Differences in Definitions of Flourishing Before and During the COVID-19 Pandemic:
A Linguistic Analysis

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Abstract

Introduction. The outbreak of COVID-19 impacted the global population in many ways, including citizens' mental well-being and the occurrence of flourishing. Previous research on flourishing and its three defining components has suggested a decline of emotional, social and psychological well-being since the start of the pandemic, but studies were largely done on quantitative data. Explorations of qualitative data on flourishing also show little use of automatic analysis, like the linguistic analysis tool LIWC. This study focuses on comparing the differences in language use related to the three well-being components within flourishing definitions before and during the pandemic using LIWC.

Method. A repeated cross-sectional design with three independent German samples was used to extract qualitative data on definitions of flourishing in 2019, 2020 and 2021. A total of 232 participants gave responses from a layperson's point of view. The data was analyzed through linguistic analysis using LIWC2015 and ANOVAs.

Results. The results showed slight variations between the frequencies of LIWC categories, but overall showed no differences related to either of the three well-being components in the definitions of flourishing between the three years. Only occupation appeared less relevant in flourishing definitions during the pandemic compared to pre-pandemic levels.

Discussion. Flourishing definitions and the relevance of emotional, social and psychological well-being to its experience seem to remain stable despite adverse events such as the pandemic. The lower mention of occupation during the pandemic might be explained by the restrictions imposed in Germany. LIWC was fairly useful as an analysis tool within the framework of the well-being components, but social well-being was not measured in all aspects and the use of the German LIWC2001 dictionary restricted the measurement of psychological well-being, which should be considered in future applications.

Keywords: flourishing, mental well-being, COVID-19, linguistic analysis, LIWC, positive psychology

Differences in Definitions of Flourishing Before and During the COVID-19 Pandemic:

A Linguistic Analysis

On 12 March 2020, the World Health Organization (WHO) declared the outbreak of the coronavirus disease (COVID-19) a pandemic (World Health Organization, 2020). Since then, the disease has brought consequences for people's health and personal life, public safety, and the economy (World Health Organization, 2020; Ciotti et al., 2020). Aside from the risk of infection and the losses of lives suffered, stressors like resource shortages, restrictions on personal liberty, social isolation, economic strain and rapidly changing prognoses have impacted citizens on a global scale (Pfefferbaum & North, 2020).

The circumstances of the pandemic resulted in psychological reactions like emotional distress, maladaptive behaviours and defensive responses and impacted citizens' mental health internationally (Cullen et al., 2020). Multiple cross-sectional and longitudinal studies in the UK measuring mental health changes after the outbreak showed an increase in distress, deterioration of mental health and a two-fold increase of anxiety symptoms after one month of the lockdown period compared to data from 2019 (Niedzwiedz et al., 2020; Pierce et al., 2020; Kwong et al., 2021). Longitudinal research on French adults also found a decrease of self-rated mental health and a correlation between smaller living spaces and an increase in depression, as well as increased anxiety since the outbreak (Ramiz et al., 2021). Further, a US-American study measuring mental health changes between 2019 and 2020 found a higher prevalence of moderate to severe anxiety (18.1% to 25.3%) and depression (21.5% to 31.7%) after the start of the pandemic (Fruewirth et al., 2021).

Nonetheless, research on Italian students comparing depressive symptoms in 2019 with measures in April 2020 and June 2020 found an initial increase of depressive symptoms during lockdown, which then decreased to levels comparable to 2019 at the second measurement point in June (Meda et al., 2021). In line with this, a meta-analysis of longitudinal cohort studies found an increase in various mental health symptoms after the onset of the pandemic but showed a decline back to pre-pandemic measures a few months later (Robinson et al, 2022). Same developments could also be observed for anxiety levels of 157,213 participants in an American study (Yarrington et al., 2021). Notwithstanding, this study also found an increase in sadness and depression in July 2020, compared to pre-pandemic and March 2020 levels, possibly showing first signs of the longer-term impact of the COVID-19 situation (Yarrington et al., 2021). These findings suggest that the circumstances surrounding the COVID-19 pandemic had an impact on the mental health of various populations. Nonetheless, it appears that some demonstrated resilience and showed

less mental health impact after the initial lockdown period, while longer-term effects beyond mid-2020 have remained largely unobserved thus far (Yarrington et al., 2021).

The observed decrease in mental health and well-being during the initial COVID-19 outbreak presents itself in areas that directly translate to psychological concepts and definitions of mental health. The World Health Organization (2004) defined mental health as a state beyond the absence of psychopathology, grounded in subjective well-being and functioning in individual and social life. According to Keyes (2002), mental health can be conceptualized as a "complete state consisting of the presence and the absence of mental illness and mental health symptoms." (p. 210), explaining that there are two dimensions: mental illness and mental well-being. Within mental health, mental well-being is conceptualized as a continuum, from *languishing* to *flourishing* in life, wherein the former is comprised of low well-being and the latter entails high levels of well-being (Keyes, 2002, 2003).

To *flourish*, an individual's affective states and social and psychological functioning have to be perceived as satisfactory, meaning that flourishing individuals score high on all three major dimensions of well-being: *emotional, social* and *psychological well-being* (Keyes, 2002; Joshanloo & Nosratabadi, 2009). Emotional well-being is recognized as a higher presence of positive affect, an absence of negative affect and a high perceived life satisfaction (Keyes, 2002; Joshanloo & Nosratabadi, 2009). Social well-being entails a sense of belonging in one's community, active contribution to society, appreciation of the quality and operation of one's social environment and society's potential, and general comfort and trust in other community members (Keyes, 1998; Joshanloo & Nosratabadi, 2009). Finally, psychological well-being is defined as one's perception of personal thriving and consists of multiple dimensions, namely self-acceptance, personal growth, purpose in life, positive relations with others, environmental mastery, and autonomy (Ryff & Keyes, 1995).

Since the outbreak of the COVID-19 pandemic, these three dimensions of mental well-being have also been individually impacted, as research shows. Emotional well-being seems to be influenced, as suggested in a cross-sectional study on South-African students' mental health and well-being, for instance, which showed a decline in measures of emotional well-being during the COVID-19 pandemic, compared to measures from 2019 (Graham & Eloff, 2022). A study by Zacher & Rudolph (2021) on German citizens also showed that life satisfaction and positive affect decreased in the first months of the pandemic, compared to 2019 measures. Additionally, research on a Norwegian sample showed a significant decrease in life satisfaction in 2020, compared to measures before the pandemic (Von Soest et al.,

2020). In terms of protective measures, the experience of emotional well-being through increased positive affect at the onset of the first lockdown period was shown to be positively correlated with time outdoors, hobbies and childcare in an Irish sample (Lades et al., 2020).

Social well-being also seems affected by the pandemic. For example, the previously mentioned study by Graham & Eloff (2022) reported a decline in social well-being and in perceived abilities to contribute to society and social relationships since the start of the pandemic. A longitudinal study on students' mental health and social networks before and after the outbreak found a decrease in social interactions and an increase in loneliness during the pandemic, which suggests a decline in social well-being due to the lack of communal connection that loneliness entails (Elmer et al., 2020).The experience of social well-being also requires social contact, which a systematic review on social patterns before and during the pandemic has shown to have declined from 7-26 social contacts pre-pandemic to 2-5 per day during the pandemic (Liu et al., 2021). This suggests that the possibility to experience social well-being was inhibited due to the decrease in physical social interaction during the lockdown and remains less initiated than before the pandemic.

When it comes to the impact of the pandemic on psychological well-being, an exploratory study on students six months into the pandemic found a decrease in measures of social-psychological well-being compared to pre-pandemic levels (Nyunt et al., 2021). Graham & Eloff's (2022) aforementioned study on students also measured a decline in psychological well-being from 2019 to 2021. Additionally, Elemo et al. (2022) found flourishing to be negatively influenced by a lack of sense of control over one's life during the timespan of the pandemic, while a study on employee flourishing during COVID-19 showed that flourishing was stifled by parental stress and lack of autonomy in scheduling one's work time (Srinivasan & Sulur Nachimuthu, 2022). These findings highlight the inhibiting effect of a lack of autonomy and control on flourishing during the pandemic, which are key aspects of psychological well-being and demonstrate its decline (Ryff & Keyes, 1995).

All mentioned findings on the three mental well-being components show that there was an overall decrease in the flourishing components, emotional, social and psychological well-being, during the pandemic compared to pre-pandemic measures. However, prior research on this topic mainly consists of cross-sectional and longitudinal quantitative data. This leaves a gap in the picture of how flourishing under the circumstances of a global pandemic might be experienced and described on an individual level. Thus, the current study will examine qualitative data on the experiences of flourishing before and during the COVID-19 pandemic.

One way to explore qualitative reports of the experience of psychological states is through linguistic analysis (Pennebaker et al., 2015). A frequently used tool for such analyses is the Linguistic Inquiry and Word Count (LIWC), a program that analyses texts through categorization of the individual words (Pennebaker et al., 2015). Pennebaker et al. (2003) suggested that people's word choice can be a measure for determining their mental, social, and physical state. It was also suggested that positive emotion words in a person's language use can predict mental well-being, while LIWC is also designed to capture certain aspects of emotional, social and psychological states through its dictionary categories (Pennebaker et al., 1997). Within LIWC2015's repertoire of dictionaries, the categories "affect", "social", "occupation" and "leisure" represent the three well-being components in some or all of their core aspects, which makes them fitting to use in the linguistic analysis of this study (Pennebaker et al., 1997; 2015).

Within the context of COVID-19, LIWC has been utilized in research to analyse social media posts for changes in language use of extraverts and introverts, identify changes in expression of affective states during the pandemic and to detect language markers for depression before and during the pandemic (Johannßen et al., 2022, Zhang et al., 2021; Vine et al., 2020). Nonetheless, there is no research on the language used to describe the experience of all three well-being components, or flourishing. Previous research comparing the experience of flourishing before and during the pandemic using a qualitative approach showed no differences in the reported characteristics of flourishing (Hauschke, 2021; Holschneider, 2021; Perk, 2021). However, these studies utilized manually conducted content analysis with self-made coding schemes, that might still have been influenced by subjective views of what content fits each code (Hauschke, 2021; Holschneider, 2021; Perk, 2021). Therefore, it would be interesting to elaborate on the findings from this previous research by focusing on the linguistic aspect of the flourishing definitions, using LIWC2015 as an automatic, time-efficient, and unbiased tool. This enables a reliable analysis of flourishing definitions, with a specific focus on the mention of emotional, social and psychological well-being through the use of LIWC2015's fitting dictionary categories. Additionally, the comparison of language use before and during the pandemic offers insights into whether any of these aspects were described as less or more important to the flourishing experience by the onset or long-term stress of the pandemic.

Consequently, the overall aim of this study is to use linguistic text analysis to detect changes in language use related to emotional, social and psychological well-being within the definitions of flourishing between timepoints before, at the start, and a year after the onset of

the pandemic. It can be expected that pre-pandemic measures of all well-being-related language use show a higher frequency compared to the other years, as the components are all equally relevant in producing flourishing on average and there were no universal inhibiting factors to flourishing at this time (Keyes, 2002). For the timepoint of the initial outbreak, a lower mention of all well-being aspects can be expected, as various research above has shown that this period had a negative impact on mental health and all three well-being areas. For the timepoint a year after the outbreak, a lower mention of social well-being compared to the other two aspects can be expected, as the long-term inhibition of social contact at the time made the experience of social well-being harder to attain and possibly less frequent and relevant to flourishing (Liu et al., 2021).

Methods

Design

The study employed a repeated cross-sectional design with three different samples across three timepoints. Qualitative data from an online questionnaire was analyzed by means of linguistic analysis. Data collection took place over a span of three weeks each in April 2019, April 2020 and April 2021. The qualitative data sample contained one response to the two open questions from each participant, given at one of the three timepoints. The research was approved by the Ethics Committee of the University of Twente (ethical numbers 190320 and 210168).

Participants and Procedure

Recruitment of participants was done using the convenience sampling method for all timepoints. Second- and third-year Psychology Bachelor-students at the University of Twente contacted their social network via social media platforms (i.e. Whatsapp, Instagram, Facebook) and face-to-face interactions. Inclusion criteria entailed a minimum age of 18 and proficiency in the German language, to be able to answer the German questionnaire. Given that the questionnaire was administered online, participants also required access to a stable internet connection and an email address to receive the questionnaire link. Each year, participants received the link to the online questionnaire via email. With the questionnaire, participants received information about the content and requirements of the study and gave informed consent. The available time to answer the open questions was 7 days from the point of receiving the link.

The sample of participants for the year 2019 included a total of 85 responses to the open questions on flourishing, of which two were missing demographical data. For the

remaining 83 responses, the mean age for this sample was 33.51 (*SD*=15.48). Within the

sample for the year 2020, 39 participants gave responses to the open questions on flourishing

and the mean age was 30.33 (*SD*=15.01). In 2021, the sample included 108 respondents with

a mean age of 35.45 (*SD*=16.78). Demographic characteristics for each sample can be seen in

Table 1.

Table 1

Sociodemographic characteristics of the three samples.

	2019		2020		2021	
	N	%	*N*	%	*N*	%
Gender						
Female	38	45.8	24	61.5	73	67.6
Male	45	54.2	15	38.5	35	32.4
Highest educational level						
Secondary	49	59.0	25	64.1	63	58.3
Higher academic	18	21.6	6	15.4	24	22.2
Vocational	13	15.6	8	20.6	11	10.2
Other	3	3.6	0	0.0	10	9.3

One-way ANOVA revealed no significant differences between the three samples for

age, $F(2, 227) = 1.50$, p = 0.226. Chi-square tests of independence showed no differences for

highest level of education ($\chi2(18) = 16.55$, $p = .554$), but revealed significant differences

between samples for gender ($\chi2(2) = 9.36$, $p = .009$), indicating that there were slightly more

male (*N*=45) than female (*N*=38) participants in 2019 compared to 2020 and 2021, but almost

twice the amount of women (*N*=24; *N*=73) compared to men (*N*=15; *N*=35) in 2020 and

2021, compared to 2019.

Materials

The qualitative open questions were identical in 2019, 2020 and 2021 and covered the

topic of flourishing, specifically the participants' defining experiences with flourishing and

the way that they observe the phenomenon in other people that they suspect to be flourishing.

The link to the open questions contained further questionnaires on other topics that were not

included in this study. The first open question was focused on the individuals' behaviours,

emotions and cognitions that they associated with flourishing (*'Flourishing means that you*

*function optimally, as an individual and in relation to others and society. Please describe one
or more situations wherein you flourish. What do you do? What do you feel? What do you
think?'*). The second open question focused on the individuals' observations of flourishing in
other people in their life, whom they assume are flourishing (*'Think about a person who you
believe is representative for a person who is flourishing. Please describe this person. What
makes you believe that this person is flourishing? How does this person act? What does
he/she feel or think?'*). The responses to both questions were combined and analyzed as one
narrative for each participant. At all timepoints, participants were asked to write a response of
150 to 600 words and the questions were asked and answered in German.

For the linguistic analysis, the programme Linguistic Inquiry Word Count, Version
1.0 (LIWC2015, 2015) was used (Pennebaker et al., 2015). LIWC2015 is a text analysis
programme that utilizes word count and categorization to detect underlying psychological
states (Tausczik & Pennebaker, 2014). This programme is fitting because of its integrated set
of dictionaries and the overarching categories that can be detected in various forms of
unstructured text (Pennebaker et al., 2015). For the analysis of emotional, social and
psychological well-being, some of the categories from the German LIWC2001 dictionary
(Wolf et al., 2008) were used in order to capture the German responses, as the version of the
LIWC2015 software used did not have its own built-in German dictionary.

The category *Affect* specifically includes measures of positive and negative emotions,
detecting word-matches for positive feelings and optimism, as well as anxiety, anger and
sadness and therefore incorporates the components of emotional well-being (Tausczik &
Pennebaker, 2014; Joshanloo & Nosratabadi, 2009). The category *Social* categorizes
concepts like communication, references to others, friends, family and humans in general and
therefore detects mentions of relationships in all forms, a basis of the social well-being
component (Tausczik & Pennebaker, 2014; Joshanloo & Nosratabadi, 2009).The categories
Occupation and *Leisure*, detect concepts like school, employment, achievement and leisure
activities, which represent the aspects of personal growth, purpose in life and environmental
mastery within psychological well-being in a professional and private setting (Tausczik &
Pennebaker, 2014; Ryff & Keyes, 1995).

Data Analysis

The qualitative data on flourishing definitions was first extracted from each of the
three years' datasets and converted into a simple text format to make it suitable for linguistic
analysis. Data preparation was done by checking spelling and punctuation. The resulting text
files were analyzed by means of linguistic analysis, performed with the program LIWC2015,

Version 1.0 (Pennebaker et al., 2015). The analysis reported the overall word-count, and the percentage of word matches for all dictionary categories of each of the separate narratives, called segments, within the sample files. To examine language use related to the three well-being categories, the LIWC2015 categories *Affect*, *Social, Occupation* and *Leisure* were applied in the linguistic analysis and resulted in percentages of words matching the categories within the total word count of each narrative-segment for each year. The programme also produced an output of color-coded segments from all words that matched with one of the dictionary categories for each sample file.

The resulting quantitative data of dictionary matches was then processed and analyzed using IBM SPSS Statistics, Version 28.0 (2021). The LIWC2015 dictionary categories were represented in the variables *Affect*, *Social*, *Occupation* and *Leisure*. The data was checked for measurement errors and false data entry, with no indication found as the data was directly extracted from the LIWC output. Thus, all data points were included in the further analysis. To represent the variables in one score for each sample, mean scores were calculated from the respective segments' percentages of dictionary matches. To then detect statistically significant differences in the means of the category matches between the three samples, one-way ANOVAs and post-hoc tests were conducted. The independent variable was the year of data collection and the well-being-related LIWC variables acted as the dependent variables. The assumptions for ANOVA were met in terms of continuous dependent variables and sample independence. For most of the variables, Shapiro-Wilk test indicated that the data was not normally distributed within one or more samples but given the large size of the samples, the high word count of responses and the purpose of the analysis, ANOVA was deemed most appropriate to detect differences between the samples. The assumption of variance was met for all but four of the variables, thus the results for these variables were derived from Welch's ANOVA and Games-Howell post hoc analysis. For all other variables, the one-way ANOVA results were further analyzed using Tukey post-hoc analysis.

Results

Linguistic Analysis

A total of 232 narratives were included in the linguistic analysis in LIWC2015, of which 85 were collected in 2019, 38 were obtained in 2020 and 108 were collected in 2021. Overall, the narratives generally included the respondents' description of activities, interactions and situations that typically lead to flourishing in themselves and others. Within the 2020 and 2021 samples, the COVID-19 pandemic was mentioned a few times in relation

to the restrictions, as they inhibited or promoted certain activities, but these were named as defining factors for flourishing regardless. In the following, the linguistic properties of each sample's narratives will be described, followed by a comparison of the samples to test for differences.

All mentioned defining factors were assigned to the corresponding word categories in LIWC2015. For the 2019 sample, a total of 26.21% of the sample's total word count was assigned to a category by LIWC2015, while 25.46% were assigned within the 2020 sample's responses and 25.63% were assigned within the 2021 sample. A detailed overview of the mean percentages of word-matches of the individual categories and the corresponding sub-categories can be found in Table 2.

Table 2

Individual and total LIWC category matches (% of total word count) found in the narratives for 2019 (N=85), 2020 (N=39) and 2021 (N=108).

		2019 (%) (22885 words)	2020 (%) (9592 words)	2021 (%) (29781 words)	*p*
Affect		7.44	7.77	7.48	.732*
	Positive emotion	6.33	6.74	6.30	.501*
	Positive feeling	1.38	1.30	1.23	.669*
	Optimism	1.10	0.81	0.89	.109*
	Negative emotion	1.10	1.03	1.18	.696*
	Anxiety	0.25	0.27	0.26	.946*
	Anger	0.09	0.10	0.07	.563*
	Sadness	0.37	0.24	0.33	.338*
Social		9.55	9.60	9.92	.633*
	Communication	1.70	1.46	1.76	.374*
	Reference to others	5.50	5.97	5.93	.464*
	Friends	0.87	0.86	0.85	.979*
	Family	0.59	0.40	0.41	.152*
	Humans	2.02	1.92	1.92	.841*
Occupation		**7.30**	6.28	**6.18**	**.003***
	School	**1.00**	0.75	**0.65**	**.019***
	Job	**3.32**	**2.53**	2.98	**.036***
	Achieve	**4.13**	3.88	**3.31**	**.004***
Leisure		1.92	1.81	2.05	.589*
	Home	1.01	0.97	1.00	.970*
	Sports	0.49	0.58	0.64	.369*
	Television	0.15	0.08	0.17	.203*
	Music	0.27	0.20	0.26	.765*

* *p* < 0.05.

Affect

As detected by LIWC2015, the overall percentages for the emotional well-being related category *Affect* were highest in 2020 (7.77%), followed by 2021 (7.48%) and 2019 as the lowest-scoring sample (7.44%). Most of the words matched to the category all fell under a sub-category, with only the word "aroused" being solely matched to *Affect*. Example word matches for *Positive emotion* were "positive, fun, gratitude, harmonious", while *Positive feelings* and *Optimism* matched words like "love, feeling, happiness, affection" and "trust, self-assured, better, safe", respectively. Examples for *Negative emotion* were "strange, uncomfortable, wrong, mistake", showing word matches like "worries, stress, uncertainty" for *Anxiety*, "argument, complaining, injustice, suppressed" for *Anger* and "doubt, hopelessness, alone, disappointed" for *Sadness*. An example of a sentence with multiple word-matches within this category was: "I often feel uncomfortable at first because I have to get out of my comfort zone to interact with strangers. […] However, once I talked to the person and explained the directions, as far as I know them, it's a great feeling."

Social

The percentages for the category *Social*, related to social well-being, were highest in 2021 (9.92%), lower in 2020 (9.6%) and lowest in 2019 (9.55%). For the main category, only the word "playing" did not match any sub-categories. The word matches for *Communication* included words like "discussion, conversation, contact, calling" and *Reference to others* included "someone, individual, child, they". The sub-category *Friends* matched words like "friend, couple, colleague, neighbour", while examples for *Family* were "partner, mother, father, daughter, son" and *Humans* matched words like "person, people, adult". An example sentence with predominantly *Social*-related word matches was: "For example, when I meet my girlfriend or my best friends or even just talk to them on the phone, it usually makes me feel good. When I talk on the phone with a friend, we always come up with funny ideas that we absolutely have to do, which almost always gives me motivation. "

Occupation

The first category related to psychological well-being, *Occupation*, measured the highest percentage in 2019 (7.3%), followed by 2020 (6.28%) and the lowest in 2021 (6.18%). All main category matches also fit a sub-category. An example for word matches for *School* was "busy, study, training, learning, expectations, volunteering", while *Job* matched words like "groups, promotion, dedication, money, company". Matches for *Achieve* included words like "performance, work, success, competence, challenging, improving". A sentence that represents this category well was: "She is always busy (work, studies, voluntary

work) and manages her everyday life very well. [...] In addition to her studies, she has now
started training as a nurse in order to make a contribution to society."

Leisure

The second psychological well-being related category, *Leisure*, measured the highest
percentage in 2021 (2.05%), followed by 2019 (1.92%) and a slightly lower score in 2020
(1.81%). There were no word matches that only fit the main category. Examples of word
matches for *Home* were "living, chores, everyday life, purpose" and *Sports* matched "team
sports, playing, movement, workout, physical activity". The sub-category *TV* matched "film,
video games, shows", while *Music* matched "recording, band, singing, instruments, dancing".
An example sentence of word-matches for this category was: "He plays three different
instruments, reads about one book a week, goes to the gym regularly and is learning
programming in order to have better job prospects after his studies." Words from this
category were often mentioned together with words matching the *Occupation* category.

Comparison of the samples

To investigate whether language use related to the three well-being components
within the flourishing definitions was different between the three samples, a one-way
ANOVA was conducted to compare all category-matches. The mean percentages from the
LIWC analysis for all main and sub-categories were used for this comparison. The main
categories *Affect*, *Social* and *Leisure* and each of its sub-categories showed no statistically
significant differences in mean percentages between the samples. For the main category
Occupation and all corresponding sub-categories, *School, Job* and *Achieve,* statistically
significant differences were shown (see Table 2).

To further inspect the group differences for *Occupation*, Tukey post hoc analysis was
conducted and showed that the 2019 sample was higher in occupation-related dictionary
matches than the 2021 sample, with a significant difference of 1.12, 95% CI [.33, 1.91], *p* =
.03. For *Job*, the test showed that job-related dictionary matches were higher in 2019 than in
2020 by a significant difference of .79, 95% CI [.06, 1.51], *p* = .03. Games-Howell post hoc
analysis for the sub-category *School* showed that school-related dictionary matches were
higher in 2019 than 2021, with a significant difference of .35, 95% CI [.06, .63], *p* =.013. For
Achieve, the test showed that achievement-related matches were higher in 2019 compared to
2021 by a significant difference of .82, 95% CI [.25, 1.4], p = .003. The overall differences in
percentages between samples are visualized in Figure 2.

These results indicate that there were no significant differences in language use
related to emotional, social and an aspect of psychological well-being between the three

samples, contradicting previous expectations about these aspects being mentioned less often
in 2020 and 2021 than in 2019. The results also indicate a lower mention of the aspect
occupation in 2020 and 2021, compared to 2019. This is partly in line with the expected
lower frequency of words related to psychological well-being in 2020 and 2021, but as this
aspect does not represent psychological well-being fully, it does not meet the expectation
completely.

Figure 2

Bar chart of the mean percentages of dictionary matches of each main variable by year.
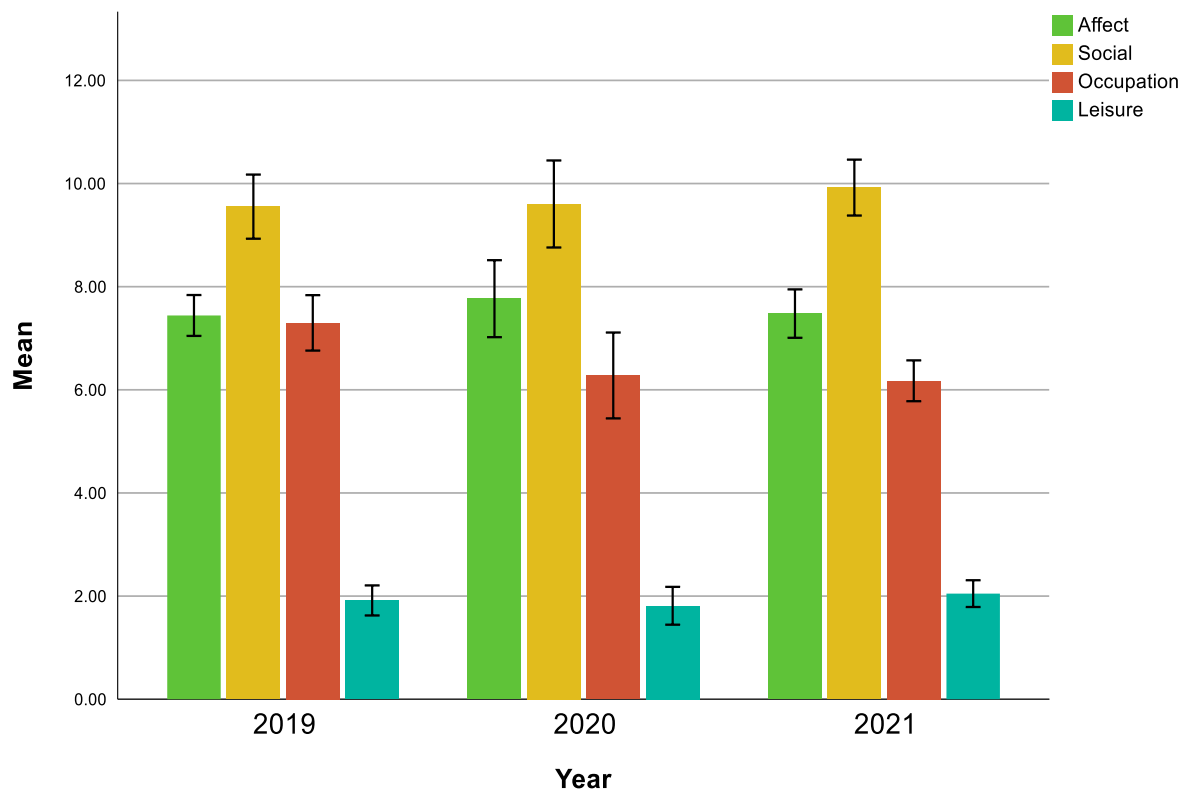
Discussion

The aim of this study was to examine definitions of flourishing from timepoints
before, at the start and a year into the COVID-19 pandemic to detect changes in language use
related to emotional, social and psychological well-being. The results showed that the
average layperson's definition of flourishing is quite stable and not greatly affected by major
events such as the COVID-19 pandemic, as there were no significant differences in language
use related to the three components across the samples. Only the topic of occupation, related
to psychological well-being, was mentioned significantly less often during the pandemic than
it was in 2019. This dividing result within one single well-being component also

demonstrated that the theory of three components of flourishing was represented well by the
measurement instruments of LIWC2015 in some aspects but was less accurate in others.

Main Findings

There were no significant differences in language use related to emotional, social, and
partially to psychological well-being between the timepoints before and during the pandemic,
making the layperson definitions of flourishing quite robust despite the adversity of the
pandemic. A possible explanation of this lack of differences between the years could be
found in previous research by Schotanus-Dijkstra et al. (2015), which showed that negative
life events were not associated with flourishing. The COVID-19 pandemic came with
multiple negative consequences like loss, restrictions of personal freedom and a decrease in
well-being and therefore can be regarded a negative life event (Pfefferbaum & North, 2020;
Graham & Eloff, 2022). The current findings reflect the lack of connection between this
negative life event and flourishing, showing little noticeable differences in flourishing
definitions, regardless of the timepoint before or during the pandemic. Additionally, previous
studies using the same data as this study to compare flourishing definitions found similar
results through qualitative content analysis. Hauschke (2021) and Holschneider (2021)
concluded that there was no variation in the content of flourishing definitions between the
2019 and 2020 samples, while Perk (2021) also described no differences in definitions
between 2019, 2020 and 2021. The current study's findings support this observation from a
new angle, namely under the aspect of language use. This analysis approach solidified the
robustness of flourishing definitions that qualitative non-automatic content analysis already
suggested, as it showed that automatically observed linguistic patterns of these definitions
also show little differences.

Occupation, including the topics school, achievement and employment, was the only
aspect of psychological well-being that showed differences and was mentioned less often
during the pandemic than before its outbreak. This finding points to a lower relevance of
these topics within the definitions of flourishing during the pandemic, compared to 2019. To
contextualize the decreased relevance of the first topic, employment, within the flourishing
definitions, one could look at the COVID-19 restrictions imposed in Germany. As various
public venues and businesses were shut down at different points throughout the pandemic, a
total of 117,000 persons became unemployed in 2020 alone (Bauer & Weber, 2020). Thus,
mention of work could have been lower during the pandemic because of this general decrease
in employment rates. Additionally, loss of work has been linked to decreased mental health
and life satisfaction, possibly inhibiting flourishing rather than acting as a defining factor

(VanderWeele, 2017). In the case of employed participants, a 2020 study on university workers showed that exposure to COVID-19 was independently associated with high work exhaustion (Evanoff et al., 2020). This may have led to less mention of employment in relation to flourishing in the current study, as work was perceived as more exhausting during the pandemic, which potentially inhibited flourishing rather than contributing to it (Evanoff et al., 2020).

Further, an explanation for the decreased mention of the second occupation-related topic, school, may be found in the changes in educational practices since the first lockdown. Given the restrictions on physical contact, educational institutions made a transition to online education at the start of the pandemic, drastically changing the usual learning environment for students (Huber, 2021). This transition was observed to be a challenge for both students and teaching staff, rather than grounds for thriving and mental well-being, therefore possibly decreasing the relevance of the topic of school to the experience of flourishing (Huber, 2021; Duraku & Hoxha, 2020). Additionally, the transition of education and added stress of the pandemic has been shown to impact student mental health, leading to less capacity for academic achievement through completing coursework, exams, and even entire semesters (Plakhotnik et al., 2021). As academic success is a commonly desired achievement, along with job promotions and work-related goals, the decrease of relevance of school and employment for flourishing could simultaneously explain the decreased mentioning of the third occupation-related topic, achievement, within the definitions.

When comparing the findings to those of the previously mentioned qualitative studies, the decrease in mention of occupation-related topics within the flourishing definitions shows contradictions with their results, as these studies generally demonstrated little differences in the relevance of psychological well-being between the samples (Holschneider, 2021; Perk 2021). Additionally, Hauschke (2021) specifically identified work as a defining aspect of flourishing but also found no significant differences in its mention throughout the years. Seeing as the current study reflected differences in terms of language use rather than content, it offers a new perspective into this exploration that may not have been possible to detect with non-automatic content analysis. Given the qualitative studies' use of self-made coding schemes, decision making could have been influenced by subjective views on which content fits each well-being category (Hauschke, 2021; Holschneider, 2021; Perk, 2021). The current study's linguistic analysis of the flourishing definitions, using a pre-developed and repeatedly improved dictionary and an un-biased automatic tool, possibly allowed for more sensitivity towards the occupation-related content than the content analysis offered and therefore seems

to have detected small differences that the previous studies could not observe (Pennebaker et al., 2015).

In addition to these findings, LIWC2015 was also used to detect changes in all well-being components simultaneously for the first time within this study. This allowed for observation of how well the tool itself and the theory used for selecting the well-being related dictionary categories worked when detecting words related to the well-being components. Applying the theory of three components of well-being within the linguistic analysis showed that the selected LIWC dictionary categories covered some components accurately, while other aspects were missing from the analysis. The LIWC categories represented the emotional and social components quite accurately in the analysis by detecting positive and negative emotions (e.g. fun, love, affection, uncomfortable, stress, uncertainty), as well as aspects of communication and all common partners and domains for social interaction (e.g. conversation, contact, friend, partner, mother, colleague). Nonetheless, certain aspects of the scientific definition of these components were not detected in the data, for example for the mention of "contribution to society". According to Keyes (1998), this is a clear aspect of social well-being, but the LIWC analysis did not categorize this formulation to be related to the social category. This suggests that the affect category can be used to linguistically analyse for Keyes' (1998) theory of well-being components quite well, while the social category seems limited to detecting specific social interactions and partners but fails to measure descriptions of broader topics like contribution to society.

Additionally, the component of psychological well-being was only partially represented through the respective LIWC categories, as there were no further applicable ones available in the German LIWC2001 dictionary (Wolf et al., 2008). The selected categories measured the defining concepts purpose in life (e.g. success, purpose), personal growth (e.g. challenging, improving) and environmental mastery (e.g. performance, competence) fittingly (Ryff & Keyes, 1995). Nonetheless, self-acceptance, positive relations with others and autonomy were not specifically measured within these categories and were therefore not represented in the measures for psychological well-being. The mention of positive relations in particular was more frequently attributed to the social category (e.g. friend, partner), but was actually just as applicable to psychological well-being, showing that these categories could not be applied to the fitting components perfectly. This ultimately suggests that the German LIWC2001 dictionary is limited to measuring only certain aspects of psychological well-being linguistically and that the current study's findings must be considered only for the

measured aspects. Therefore, the findings' implication for insights on psychological well-being as a whole is limited in this sense.

Strengths and Limitations

A major strength of the current study was its focus on linguistic analysis and the use of LIWC2015, an expert-developed linguistic analysis tool, allowing for a reliable evaluation of the data (Pennebaker et al., 2015). The focus on the linguistic aspect also allowed for detection of the well-being components without explicit mention of them within the open question, providing a more observational analysis with sensitivity towards the role of each component within the flourishing experience. Each of the well-being components also had at least one corresponding LIWC dictionary category that measured some or all of its defining aspects within language use, offering insight into the exact aspects that differed in frequency between the years. Additionally, the samples' participant ages ranged from young adults to senior citizens and included individuals from all common educational backgrounds, making the study generally representative in terms of age and education level and including perspectives on the experience of flourishing across varying demographic backgrounds.

Nonetheless, some limitations need to be considered within this study. When it comes to the use of the linguistic analysis software, LIWC2015 version 1.0 was used for the analysis, which does not include the German version of the 2015 dictionary in the software's internal dictionary. Instead, the German LIWC2001 dictionary had to be used, which differs from the improved 2015 dictionary in a few categories. This resulted in some aspects of the three mental well-being components not being available for the analysis, like affiliation, risk and reward within the personal concerns category from the LIWC2015 dictionary. These word-topics could have shed more light on the thriving-related experiences of participants, but could not be used.

In terms of the sample's representativeness, the representation of gender can be seen as unequal within the three samples. The 2020 and 2021 samples included almost twice the number of female participants as male participants, which limits comparability between the samples. This makes the findings less generalizable, as previous research has shown that flourishing is not predicted identically for men and women, and this might have influenced the content of the definitions to be more exemplary of female flourishing, rather than representative for the general population (Schotanus-Dijkstra et al., 2015). Further, the differences between samples were measured between three completely independent groups instead of following the same participants over the span of the three years. This could mean that the findings were impacted by each sample's individual composition of participants,

which further limits the comparability between the results for each year. Additionally, the samples were of different sizes between the years, as the 2020 sample (N=39) consisted of less than half the number of participants that the 2021 sample (N=108) included. Even though the internal calculation of percentages within LIWC2015 considered each sample's overall word-count, the linguistic analysis is said to be more reliable the higher the word count of the text at hand (Pennebaker et al., 2015). Therefore, the conditions for the LIWC2015 analysis were less optimal for the 2020 sample than the other samples.

Implications for Future Research

In the future, LIWC2015 can be used as a viable tool to analyse qualitative data related to emotional well-being, as well as certain aspects of social and psychological well-being. It appears to be equally fitting to explore qualitative data as non-automatic qualitative methods, provided the concepts can be measured through existing dictionaries. Replications of this study with German data would benefit from using the newest LIWC2015 version and the built-in German dictionary, as this could offer more well-being-related measurement instruments, more research-focus possibilities and especially a more detailed and representative look into the psychological well-being component. These implications could also motivate further development of new LIWC dictionaries that are specifically focused on the three well-being components or other theories of well-being, as the linguistic markers for these concepts can be conveniently derived from qualitative data on flourishing.

More generally, future research on differences in language use could offer more concrete insights into the changes over time if the same group would be observed for all timepoints. This way, the analysis could account for baseline linguistic markers and detect changes across the other timepoints from there, making the differences between years more comparable. Gender should also be considered as a possible confounding variable and, in the case of an unequally representative sample, should be controlled for to preserve the generalizability of findings. In case of a continuation of between-groups comparison of this study's data, an additional sample representing definitions of flourishing in post-pandemic times could be added to detect possible changes after life reverted back to pre-pandemic standards. This would provide an opportunity to see whether certain aspects of flourishing became more relevant after having been less accessible due to the lockdown, like social interactions. Additionally, a simultaneous observation of how many people within the samples are flourishing could offer interesting insights into whether definitions change or remain robust regardless of differences or stability in the prevalence of flourishing among the

samples. All these measures could offer fascinating future insights on the topic of language use, flourishing and COVID-19.

Conclusion

In conclusion, this study offered a novel perspective into the language used within definitions of flourishing before and during the COVID-19 pandemic. A detailed view of the experience of flourishing, both under ordinary circumstances and a global pandemic, showed that the defining aspects of flourishing do not seem to differ greatly in relevance of emotional, social and psychological well-being. The only difference measured was a slightly lower mention of occupation-related topics during the pandemic, suggesting lower relevance of this aspect of psychological well-being. Overall, this study demonstrates a stable consistency of flourishing definitions regardless of global crises and offers new grounds for further use of automatic analysis of qualitative data through LIWC and its expandable potential for measuring well-being related concepts.

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