




# Good Personality and Subjective Well-Being During the COVID-19 Pandemic: A Three-Wave Longitudinal Study in Chinese Contexts

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## Abstract

Numerous studies have emphasized the importance of examining psychological distress during the COVID-19 pandemic. It is important to identify the factors that affect the influence of COVID-19 on people's mental health. The present research was a three-wave longitudinal study ( $N=1495$ ) examining the concurrent and prospective relations of good personality with subjective well-being during the COVID-19 pandemic. Results showed that good personality positively predicted the subsequent well-being after controlling for the respective autoregressive effects and Big Five personality traits. Specifically, individuals who scored higher on measures of good personality tended to maintain higher well-being in the face of COVID-19. However, subjective well-being could positively predict subsequent personality only at the first time point. In addition, the prospective effect of good personality on subjective well-being was greater than the reverse effect. These findings support the opinion that as a positive value orientation in personality, good personality has a significant positive impact on the response to the pandemic situation.

**Keywords** Good personality · Subjective well-being · COVID-19 · Longitudinal study · Cross-lagged analysis

## 1 Introduction

From the psychological perspective, the pandemic of COVID-19 has a significant impact on people's mental health (Counted et al., 2020; Gubler et al., 2021; Wang et al., 2021). Numerous studies have emphasized the importance of considering psychological distress

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during pandemics (Yıldırım & Güler, 2021). Personality, as a stable disposition that reflects unique differences in individuals' cognition, behavior, and emotion, determines an individual's mindset and behavior in response to a life-threatening crisis. Individual differences may help explain why some people are more susceptible to psychological distress when experiencing the COVID-19 pandemic, while others are not (Liu et al., 2021; Nikčević et al., 2021; Zettler et al., 2022). Therefore, it is necessary to investigate the influence of personality factors on people's mental health during the pandemic (Rossi et al., 2021).

Although there has been a great deal of research examining the effect of personality on mental health under the COVID-19 pandemic, some gaps remain. First, most studies examining the influence of COVID-19 on mental health concerned only the early stages or the most serious stage of the pandemic (e.g., Zacher & Rudolph, 2021). By contrast, little is known about the effects of the pandemic when it has been under control. Second, although studies have been conducted to explore the relationship between personality and mental health during the COVID-19 pandemic, most of them concerned a broad set of faceted personality traits (e.g., Anglim & Horwood, 2021; Aschwanden et al., 2021; Modersitzki et al., 2021) or identified what kind of people experienced more negative psychological consequences to the COVID-19 pandemic (e.g., Kroencke et al., 2020). As researchers advocated for paying attention to the fusion of positive psychology and psychological approaches in addressing the pandemic (Waters et al., 2021), understanding how positive personality traits work on mental health and whether a positive personality plays a role on the change of well-being during the COVID-19 pandemic have practical implications for learning to cope with negative events. Moreover, exploring the combinative influence of personality and life events on well-being may provide a strong empirical finding for assessing the theoretical interaction of personality and environment (Anglim & Horwood, 2021). Thus, the present study attempts to provide some evidence that a good personality (GP), which represents a positive disposition of moral character (Jiao et al., 2021), is an effective predictor of people's well-being during the COVID-19 pandemic. Specifically, we sought to assess whether GP characters influence people's subjective well-being (SWB).

## 1.1 Good Personality and Subjective Well-Being

GP, also called virtuous or kindness personality, refers to a positive disposition of moral character (Jiao et al., 2019). It is an individual's inherent positive psychological character developed by the interaction of heredity and environment with social and moral evaluation significance. GP, which reflects the light or beneficent sides of human nature (Jiao et al., 2019, 2021), encompasses four virtuous dimensions, namely, conscientiousness and integrity, altruism and dedication, benevolence and amicability, and tolerance and magnanimity. GP systematically integrates the positive traits with typical moral characteristics. Evidence from the previous studies suggested that GP is related to dimensions of the HEXACO personality model, but can predict prosocial behavior beyond them, indicating the moral uniqueness of GP in the personality domain (Jiao, 2021). Since moral character traits are distinctive from other non-moral traits in basic personality (e.g., the five-factor or the HEXACO), it is necessary to investigate moral character in a targeted and specific way (Helzer et al., 2014). Therefore, this study focused on the important role of GP during the COVID-19 pandemic.

Many researchers have explored the connection between personality traits and mental health, found that personality traits and similar variables have noteworthy effects on positive mental health (Strickhouser et al., 2017), and speculated that personality may be one

of the strongest factors influencing well-being (DeNeve & Cooper, 1998; Strickhouser et al., 2017). Previous studies have obtained evidence of the robust relationship between personality and SWB. For example, relevant research suggests that individuals with higher Extraversion, Agreeableness, Conscientiousness, Openness to Experience, and lower Neuroticism experience more life satisfaction, a higher frequency of positive affect (PA), and a lower frequency of negative affect (NA; DeNeve & Cooper, 1998; Steel et al., 2008). Furthermore, longitudinal evidence has indicated that personality (e.g., Agreeableness, Conscientiousness, and Neuroticism) and well-being can prospectively predict each other's changes (Soto, 2015).

Previous studies have also found that GP characteristics are facilitators of individuals' SWB. For example, it has been found that a light personality significantly predicts individuals' self-transcendence value and life satisfaction (Kaufman et al., 2019). As a component of GP character, honesty is negatively correlated with some of the Symptom Checklist-90 (SCL-90, a questionnaire used to assess people's general psychological symptoms) factors, suggesting that this personality trait is beneficial for individuals maintaining physical and mental health (Cui & Wang, 2005). Furthermore, previous studies on the Junzi personality (referring to the ideal personality in Confucianism) found that people with higher levels of Junzi personality have a functionally positive psychological state and interpersonal relationships (Ge, 2020; Ge & Hou, 2021).

A higher level of GP may contribute to increased SWB in several ways. On the one hand, people with high GP might possess specific capacities, mindsets, and qualities necessary for a healthy and happy life. For example, upregulating implicit PA can facilitate individuals' recovery from negative threat-exposed events (Quirin et al., 2011). Individuals with high GP traits possess stronger implicit affect regulation ability, can increase their implicit PA more effectively and can quickly repair their affects automatically after NA is induced (Javaras et al., 2012; Sun et al., 2019). Moreover, kind people have greater self-control capacity (Ge & Hou, 2021), which is positively related to affective well-being, life satisfaction, and positive emotions (Hofmann et al., 2014; King & Gaerlan, 2014; Tangney et al., 2004). Furthermore, people with higher GP demonstrate more optimism and resilience (Ge & Hou, 2021; O'Brien et al., 2021; Sharpe et al., 2011) and show more adaptive coping (Volk et al., 2021). These positive psychological capitals have protective functions, which help individuals reduce their death anxiety and stress when facing the COVID-19 pandemic and thereby maintain higher happiness and mental health (Yıldırım & Güler, 2021). In addition, people believe they are moral, and this belief plays an integral role in the construction of personality identity (De Freitas et al., 2018; Stanley et al., 2019). Therefore, highly kind individuals experience higher self-consistency, thus helping them have fewer mental health problems (Wang & Cui, 2007).

On the other hand, GP characters may also influence a person's SWB through behaviors and the corresponding outcomes during the pandemic. Individuals with higher levels of GP characters and prosocial orientation tend to engage in more prosocial behaviors, such as donating to others (e.g., Ferguson et al., 2019), cooperating (e.g., Hilbig et al., 2014; Thielmann et al., 2020), helping strangers and volunteering (e.g., Kislyakov & Shmeleva, 2021), which in turn can promote individuals' well-being (Aknin et al., 2013, 2015; Dunn et al., 2008, 2014; Lyubomirsky et al., 2005; Thoits & Hewitt, 2001). Furthermore, researchers have also found an association between individuals' personality traits and their behavioral responses during the pandemic period. Higher conscientiousness and agreeableness are related to taking more preventive actions to avoid contracting COVID-19 (Aschwanden et al., 2021), which may ease people's anxiety and NA in the face of stressful events. In

summary, these indirect effects of personality traits on behaviors may help explain why kind individuals generally experience greater happiness.

In the face of the threat of COVID-19, exploring the triggered psychological changes and their influencing factors can help to prevent mental illness in a more effective way (Feinstein et al., 2020). In addition, major catastrophic events that affect national stability and livelihood security may cause social stress reactions, triggering a series of negative derivative behaviors. Moreover, personality is an endogenous factor and plays a fundamental role in promoting mental health, having a healthy personality plays an important role in this situation. Therefore, it is imperative to investigate the influence of GP on individuals' SWB.

## 1.2 Overview of the Present Research

According to the findings of the existing studies mentioned previously, we proposed that individuals with a higher level of GP characters experienced higher SWB during the COVID-19 pandemic. The present research was conducted to test hypotheses about the concurrent and prospective relations between GP and SWB during the COVID-19 pandemic. Although not the core questions primarily explored in this study, it is also important to model the reverse effect (i.e., the relationship between SWB in one period and GP in the following periods). This association would also support the upward spirals of personality and SWB that were found in previous studies (e.g., Soto, 2015). Longitudinal data used in this study were collected from the online platform between February and July 2020 in China. During this period, there were three stages of COVID-19: outbreak (February), peak (March), and steady control (July). We expected to find that GP may display the function of helping people overcome the psychological difficulties brought about by COVID-19; in this regard, people with a higher GP would tend to experience higher levels of SWB. The use of a longitudinal design coupled with a cross-lagged analysis can further increase our confidence in the temporal order underlying the association between GP and SWB. All items for the study are available in the supplemental materials. The study has not been preregistered.

## 2 Method

### 2.1 Measures

#### 2.1.1 Good Personality

Participants were asked to rate themselves on twelve traits that were used to describe a person's GP (Jiao et al., 2019, 2021), such as being *benevolent*, *compassionate*, and *trustworthy*. A 5-point Likert-type response format (1 = *strongly disagree* to 5 = *strongly agree*) was used for this questionnaire. Items were averaged to create the score of GP. Cronbach's  $\alpha$  of the measurement at three occasions was 0.88, 0.88, and 0.87, respectively. In the present study, using the robust maximum likelihood estimator (MLR), confirmatory factor analysis showed that the model with one second-order factor and four first-order factors had a good fit across three measurement waves:  $\chi^2(50) = 177.50-287.46$ , comparative fit index (CFI) = 0.94–0.95, Tucker–Lewis index (TLI) = 0.91 to 0.94, root mean square

error of approximation (RMSEA)=0.051–0.056, standardized root mean square residual (SRMR)=0.037–0.040.

### 2.1.2 Subjective Well-Being (SWB)

SWB was a compound measure calculated by the scores of happiness, PA, and NA. Happiness was used to measure the cognitive component of SWB, which reflects people's subjective evaluation of their lives (Schimmack et al., 2008), as previous studies did (e.g., Gutiérrez-Cobo et al., 2021). Thinking about the goodness of life may reflect one's life evaluation and judgment (Steptoe et al., 2015). Therefore, in the current study, participants were asked to rate the extent of happiness they thought about their lives over the last two weeks on a scale of 1 (very *unhappy*) to 10 (very *happy*). PA and NA were measured to represent the affective component of SWB (c.f. Aknin et al., 2013; Lucas et al., 1996). Participants were asked to rate the frequency of 10 terms that represent positive and negative affect they generally feel in the last five days from 1 (*never*) to 5 (*always*). Items were selected from the PANAS scale (Watson et al., 1988) and from emotional reactions that might occur during pandemics (e.g., *upset*, *scared*, *anxious*). There were 4 positive emotions and 6 negative emotions. The Cronbach's  $\alpha$  coefficients of the PA measurement in the three waves were 0.83, 0.84, and 0.85, respectively, and the  $\alpha$  coefficients of the NA measurement were 0.86, 0.87, and 0.89, respectively. In the current study, PA and NA scores were computed by averaging their respective items. Then, happiness, PA, and NA scores were standardized separately. Finally, a composite score for SWB was calculated by adding happiness with PA and then subtracting NA (Bauger et al., 2021).

### 2.1.3 Big Five Personality

To explore whether the relationship between GP and SWB is robust and not redundant with the relationship between broad personality traits and SWB, in the analysis, we included the Big Five factors of personality as additional control variables in the process of personality predicting well-being. Big Five traits were measured by the 20-Item Mini-IPIP (Donnellan et al., 2006) at T1. Items were rated on a 5-point scale (1 = strongly disagree, 5 = strongly agree) with Cronbach's  $\alpha$  of 0.68 (Extraversion), 0.61 (Agreeableness), 0.60 (Conscientiousness), 0.67 (Neuroticism), and 0.65 (Intellect/Imagination).

## 2.2 Participants and Procedure

The present study was part of a more extensive project that was conducted during the COVID-19 pandemic. Data from the project were already used by Shi et al. (2020) to examine the characteristics and fluctuations of college students' values. In this study, however, we focus on the relationship between GP and happiness. No overlap is shared in terms of data. Data were collected through an online questionnaire survey platform called Creator of Data and Model (Credamo, [www.credamo.com/#/](http://www.credamo.com/#/)), which is a reliable Chinese data-collection platform and has been used by many researchers (e.g., Dong et al., 2021; Gong et al., 2020; Huang & Sengupta, 2020). Three measurement occasions were involved. Participants were first surveyed in February 2020 (T1), which was

the early stage of the severe outbreak of COVID-19. The second survey was conducted in March 2020 (T2), when the COVID-19 pandemic was initially controlled in China, and the third measurement occasion was in July 2020 (T3), when the COVID-19 pandemic was under steady control in China. At each measurement occasion, participants were required to fill out the informed consent form and would receive RMB 10 (approximately \$1.50) as a reward after completing the survey. Demographic information was collected at the first occasion.

One thousand four hundred and ninety-five participants (887 males, mean age = 27.78,  $SD = 7.30$  years, four participants did not report their ages) completed the measurement at T1. Among them, 1187 participants responded at T2 (79.40% of T1 sample), and 973 participants were recruited at T3 (65.08% of T1 sample). Data matching was achieved via the ID names registered by participants on the Credamo platform. Table 1 provides a detailed report on the demographics of the sample.

### 2.3 Analysis

First, the demographics and psychological characteristics of the participants were analyzed. Pearson correlations were used to test the associations between the variables. ANOVA, chi-square tests, descriptive analyses, and correlation analyses were conducted by SPSS 25.0.

**Table 1** Sample demographic characteristics in the study

Characteristics	Total	
	<i>n</i>	%
<i>Gender</i>		
Male	887	59.33
Female	608	40.67
<i>Residence</i>		
Urban	1120	74.92
Rural	375	25.08
<i>Education background</i>		
Primary or below	10	0.67
Secondary/technical	234	15.65
Junior college	368	24.62
Bachelor	794	53.11
Master or above	89	5.95
<i>Monthly income</i>		
2000 yuan and below	48	3.21
2001–5000 yuan	248	16.59
5001–10,000 yuan	543	36.32
10,001–20,000 yuan	445	29.77
20,001–30,000 yuan	155	10.37
30,001 yuan and above	56	3.75
	<i>M ± SD</i>	
Subjective social class (1–10)	5.34 ± 1.57	
Age	27.78 ± 7.30	

Second, to explore the relationships between GP and SWB, we fit a three-wave cross-lagged panel model to the longitudinal data in Mplus 8.3 (Muthén & Muthén, 2017). The cross-lagged panel model contains both autoregressive paths that reflect the stability of each variable over time and cross-lagged paths that reflect the relationships between variables over time (Wang et al., 2021). Big Five personality and demographics were entered as covariates in formal data analyses to adjust for potential confounding influences. The model fit indices used included the comparative fit indices (CFI), the Tucker–Lewis Index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). CFI and TLI values of  $\geq 0.95$ , RMSEA with a value  $\leq 0.06$ , and SRMR with a value of  $\leq 0.08$  are considered a good fit (Hu & Bentler, 1999).

Results of the Kolmogorov–Smirnov test and the Shapiro–Wilk test showed that the distributions of variables of interest deviated significantly from normality ( $ps < 0.001$ ). However, considering the sensitivity of the significance test to large samples, we further examined the skewness and kurtosis of GP and SWB at three occasions, as well as the shapes of their distributions. The skewness values ranged from  $-1.02$  to  $-0.31$ , and the kurtosis values fell between  $0$  and  $1.40$ . Inspection of the histograms further indicated that these variables were slight to moderate non-normal (skew  $< 2$ , kurtosis  $< 7$ ; Finney & DiStefano, 2013). Due to the violation of normality, outliers were checked for GP and SWB at three occasions. We used box plots to detect univariate outliers and Mahalanobis distance to check multivariate outliers (Tabachnick & Fidell, 2019). Only one case was identified as both multivariate and univariate outliers. Follow-up analyses were conducted separately with the case included and removed, but no substantial differences were found in the results. Therefore, we only report the results obtained when the case was kept. To handle the non-normal data, we used bootstrapping procedure in model estimation, which allows to correctly estimate effects in non-normal data (Finney & DiStefano, 2013). The number of bootstrapped samples was 5000 as previous researchers suggested (Preacher & Hayes, 2008).

## 3 Results

### 3.1 Attrition Analyses

We conducted ANOVA and a chi-square test on the primary study variables and demographics to examine whether there were systematic differences between the participants who continued and those who dropped out in the study. We found significant differences in gender ( $\chi^2 = 9.09$ ,  $df = 1$ ,  $p = 0.003$ ), residence ( $\chi^2 = 37.71$ ,  $df = 1$ ,  $p < 0.001$ ), education ( $\chi^2 = 61.30$ ,  $df = 4$ ,  $p < 0.001$ ), monthly income ( $\chi^2 = 16.70$ ,  $df = 5$ ,  $p = 0.01$ ), subjective social class [ $F(1, 1493) = 20.00$ ,  $p < 0.001$ ], and age [ $F(1, 1493) = 18.17$ ,  $p < 0.001$ ]. In contrast, stayers and nonstayers did not show differences in baseline SWB [ $F(1, 1493) = 0.11$ ,  $p = 0.75$ ], or GP [ $F(1, 1493) = 0.001$ ,  $p = 0.98$ ]. To avoid the possible impacts of the biases in the demographic variables due to attrition on model estimates, the full information maximum likelihood (FIML) estimator was used in this study. FIML is an efficient technique for addressing missing values (Allison, 2003; Lee & Shi, 2021), and has been used in a variety of longitudinal studies with similar rates and amount of missing data (e.g., Liekefett et al., 2021; Luijten et al., 2022; Santos &

**Table 2** Correlations among variables across three waves

Variables	$\alpha$	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. T1 GP	.88	1															
2. T1 SWB	-.29***	1															
3. T2 GP	.88	.62***	1														
4. T2 SWB	-.29***	.61***	.40***	1													
5. T3 GP	.87	.58***	.24***	.69***	1												
6. T3 SWB	-.29***	.53***	.20***	.69***	.44***	1											
7. E	.68	.22***	.15***	.20***	.21***	.21***	1										
8. A	.61	.48***	.23***	.36***	.21***	.39***	.39***	1									
9. C	.60	.39***	.33***	.31***	.32***	.30***	.32***	.26***	1								
10. N	.67	-.30***	-.59***	-.28***	-.52***	-.30***	-.50***	-.30***	-.49***	1							
11. I	.65	.22***	.14***	.22***	.15***	.24***	.15***	.31***	.40***	.37***	1						
12. Gender	-.01	.03	.02	.02	.01	.02	.02	.05	-.04	-.04	-.06*	1					
13. Age	-.13***	.03	.14***	.13***	.13***	.15***	.19***	.05*	.10***	.22***	-.16***	.04	1				
14. Education	-.07**	.03	-.02	-.02	.01	-.00	.06	.08**	.13***	.17***	-.14***	.23***	-.06*	1			
15. Social class	-.18***	.22***	.21***	.21***	.25***	.23***	.28***	.22***	.21***	.23***	-.28***	.20***	.16***	.28***	1		
16. Residence	-.07**	-.02	-.03	-.03	-.03	-.03	-.10**	-.10***	-.13***	-.15***	.10***	-.11***	.06*	-.23***	-.25***	1	
17. Monthly income	-.12***	.06*	.07*	.07*	.11***	.08*	.17***	.16***	.17***	.18***	-.16***	.19***	.06*	.13***	.33***	.34***	1

GP = good personality; SWB = subjective well-being, E = Extraversion; A = Agreeableness; C = Conscientiousness; N = Neuroticism; I = Intellect/Imagination. Gender: 0 = female, 1 = male. Education: 1 = Primary or below, 2 = Secondary/technical, 3 = Junior college, 4 = Bachelor, 5 = Master or above. Residence: 0 = Urban, 1 = Rural. Monthly income: 1 = 2,000 yuan and below, 2 = 2,001–5,000 yuan, 3 = 5,001–10,000 yuan, 4 = 10,001–20,000 yuan, 5 = 20,001–30,000 yuan, 6 = 30,001 yuan and above. Social class: Perceived subjective social class on a scale from 1 to 10 \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$



Grossmann, 2021). FIML utilizes all available information to estimate model parameters, including information from cases with incomplete data (Enders & Bandalos, 2001; Ferro, 2014). Therefore, all the 1,495 participants were included in the analyses.

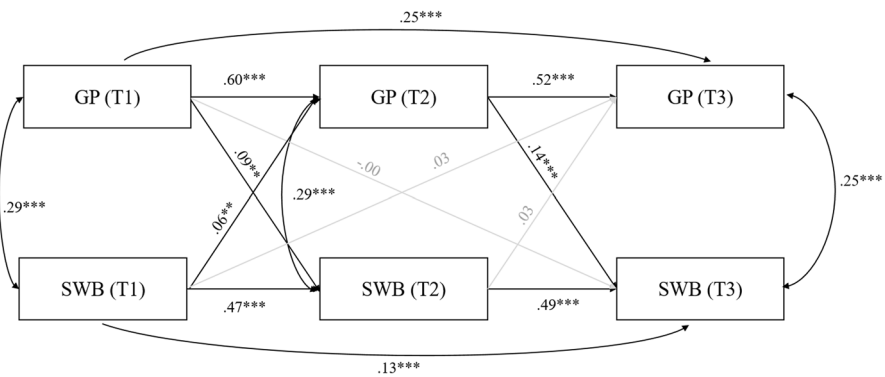
### 3.2 Descriptive Analyses

Table 2 shows the correlations among GP and SWB at each time point. The results showed that rank-order stability was moderate for GP (*r*s ranging between 0.58 and 0.69, *p*s < 0.001) and SWB (*r*s ranging between 0.53 and 0.69, *p*s < 0.001), across measurement occasions. GP was significantly positively correlated with SWB in terms of concurrent and prospective relationships (*r*s ranging between 0.29 and 0.44, *p*s < 0.001).

### 3.3 Longitudinal Cross-Lagged Analyses

Longitudinal cross-lagged analyses were conducted to examine the bidirectional relationships between GP and SWB in the structural model shown in Fig. 1. Fit indices showed that the model fit the data well,  $\chi^2(10) = 28.94, p = 0.001, CFI = 0.99, TLI = 0.96, RMSEA = 0.04, 90\% CI [0.021, 0.051], SRMR = 0.01$ . The standardized path coefficients are also presented in Fig. 1.

Results indicated that all autoregressive paths and first-order cross-lagged pathways from GP to SWB were significant. Specifically, after controlling the Big Five traits and demographic variables, current GP levels positively predicted future SWB levels for adjacent time points ( $\beta_{T1GP \rightarrow T2SWB} = 0.09, SE_{T1GP \rightarrow T2SWB} = 0.03, p < 0.01$ ;  $\beta_{T2GP \rightarrow T3SWB} = 0.14, SE_{T2GP \rightarrow T3SWB} = 0.04, p < 0.001$ ), while the second-order cross-lagged path from GP at T1 to SWB at T3 was not significant ( $\beta_{T1GP \rightarrow T3SWB} = -0.00, SE_{T1GP \rightarrow T3SWB} = 0.04, p = 0.94$ ). On the other hand, the impact of SWB on GP was dynamic over time. Only T1 SWB positively predicted T2 GP ( $\beta_{T1SWB \rightarrow T2GP} = 0.06, SE_{T1SWB \rightarrow T2GP} = 0.02, p < 0.01$ ), whereas GP at T3 was not associated with SWB at T2 ( $\beta_{T2SWB \rightarrow T3GP} = 0.03, SE_{T2SWB \rightarrow T3GP} = 0.03,$



**Fig. 1** The cross-lagged model with bidirectional effects between good personality and SWB across three waves. All pathways are standardized coefficients. To present the results more concisely, the effects of covariates are not shown in the figure. The single arrowed lines are predictive relationships, double-arrowed lines are correlations; significant paths are displayed as black lines; insignificant paths are displayed as gray lines. All coefficients represent standardized values. GP = good personality; SWB = subjective well-being \*\**p* < .01. \*\*\**p* < .001.

$p=0.30$ ). Furthermore, the second-order cross-lagged effect from SWB to GP was not significant ( $\beta_{T1SWB \rightarrow T3GP}=0.03$ ,  $SE_{T1SWB \rightarrow T3GP}=0.03$ ,  $p=0.27$ ).

Moreover, to statistically examine whether the effects of GP on SWB significantly differed from the effects of SWB on GP, we constrained the first-order cross-lagged effects between GP and SWB to be equal in each time interval (i.e., Time 1 to Time 2 and Time 2 to Time 3, respectively), yielding two more restrictive models. In Model 1a, the paths from GP at Time 1 to SWB at Time 2 and from SWB at Time 1 to GP at Time 2 were set to be equal, while in Model 1b, the equality constraints were imposed on the paths from GP at Time 2 to SWB at Time 3 and from SWB at Time 2 to GP at Time 3. Compared with the unconstrained model, the two models fit the data significantly worse. For Model 1a,  $\Delta\chi^2=9.87$ ,  $\Delta df=1$ ,  $p<0.01$ ; for Model 1b,  $\Delta\chi^2=19.22$ ,  $\Delta df=1$ ,  $p<0.001$ . Therefore, in both time intervals, the cross-lagged effects from GP to SWB were significantly stronger than the reversed cross-lagged effects.

## 4 Discussion

This study investigated the long-term relationship between GP characters and SWB during the COVID-19 pandemic and highlighted the important role of GP as a predictor of individuals' well-being. First, GP was positively correlated with SWB across the three waves. Second, consistent with previous research establishing associations between positive personality and well-being (DeNeve & Cooper, 1998; Soto, 2015; Steel et al., 2008), the cross-lagged analysis showed that after controlling for demographics and the influence of Big Five personality, higher current levels of GP were associated with higher SWB levels at a later time point, while only SWB at T1 positively predicted GP at T2.

### 4.1 GP and SWB Under the COVID-19

The outbreak of the COVID-19 pandemic has brought about many negative effects, which are detrimental to people's mental health. The serious nature of the situation induced people's death anxiety, depression, mental illness, and higher NA, accompanied by a decrease in life satisfaction and PA (Anglim & Horwood, 2021; Kroencke et al., 2020; Wang et al., 2021; Zhang et al., 2020). How did positive personality work when people responded to the pandemic? This study provides some empirical evidence for this question. The finding that GP predicted SWB suggests that not everyone was equally affected by COVID-19, and people with higher GP tended to be happier and less susceptible to pandemic influences. In other words, even though changes in life events influence people's happiness (Luhmann et al., 2012), a positive personality plays a very important role in this process.

The cross-lagged effects of GP on SWB are meaningful. First, the cross-lagged effects of GP on SWB are practically important, though the standardized path coefficients appear to be small ( $\beta_s=0.09$  and  $0.14$ ). The cross-lagged effects are usually not large due to controlling for stability effects (Adachi & Willoughby, 2015; Orth et al., 2022). Based on such considerations, Orth et al. (2022) specifically proposed benchmark values for properly interpreting the size of cross-lagged effects, which are standardized coefficients of 0.03 (small effect), 0.07 (medium effect), and 0.12 (large effect). Accordingly, the effects of GP on the subsequent SWB could be interpreted as a medium to large effect and a large effect, respectively. Considering that these cross-lagged effects were additionally controlled for the general personality factors (i.e., Big Five factors), it can be speculated that the GP was

indeed a meaningful predictor of individuals' SWB. Second, even a small prospective effect may become additive and generate a cumulative impact over time (Adachi & Willoughby, 2015; Soto, 2015). The prospective effect of GP on SWB was based on data over several months. Whereas over several years or longer, the effect may add, then GP may have a cumulative impact on SWB. Moreover, since a high level of well-being is extremely important for individuals' mental health in the pandemic of COVID-19, even a small change may bring great meaning.

One psychological mechanism underlying the relation between GP and SWB may be the self-determination theory (SDT; Deci & Ryan, 2000), which argues that facilitating the satisfaction of psychological needs can contribute to the enhancement of well-being. Specifically, people with high GP may tend to act in a way that fosters the satisfaction of competence, relatedness, and especially, the need for the autonomy to conduct kindness as they are inclined to do, which may facilitate individuals' well-being (Baumeister & Leary, 1995; Dunn et al., 2014; Hui and Kogan, 2018; Martela and Ryan, 2016). Moreover, researchers have proposed a new concept of moral need as the basic psychological needs, which refers to subjective "feeling or experience that one is a moral" (Prentice et al., 2019, pp. 499). GP may be a vital personality factor that contributes to satisfying the moral need, resulting in the enhancement of human well-being (Jayawickreme et al., 2020; Prentice et al., 2019, 2020). In addition, people with high GP may experience high social mindfulness, which enhances positive interpersonal relationships and thus can promote well-being (Van Doesum et al., 2020).

Furthermore, we also conducted a comparison between the effects of T1 GP on T2 SWB and T2 GP on T3 SWB, the model which constrained these paths were equal did not show a significantly worse fit,  $\Delta\chi^2=1.48$ ,  $\Delta df=1$ ,  $p>0.05$ . Although these effects were not significantly different, it seems that the cross-lagged effect of GP on SWB became stronger over time ( $\beta_{T2GP \rightarrow T3SWB}=0.14$  versus  $\beta_{T1GP \rightarrow T2SWB}=0.09$ ), which may be due to the *personality-dampening effect of strong situations* (Cooper & Withey, 2009) on the individuals in personality-situation interactions. The theory illustrates that when situations are strong and have powerful effects, personality may be less influential (Beatty et al., 2001; Mischel, 1977). The pandemic occurred suddenly and spread rapidly, and its impact on people was so great that it led to a diffusion of anxiety, depression, and negative emotions throughout society. The situation was so strong that even people with a higher level of good personality may experience a negative shock to their cognition and emotion, resulting in a low SWB in consequence. However, once the pandemic started to ease, which could be considered a weakened situation, the positive effect of personality (positively predicting SWB) appeared to be more pronounced during the subsequent coping process (T2  $\rightarrow$  T3). This also implies that the impact of GP on SWB may be influenced by (and even depend on) changes in circumstances or life events.

The current study has several implications for the study of personality and well-being. GP concerned in this study is a kind of positive personality, and personality psychologists argue that people consistently exhibit varying degrees of good and evil patterns in their thoughts, feelings, and behaviors, which can be partly attributed to personality traits associated with ethical, moral, and socially desirable (or aversive) beliefs and behaviors (Kaufman et al., 2019; Moshagen et al., 2018). This kind of personality may have an impact on individuals' well-being; for example, researchers found that kindness was associated with improvements in happiness and well-being (Jasielska, 2020; Shillington et al., 2021). Moreover, research on GP contributes to the understanding of the positive and growth-oriented side of human nature (de la Iglesia & Solano, 2018; Maslow, 1962; Peterson & Seligman, 2004), and the results in the current study also provide support for this claim.

In addition, this study also found that the effect of GP on SWB was larger than the effect of SWB on GP, which is an extension of previous studies on the bidirectional relationship between personality and well-being.

Furthermore, the current results revealed the hopeful role of GP in a real social emergency event and showed that GP can help to improve individuals' positive psychological coping in the face of a suffering situation (i.e., the COVID-19 pandemic in this study), which challenges their mental health (Galea et al., 2020; Kroencke et al., 2020), even when we control for general personality effects. This finding has important application value for the healthy development of individuals and society. Researchers claim that we need to comprehend the individual differences in personality in the face of environmental changes, because these periods that reflect social discontinuity are more likely to provide situational cues that help people identify the impact and functions of personality traits in general (Caspi & Moffitt, 1993; Kroencke et al., 2020). The Accentuation Hypothesis states that in novel and uncertain circumstances, personality can best predict peoples' behavior (Caspi & Moffitt, 1993). Hence, GP may be an effective dispositional factor that increases individuals' happiness in daily life and experience. Moreover, increasing people's happiness and well-being is an important goal for the positive psychology (Gable & Haidt, 2005; Sheldon & Lyubomirsky, 2004), and the finding of this study is a complement to previous explorations of the relationship between positive factors and well-being (e.g., Bono et al., 2020; Schutte & Malouff, 2019; Tan et al., 2021). Furthermore, Waters et al. (2021) proposed that positive psychological elements may play three roles during COVID-19: buffering for mental health disorders, bolstering mental health, and building factors that enhance future mental health. The current study provides supporting evidence that GP, as a positive personality construct, served a bolstering role by increasing SWB from the beginning of the COVID-19 pandemic to the stage when it was steadily controlled.

## 4.2 Limitations and Future Directions

There are several limitations of the current study. First, assessments before the pandemic were not included: Since the first few days of COVID were the most stressful period for people, measuring variables both pre- and post-COVID may help to clarify the effect of COVID as a strong situation in the relationship between personality and well-being (Anglim & Horwood, 2021). In addition, although we controlled participants' age, gender, residence, monthly income, and subjective social class, some other factors may also influence the outcomes (e.g., whether someone close to the individual was infected or the severity of the COVID-19 pandemic in the area in which the individual was living). Future research could examine how GP interacts with these factors caused by the pandemic to affect individuals' well-being.

Second, there were still some limitations of the measurements. Regarding to the SWB, happiness in this study was measured by a single-item scale, which may lead to a lower reliability value compared to the multi-item measures (Ock, 2020). Moreover, we did not collect comprehensive measures of subjective well-being, such as life satisfaction and psychological adjustment (e.g., self-esteem). Using multiple methods to measure well-being is advocated by researchers in the positive psychology field (Aknin et al., 2013; Diener et al., 2003; Hui et al., 2020). In addition, due to the distinctiveness between frequency and intensity of the affective component of SWB (e.g., Diener et al., 1991; Garcia & Erlandsson,

2011), there may also be different association patterns in the relationship between GP and SWB when measuring the affective component in different forms. We recommend future research to replicate and extend our findings with more fine-grained measures on well-being indices. Furthermore, regarding personality, we measured the Big Five personality with the Mini-IPIP, which, given its length and breadth, showed a relatively lower internal consistency in the current study, which may affect the effectiveness of using the Big Five personality as a control variable. Future research can use longer and more reliable measures for the Big Five personality (e.g., the 60-item BFI-2; Zhang et al., 2022) when testing the functions of GP.

Third, the limitations for generalizability also need to be addressed. Specifically, there were differences in some demographic variables between completers and dropouts in the study. This may result in a narrower sample and less generalizable results. Besides, the concept and measurement of GP in the study were based on Chinese culture and the study was conducted in China, so the results should be extended to broader samples and replicated in other cultures.

Moreover, the COVID-19 pandemic is still spreading globally and threatening people's lives, and it will obviously continue to have an impact on individuals and society in the future. Hence, an interesting question is whether GP will continue to play a role in predicting individual happiness or whether the facilitating effect of GP on happiness will accumulate or cease over time. Furthermore, researchers have found that not only can changes in personality traits predict well-being, but also changes in well-being can predict personality changes (Soto, 2015). Therefore, it would be important to discover and explore the far-reaching effects of changes in individuals' GP traits on changes in well-being.

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**Data Availability** The data will be made available upon reasonable request.

## Declarations

**Conflict of interest** No conflict of interest exists in the submission of this manuscript, and manuscript is approved by all authors for publication.

**Ethical Approval** The study was approved by the Institutional Review Board of the Faculty of Psychology, BNU.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

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