism between 2019 and 2020, the change score of optimism was neither related to well-being nor to the perceived effectiveness of the recommendations. Perhaps, individually a change occurred but not on average. Optimism might have decreased for some people and increased for others but these changes were not related to well-being or the recommendation variable. Optimism change might depend on individual characteristics such as altering resources or personal circumstances which would support the dispositional nature of optimism (Carver et al., 2010).

The present results also show that higher optimism is related to a greater perceived effectiveness of the recommendations. This could follow the *Expectancy-Value Theory* (Austin & Vancouver, 1996), according to which optimists could expect to reach the best possible future outcome and the goal of stopping the spread of COVID-19. They would perceive the recommendations as effective to have the confidence of reaching their goal. According to the postulations in the *Model of Mental Health* (Taylor & Brown, 1988), optimists could also perceive the recommendations as effective by using *Positive Illusions* and feel more control over the COVID-19 pandemic. Optimists have the skill of projecting *positive pre-experiencing* into picturing their future. They create detailed mental images about their positive expectations (Blackwell et al., 2013) which could alter their perception towards the recommendations, too.

It is beyond the scope of the study to determine explanations for the relation of optimism and well-being because it was not mediated by the recommendation variable. Even after controlling for confounding effects the mediation results of the study did not change. This supports their robustness. Therefore, there is no support for the assumption that perceiving the recommendations as effective served as an emotion-focused coping technique. Coping is strongly related to well-being (e.g., Cooper et al., 2017), thus, the connection would have been expected in the present study. Perhaps, optimists experienced higher well-being for other reasons and not for their perception of the recommendations. Still, the flexible approach-focused coping style of optimists (Aspinwall & Brunhart, 1996; Aspinwall & Taylor, 1997; Scheier & Carver, 1992; Solberg Nes & Segerstrom, 2006) could be a reason why optimists experienced more well-being during the COVID-19 pandemic. Active coping could appear in other forms than the perception of the COVID-19 recommendations. For instance, situational acceptance or investment in personal growth (Scheier & Carver, 1992) as coping techniques might increase well-being since both are parts of psychological well-being. More factors that might have generated the relation of optimism and well-being could have been *Positive Illusions* because of greater control perception (Taylor & Brown, 1988, 1994) which could lead to more environmental mastery during the COVID-19 pandemic. Adherence to the COVID-19 recommendations might also have a mediating effect. Optimists show more socially desirable behavior (Jovančević & Milićević, 2020) which could represent more adherence and could result in greater social contribution or social acceptance.

Perceived effectiveness of the recommendations was not related to well-being. The missing relation and moderate well-being levels might indicate that the COVID-19 pandemic did not impact well-being as expected. In previous years higher well-being levels were found (e.g., Lamers et al., 2011; Schotanus-Dijkstra et al., 2016) which would imply some effect of the pandemic on well-being. But the present study offered no indications that well-being levels are low in times of COVID-19. The moderate optimism levels in 2020 and the positive relation

between optimism and well-being would support this assumption. Thus, the restrictions from the COVID-19 recommendations might not have a strong impact on people's well-being. It might even be debatable if the pandemic itself had a specific influence on people's optimism or well-being. Perhaps, the pandemic had more impact on distress and ill-being. After all, most COVID-19-related studies set their research foci on these topics (e.g., Bartoszek et al., 2020; Xiong et al., 2020). But increasing distress does not necessarily indicate decreasing well-being (Keyes, 2002) which is also shown by the present findings.

Limitations and Strengths

The present study contains several limitations and strengths which apply to the following aspects: research objectives, sample, instruments, data access and statistics. First, psychological resources such as efficacy or gratitude were also identified as protective factors for well-being (Pellerin & Raufaste, 2020) but were not considered in the present study. By focusing on optimism alone, further insights into well-being during the COVID-19 pandemic are unaccounted for. However, the specific research focus is simultaneously a great strength of the present study. A longitudinal examination of optimism was possible due to the data from the LISS panel. It offered a unique and innovative insight into the effects of optimism on multi-dimensional well-being and the perception of the COVID-19 recommendations.

Second, the initial sample size was reduced immensely after selecting only participants who completely filled out all questionnaires. This fostered selection biases and might have decreased the validity of the present results. The limitation was balanced out by comparing the means of the variables between the final sample and those missing in the sample. The final sample was still representative regarding several sociodemographic variables of Dutch citizens. The sample reduction gave the opportunity to work with a complete sample and enabled longitudinal analyses with the same participants.

Third, self-reported instruments were used which could decrease the validity of the results. For instance, participants might have answered questions regarding the COVID-19 recommendations according to social desirability. But a well-validated instrument was used to measure optimism and an optimized version of the MHC-SF to measure well-being. They also enabled the assessment of frequent governmental changes during the pandemic by surveying the experiences of the past couple of weeks. The condensed inquiry periods gave a precise view of the perception of the participants' daily life.

Fourth, by working with the LISS panel, merely information that was assessed in this regard could be incorporated into the present study. It confined the liberty to analyze information of matter and pragmatic choices needed to be made. For instance, the perception of the effectiveness of the COVID-19 recommendations could have been too complex to measure quantitatively but no other assessment took place in the LISS panel. However, limitations for the present study were minor and working with the LISS panel represented a great strength by providing a wide database and a large, representative sample.

Fifth, the statistical assumptions (Hayes, 2013) were not completely fulfilled, especially for the recommendation variable and the optimism change. Deviations could have influenced the mediation results by leading to a decrease of power and an altered confidence interval width. The limitation was considered by adjusting alterations from normality with bootstrapping. Potential influences of heteroscedasticity were minimized by working with heteroscedastic consistent standard error estimators. Moreover, the confirmation of the assumptions is not obligatory (Hayes, 2013).

Lastly, a great strength of the present study was the examination of possible confounding effects of sociodemographic variables. Small relations were found between individual sociodemographic variables and optimism, well-being and the recommendation variable. After integrating the sociodemographic variables into the mediation analyses, the mediation results did not change. The possible influence of age, gender and highest education

may not have been high and the monitoring for possible confounders increased the robustness of the present results by leading to consistent outcomes.

Recommendations for Future Research

Further research should integrate additional mediators such as coping styles or adherence to the recommendations to explain the relation of optimism and well-being. It would be interesting to examine other psychological resources which protect well-being during the COVID-19 pandemic. After gaining detailed results from the Netherlands, an international replication of the present study could present insights into the experience of the COVID-19 pandemic in other nations. Diverse sociodemographic or cultural aspects and different governmental measures could result in advanced understandings. A follow-up study of optimism levels in 2021 could explore the stability of optimism in a persistent adverse situation. The perceived effectiveness of the recommendations could be measured qualitatively, by participants expressing their experience in their own words. Moreover, further research could correct the simple mediation analyses of the present study for multiple or multivariate mediation analyses. Hereby, combined insights regarding several mediators or the relations of the well-being dimensions with each other might be found.

Conclusion

The present study offered interesting insights into optimism and well-being in times of COVID-19. It inserted robust support for the established relation between well-being and optimism and proposed evidence for the stable, dispositional nature of optimism. It further presented the positive attitude of optimists towards the effectiveness of the COVID-19 recommendations. Therefore, the study offered a meaningful base in an innovative and prevailing topic. Actively using the results by responding to individual levels of optimism may lead to more adherence to the recommendations or an increase in well-being. For instance,

future governmental measures could be implemented or advertised by responding to different optimism levels to increase their perceived effectiveness. Likewise, people who work in social sectors such as hospitals or schools could encourage constructive future expectations during the pandemic according to individual optimism levels.

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Appendix

Appendix A

Figure 1

Question Regarding the Perceived Effectiveness of the Recommendations From the

Questionnaire the "Effects of the COVID-19 Outbreak"

In your opinion, how effective are the following actions for protecting yourself against the coronavirus?
- Wearing a face mask
- Praying
- Washing your hands with soap or using hand sanitizer frequently
- Seeing a doctor if you feel sick
- Seeing a doctor if you feel healthy, but worry that you were exposed to the virus
- Avoiding public spaces, gatherings, and crowds
- Avoiding contact with people who could be high-risk py20a030 Avoiding hospitals and clinics
- Avoiding cafes and restaurants
- Avoiding the use of public transportation

Not effective at all	Hardly effective	Somewhat effective	Effective	Very effective
1	2	3	4	5

Figure 2

Items and Response Format of the LOT-R by Scheier et al. (1994)

To what extent do you agree or disagree with the following statements?
- In uncertain times, I usually expect the best.
- It's easy for me to relax.
- If something can go wrong for me, it will.
- I'm always optimistic about my future.
- I enjoy my friends a lot.
- It's important for me to keep busy.
- I hardly ever expect things to go my way.
- I don't get upset too easily.
- I rarely count on good things happening to me.
- Overall, I expect more good things to happen to me than bad.

Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Figure 3

Items and Response Format of the MHC-SF-R by Westerhof & ten Klooster (2020),

Translated Into English

Group 3: MHC-SF with original items and revised response format
The following questions are about feelings that people might have. Please read each statement carefully and check the number that best represents HOW OFTEN you have experienced or felt this DURING THE PAST WEEK.

In the past week, how often did you feel …
… that you were happy?
… that you were interested in life?
… that you were satisfied with life?
… that you had something important to contribute to society?
… that you belonged to a community (like a social group, or your neighborhood)?
… that our society is becoming a better place for people?
… that people are basically good?
… that the way our society works makes sense to you?
… that you liked most parts of your personality?
… that you had experiences that challenged you to grow and become a better person?
… that you were good at managing the responsibilities of your daily life?
… that you had warm and trusting relationships with others?
… that you were confident to think or express your own ideas and opinions?
… that your life has a sense of direction or meaning to it?

Never	Rarely	Sometimes	Regularly	Often	(Almost) always
0	1	2	3	4	5

Appendix B

Table 1

Results of the Kaiser-Meyer-Olkin Measure of Adequacy (KMO-Test) and Bartlett Test for

Sphericity for Each Exploratory Factor Analysis

	MHC-SF-R	Optimism 2019 & 2020	All recommendations	Selected Recommendations
KMO-Test	.91	.86	.80	.84
Bartlett Test	$X^2(91) = 3342.81^{***}$	$X^2(66) = 2292.24^{***}$	$X^2(45) = 1103.70^{***}$	$X^2(15) = 913.71^{***}$

Note. *** $p < .001$.

Table 2

Results of the Exploratory Factor Analysis Including the MHC-SF-R Items With Three-

Factor Varimax Rotation

	Factor			Communality
	1 Psychological well-being	2 Emotional well-being	3 Social well-being	
1 … happy?	.16	**.86**	.21	.82
2 … interested in life?	.32	**.76**	.19	.71
3 … satisfied?	.23	**.84**	.22	.80
4 … that you had something important to contribute to society?	.06	.36	**.68**	.60
5 … that you belonged to a community (like a social group, your neighborhood, your city)?	.16	.25	**.72**	.61
6 … that our society is becoming a better place for people	.22	.09	**.80**	.70
7 … that people are basically good?	.46	.05	**.60**	.57
8 … that the way our society works makes sense to you?	**.67**	-.05	.35	.58
9 …that you liked most parts of your personality?	**.70**	.31	.22	.64
10 … good at managing the responsibilities of your daily life?	**.66**	.42	.01	.62
11 … that you had warm and trusting relationships with others?	**.62**	.48	.14	.63

12 … that you have experiences that challenge you to grow and become a better person?	**.49**	.15	.35	.38
13 … confident to think or express your own ideas and opinions?	**.70**	.28	.13	.59
14 … that your life has a sense of direction or meaning to it?	**.54**	**.54**	.23	.64
Eigenvalue	6.35	1.40	1.12	
% of Total Variance	45.32	10.01	8.02	
Total Variance			63.34%	

Note. Principal component analysis as extraction method

The Bartlett's test of Sphericity and the Kaiser-Meyer-Olkin Measure of Sampling Adequacy

(KMO) resulted in an adequate relation for the factor analysis. Regarding the results in table 2,

two items did not load on the theoretical determined factors. Item 8 *("… that the way our society*

works makes sense to you?") theoretically belongs to social well-being (.35) but loaded higher

on the factor for psychological well-being (.67). Item 14 ("*… that your life has a sense of*

direction or meaning to it?") loaded equally on psychological (.54) and emotional well-being

(.54). Factor loadings > .60 were evaluated as high. In the present EFA, this was the case for

all items besides item 12 *("… that you have experiences that challenge you to grow and become*

a better person?") with the highest loading on psychological well-being (.49).

Table 3

Results of the Exploratory Factor Analysis Including the LOT-R Items (Without Filler

Items) From 2019 and 2020 With a Fixed One-Factor Structure.

		Factor	Communality[a]
1. In uncertain times, I normally expect the best.	2019	.53	.28
	2020	.53	.28
4. I'm always optimistic about my future.	2019	.67	.45
	2020	.65	.42
10. Overall, I expect more good things to happen to me than bad.	2019	.63	.40

Wearing a face mask	.10	.11	**.71**		.52
Eigenvalue	3.30	1.41	1.05		3.14
% of Total Variance	33.02	14.05	10.54		52.4
Total Variance			57.61%		52.4%

Note. Principal component analysis as extraction method

The Bartlett Test and the KMO assured adequacy for both EFAs. Four items with small factor

loadings were identified (see table 4): "*Wearing a face mask*" (.10), "*Praying*" (-.02), "*Seeing*

a doctor if you feel sick" (.26) and "*Seeing a doctor if you feel healthy but you worry you were*

exposed to the virus" (-.07). Each of these items was constructed conditionally which could be

the reason why they form a new factor. Face masks, for instance, were not mandatory at the

time of the study conduction, praying might only be effective for religious people and the last

two items are composed as conditional if-sentences. After removing the conditional items, a

new PCA resulted in one factor with factor loadings >.60, besides the item "*Washing your*

hands with soap or using hand sanitizer frequently" (.56).

Table 5

Results of the K-S Test

	df	D	p
Optimism 19	487	.06	<.001
Optimism 20	487	.07	<.001
Overall Well-Being	487	.05	.006
Recommendations	487	.13	<.001

Table 6

Unstandardized Coefficients (CE), T-Values and Confidence Intervals (CI) of the Simple

Mediation Analyses with Optimism 2019 as Independent Variable

Mediation	CE	t(485)	p	CI	
				Lower	Higher
Well-Being					
a path	.012	1.83	.068	-.000	.025
b path	-.004	-.08	.938	-.107	.099
c path	.089	11.85	.000	.074	.103
c' path	.089	11.86	.000	.074	.103

				CI	
				Lower	Higher
indirect	.000			-.002	.001
Emotional WB					
a path	.012	1.83	.068	-.001	.025
b path	.053	.79	.432	-.079	.185
c path	.114	11.94	.000	.095	.133
c' path	.113	11.93	.000	.095	.132
indirect	.001			-.001	.003
Social WB					
a path	.012	1.83	.068	-.001	.025
b path	-.052	-.79	.428	-.182	.077
c path	.064	7.19	.000	.046	.081
c' path	.064	7.23	.000	.047	.082
indirect	-.001			-.003	.001
Psychological WB					
a path	.012	1.83	.068	-.001	.025
b path	.008	.13	.898	-.109	.125
c path	.097	11.21	.000	.080	.114
c' path	.097	11.24	.000	.080	.114
indirect	.000			-.002	.002

Table 7

Unstandardized Coefficients (CE), T-Values and Confidence Intervals (CI) of the Simple

Mediation Analyses with Change Score as Independent Variable

Mediation	CE	t(485)	p	CI	
				Lower	Higher
Well-Being					
a path	-.016	-1.68	.093	-.035	.003
b path	.048	.81	.419	-.068	.163
c path	.010	.74	.458	-.016	.035
c' path	.010	.79	.425	-.015	.036
indirect	-.000			-.004	.001
Emotional WB					
a path	-.016	-1.68	.093	-.035	.003
b path	.114	1.48	.140	-.038	.265
c path	-.003	-.19	.847	-.038	.031
c' path	-.001	-.09	.931	-.036	.031
indirect	-.002			-.006	.001
Social WB					
a path	-.016	-1.68	.093	-.035	.003
b path	-.010	-.15	.880	-.143	.123
c path	.022	1.50	.136	-.007	.052
c' path	.022	1.49	.137	-.007	.052
indirect	.000			-.003	.003

Psychological WB

a path	-.016	-.168	.093	-.035	.003
b path	.062	.95	.344	-.067	.192
c path	.006	.40	.689	-.022	.034
c' path	.007	.47	.640	-.022	.035
indirect	-.001			-.004	.001

Table 8

Unstandardized Coefficients (CE), T-Values and Confidence Intervals (CI) of the Simple

Mediation Analyses with Integration of Covariates

Mediation	CE	*t*(482)	*p*	CI	
				Lower	Higher
Optimism – recommendations					
Age	.004	2.75	.006	.001	.006
Gender	.011	2.05	.041	.004	.210
Education	-.032	-1.97	.049	-.065	-.000
Optimism – Recommendation - Well-Being					
Age	-.003	-2.10	.036	-.006	-.000
Gender	.303	.497	.620	-.090	.150
Education	.030	1.58	.115	-.007	.067
Change Score – Recommendations					
Age	.004	2.71	.007	.001	.006
Gender	.108	2.07	.039	.005	.211
Education	-.027	-1.66	.097	-.059	.005
Change Score – Recommendations Well-Being					
Age	-.003	-1.49	.136	-.006	.001
Gender	.023	.37	.744	-.114	.159
Education	.060	2.88	.004	.019	.102

Figure 4

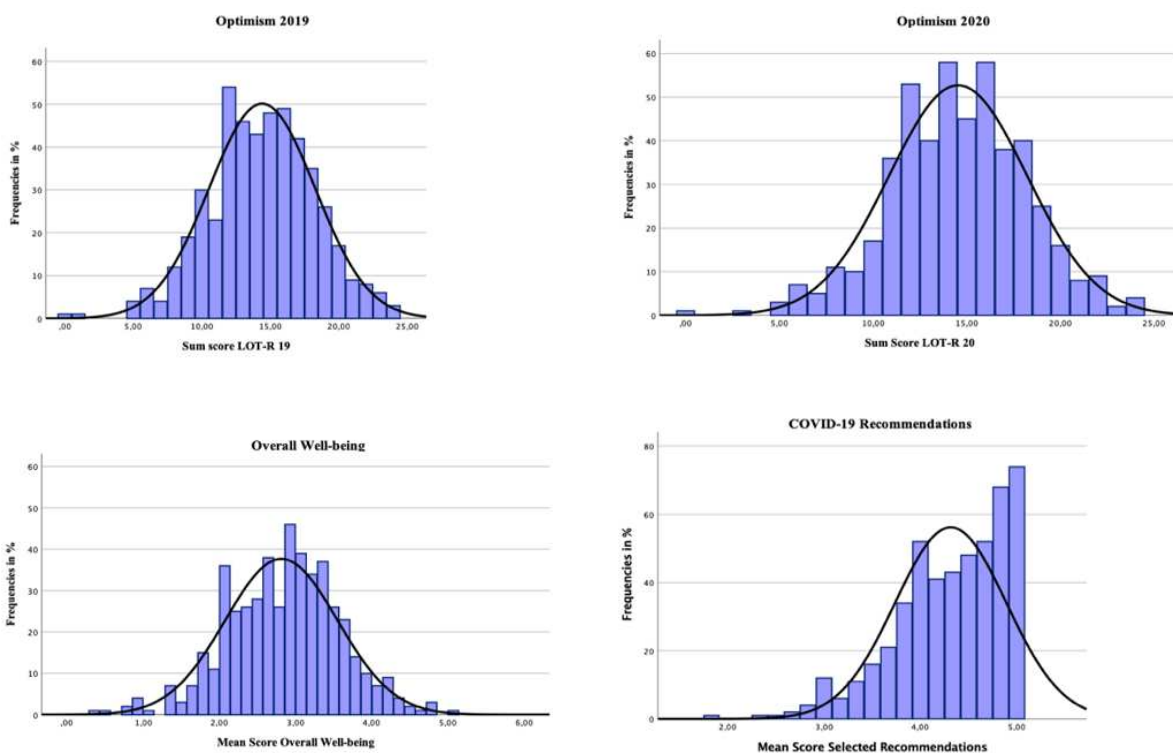*Distribution of the Variables with Normal Distribution Curve*

Figure 5

Scatterplot and Normal Q-Q Plot of the Standardized Residuals From the Regression of Optimism 2019 on Well-being
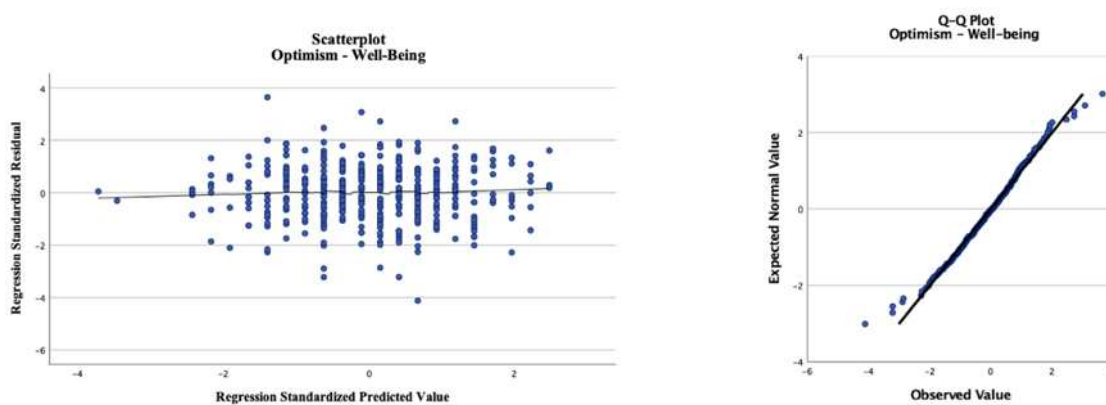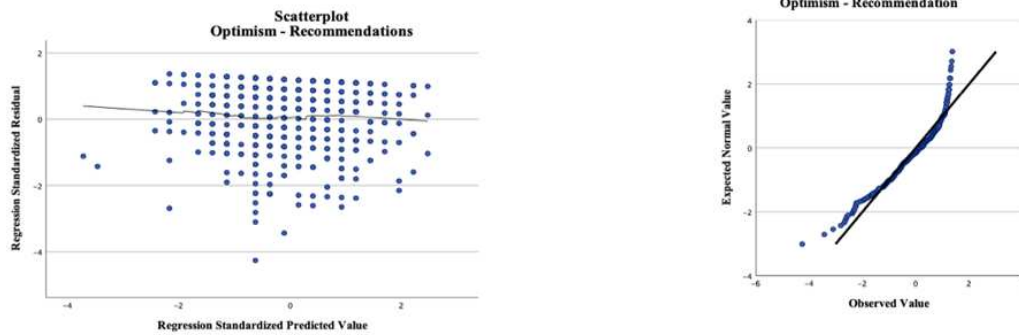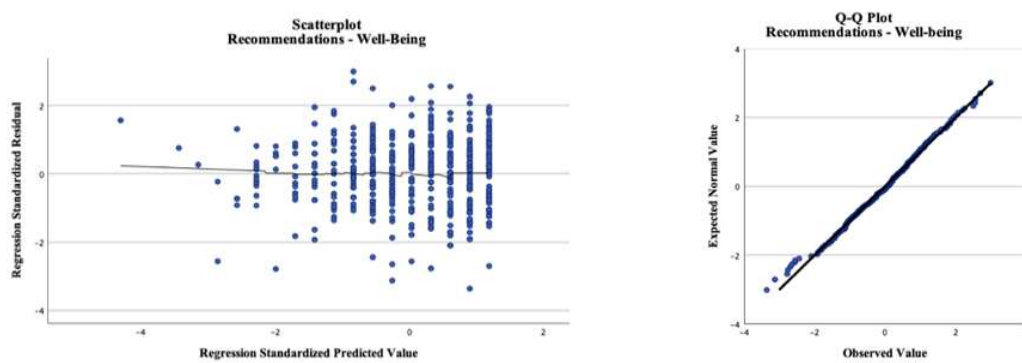
Figure 6

Scatterplot and Normal Q-Q Plot of the Standardized Residuals From the Regression of

Optimism 2019 on Recommendations

Figure 7

Scatterplot and Normal Q-Q Plot of the Standardized Residuals From the Regression of

Recommendations on Well-being

Figure 8

Scatterplot and Normal Q-Q Plot of the Standardized Residuals From the Regression of

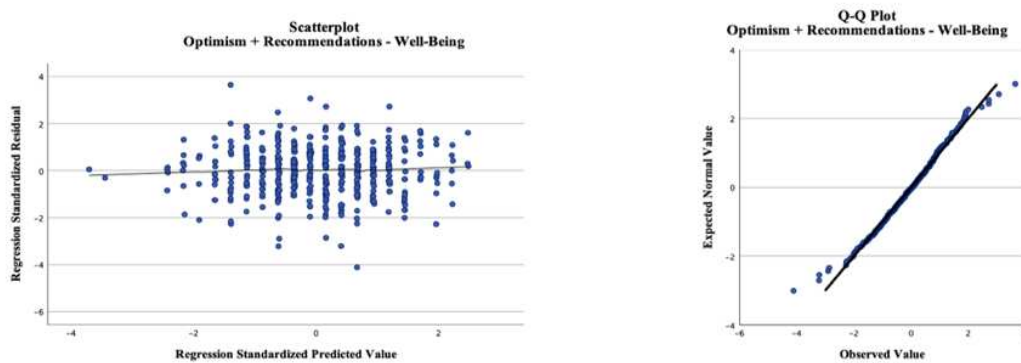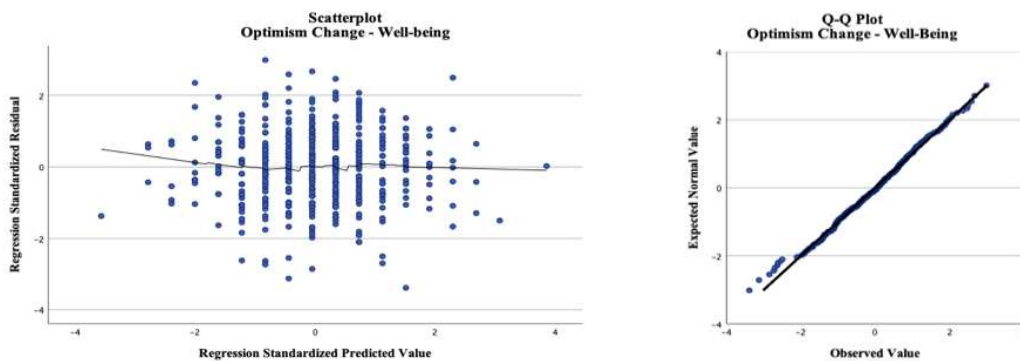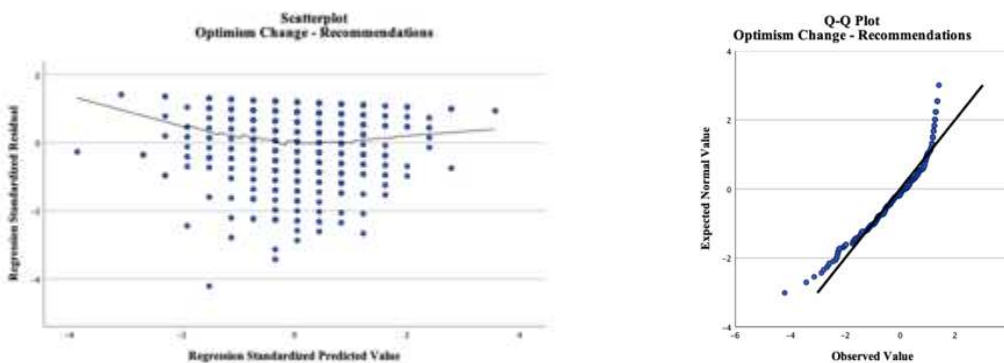*Optimism 2019 + Recommendations on Well-Being*

Figure 9

Scatterplot and Normal Q-Q Plot of the Standardized Residuals From the Regression of

Change Score on Well-Being

Figure 10

Scatterplot and Normal Q-Q Plot of the Standardized Residuals From the Regression of

Change Score on Recommendations

Figure 11

Scatterplot and Normal Q-Q Plot of the Standardized Residuals From the Regression of

Change Score + Recommendations on Well-Being